Expanding the Framework of Safe Withdrawal Rates

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Basics of Safe Withdrawal Rates

- Fundamental client questions:
  - How much can I safely spend from this portfolio without needing to worry about the markets?
  - If I want to spend $XXX, how much money do I need in the account to safely retire?

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Linear Projections & Safe Spending

- Case example:
  - 60-year-old retiree for 30-year retirement
  - Inflation assumed to be 3%
  - 60% stocks, 40% bonds (rebalanced annually)
  - Stocks assumed to earn 10% (real 7%)
  - Bonds assumed to earn 5% (real 2%)
  - Average portfolio return 8% (real 5%)
  - Initial portfolio of $1,000,000

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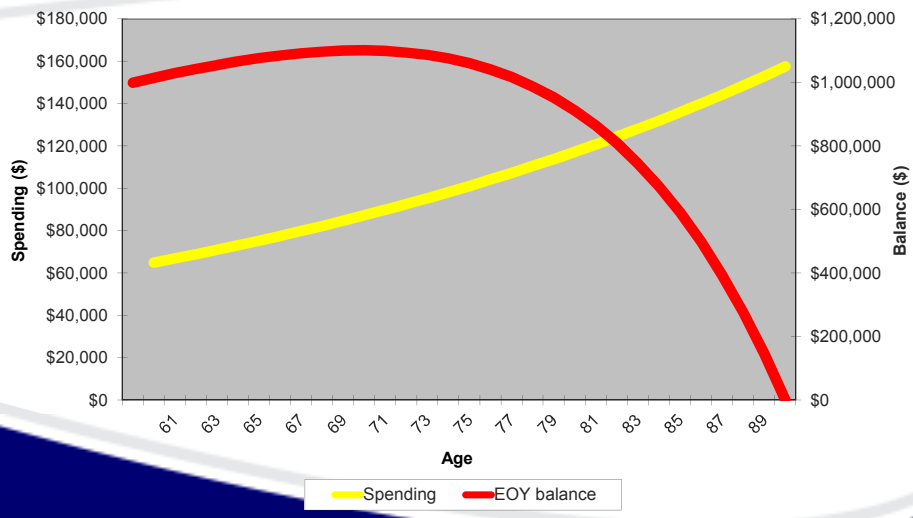
Linear Projections & Safe Spending



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Linear Projections & Safe Spending

Year	Initial Balance	Portfolio Growth	Portfolio Withdrawal	End of Year Balance
1	$1,000,000	$80,000	($65,895)	$1,014,105
2	$1,014,105	$81,128	($67,872)	$1,027,362
3	$1,027,362	$82,189	($69,908)	$1,039,643
4	$1,039,643	$83,171	($72,005)	$1,050,810
5	$1,050,810	$84,065	($74,165)	$1,060,709
6	$1,060,709	$84,857	($76,390)	$1,069,176
7	$1,069,176	$85,534	($78,682)	$1,076,028
8	$1,076,028	$86,082	($81,042)	$1,081,068
9	$1,081,068	$86,485	($83,474)	$1,084,080
10	$1,084,080	$86,726	($85,978)	$1,084,828
11	$1,084,828	$86,786	($88,557)	$1,083,057
12	$1,083,057	$86,645	($91,214)	$1,078,488
13	$1,078,488	$86,279	($93,950)	$1,070,817
14	$1,070,817	$85,665	($96,769)	$1,059,714
15	$1,059,714	$84,777	($99,672)	$1,044,819
16	$1,044,819	$83,586	($102,662)	$1,025,742
17	$1,025,742	$82,059	($105,742)	$1,002,060
18	$1,002,060	$80,165	($108,914)	$973,311
19	$973,311	$77,865	($112,181)	$938,994
20	$938,994	$75,120	($115,547)	$898,567
21	$898,567	$71,885	($119,013)	$851,439
22	$851,439	$68,115	($122,584)	$796,970
23	$796,970	$63,758	($126,261)	$734,466
24	$734,466	$58,757	($130,049)	$663,175
25	$663,175	$53,054	($133,951)	$582,278
26	$582,278	$46,582	($137,969)	$490,891
27	$490,891	$39,271	($142,108)	$388,054
28	$388,054	$31,044	($146,371)	$272,727
29	$272,727	$21,818	($150,763)	$143,783
30	$143,783	$11,503	($155,285)	$0

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Linear Projections & Safe Spending

- Question: How much can be safely spent?
- Answer: $65,895, or about 6.6%
- Is 6.6% the "safe withdrawal rate"?
  - Safe withdrawal rate versus Initial withdrawal rate
- Primary Challenge:
  - Assumes returns are the same each and every year

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Return Sequencing

- Consequences of return sequencing:
  - What happens if the *average* return of stocks is 10%, but the returns vary from year to year?
  - What if the first two years are 0%, and the last two are 20%?
  - What if the first two years are 20%, and the last two are 0%?

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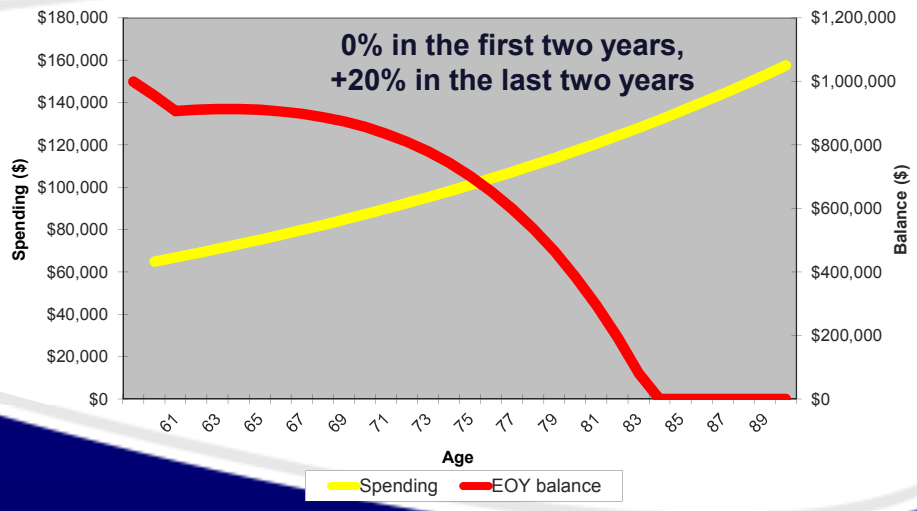
Linear Projections & Safe Spending



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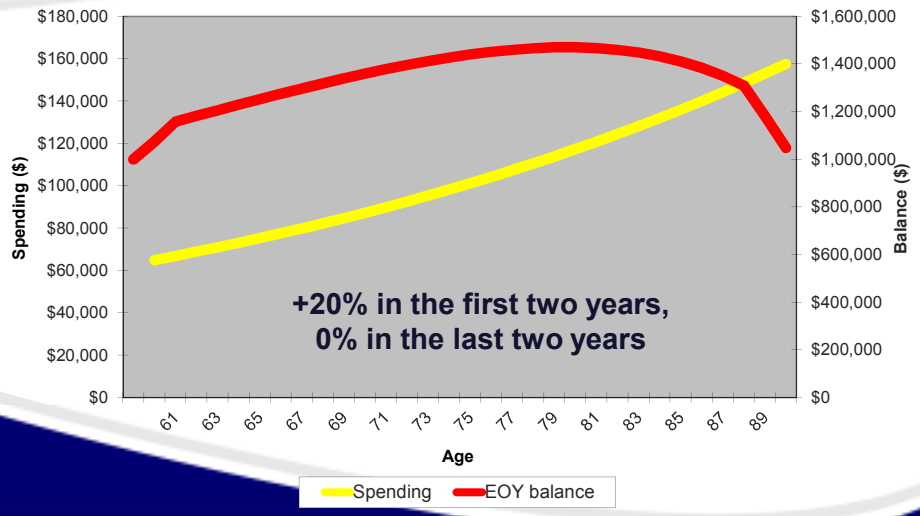

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Return Sequencing

- Consequences of return sequencing:
  - What happens if inflation varies as well?
  - What if inflation is 3.5% instead of only 3%?
    - Funds are extinguished in only 26 years!
  - What if inflation is 2.5% instead of 3%?
    - Funds last for 35 years instead!
  - A 1% fluctuation in inflation can shift a 30-year target by 9 years!

- The combined effect of both can be especially severe…

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Return Sequencing

- Retiree environment from 1969 to 1999
  - Inflation: 5.33%
  - Equities (S&P 500): 13.39% (8.06% real)
  - Bonds (5-year Treas.): 8.62% (3.29% real)
- What is the (linear) safe withdrawal rate?
  - 60% equities, 40% fixed portfolio
  - Average portfolio return: 11.48%

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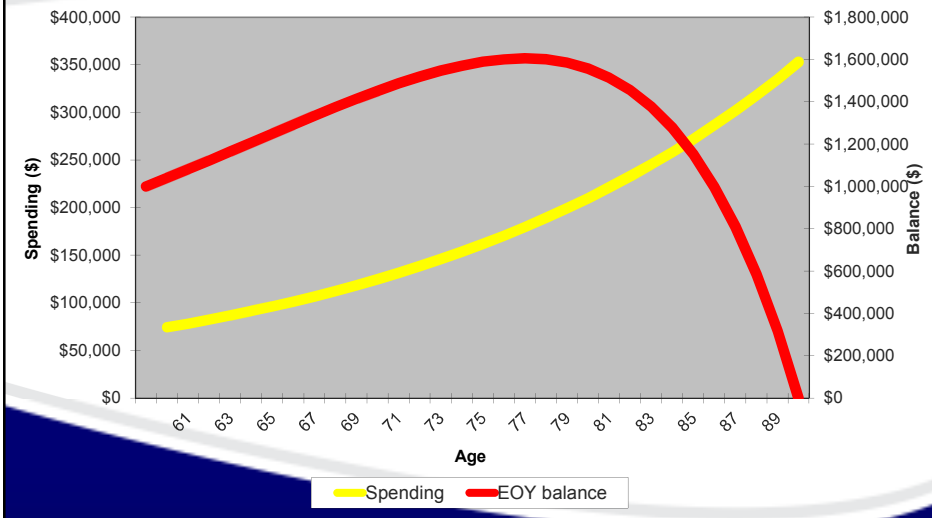

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Linear Projections & Safe Spending

- Question: How much can be safely spent with 1969-1999 returns?
- Answer: $74,308, or about 7.4%!
- What happens when we take into account the order of returns and inflation?

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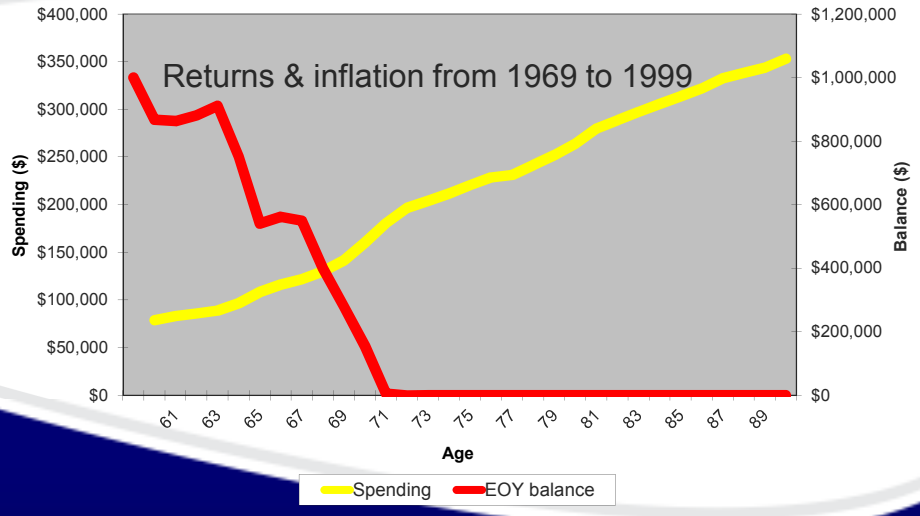
Linear Projections & Safe Spending



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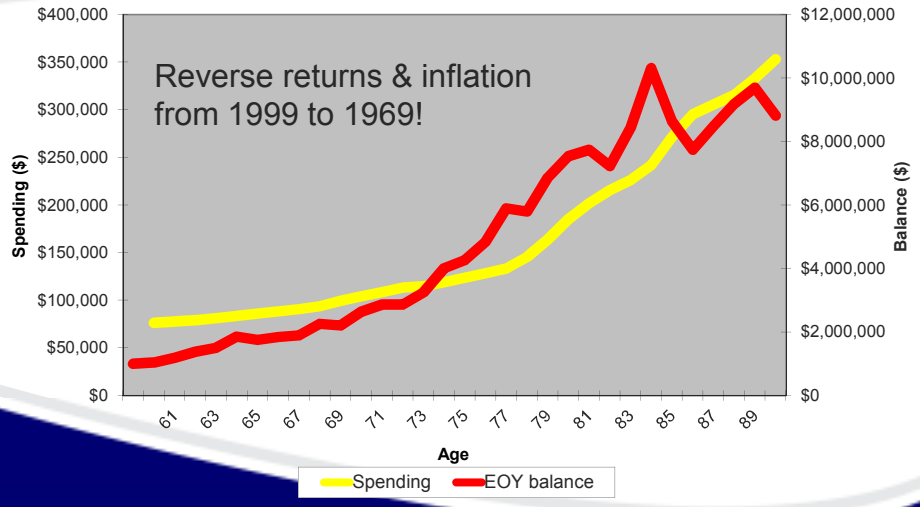

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Return Sequencing

- The sequences of returns matter, a lot!
- Disparities in the early years have a magnified effect over time!
- The extent of volatility matters too!

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Current Research on Safe Withdrawal Rates

- The challenge of safe withdrawal rates:
  - Given the impact of volatility, how much of a “safety margin” is necessary?
  - Given historical market returns, how high of a withdrawal rate would have survived any historical market scenario?
  - What is the optimal portfolio allocation to survive the volatility?
- Research:
  - Determine which portfolio mixes sustained what maximum withdrawal rates over rolling historical time periods or using Monte Carlo analysis

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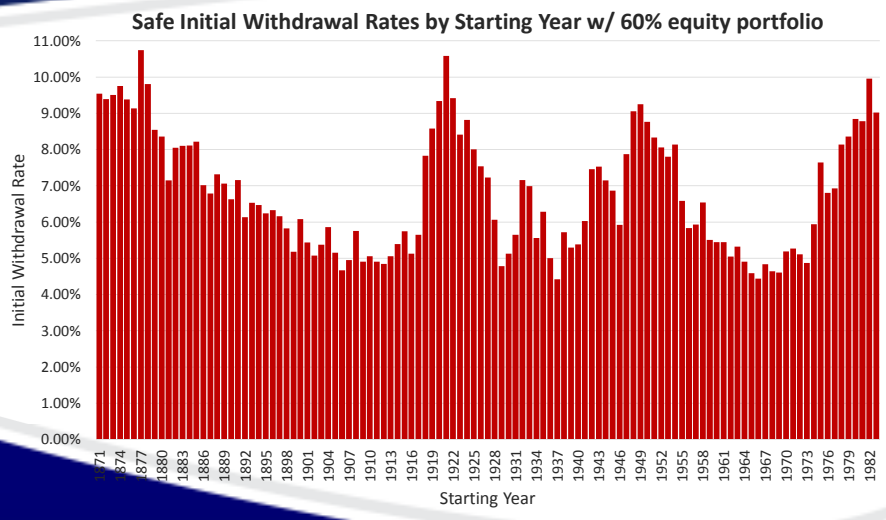
Current Research on Safe Withdrawal Rates



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Current Research on Safe Withdrawal Rates

- The challenge of safe withdrawal rates:
  - Given the impact of volatility, how much of a "safety margin" is necessary?
    - ~2% less than the historical average
  - Given the historical returns of the markets, how high of a withdrawal rate would have survived any historical market scenario?
    - ~4% - 4.5% of the initial account balance
  - What is the optimal portfolio allocation to survive the volatility?
    - ~60% in equities (varying from 40%-70% in some studies)

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Safe Withdrawal Rates

- Adjustments to Safe Withdrawal Rates
  - Fees / Alpha
  - Taxes
  - Time Horizon
  - Diversification
  - Spending Flexibility
  - Risk Tolerance
  - Valuation & Tactical Shifts
  - Legacy/Longevity Hedging

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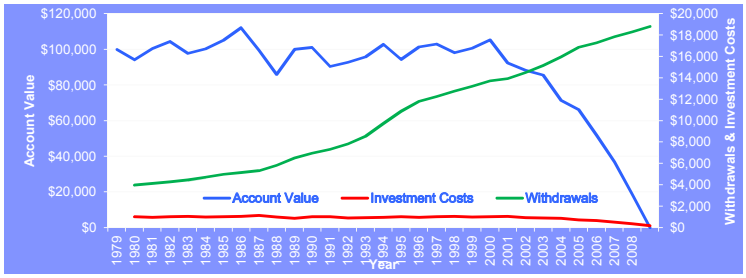
Safe Withdrawal Rates

- Impact of Expenses
  - Safe withdrawal rates are reduced by expense drag
  - Impact is self-mitigating, though



- Pye (2001) found 1% expense translates into 0.5% reduction in SWR
- Kitces (2008) found 40%-45% of cost translates into SWR reduction
  - Impact is reduced to 35% due to impact of taxation

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Safe Withdrawal Rates

- Impact of Taxation
  - Bengen (1996) found taxation reduced SWR by 0.3% to 0.5% on taxable accounts, assuming taxes come directly from account
  - Kitces (2010) found higher reductions with higher dividend and turnover assumptions, especially at higher tax rates. Pye (2001) found similar reductions of reductions as high as approximately 0.8%.

Client Tax Exposure	SWR Reduction
Low Tax	0.25%
Moderate Tax	0.50%
High Tax	0.75%

  - For retirement accounts, tax rate applied directly against gross withdrawal rate – e.g., 20% tax rate on 4% withdrawal reduced to 3.2% for spendable amount

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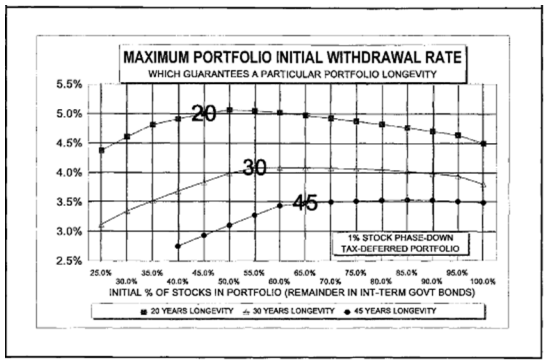
Safe Withdrawal Rates

- Varying Time Horizons
  - Bengen (1996) suggested the safe withdrawal rate rises by approximately 1% over 20-year time horizon; drops by 0.5% over 40+ years



  - Supported by Blanchett (2007) & Pfau (2012)

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Safe Withdrawal Rates

- Greater diversification
  - Original SWR research based on only a two-asset-class portfolio
  - Bengen (1997) suggests small caps raise SWR by 0.2%
  - Cooley, Hubbard, & Walz (2003) shows limited benefit from internationals, but suggest some value
  - Kizer (2005) suggests benefit to international bonds
  - Cassaday (2006) finds significantly higher SWR (as much as 3% more) using real estate and commodities, with caveats

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Safe Withdrawal Rates

- The benefits of spending flexibility
  - Bengen (2001) showed that SWR can increase 10%-15% if clients anticipated later spending declines
  - Guyton & Klinger (2006) showed that flexible spending along the way can sustain 5.2%+ starting SWR
    - Capital preservation rule – withdrawal is reduced by 10% if the current year's withdrawal rate has risen 20%
    - Prosperity rule – withdrawal is increased by 10% if the current year's withdrawal rate has fallen 20%
  - Frank, Mitchell, & Blanchett (2011) suggested probability-of-failure threshold as guardrails

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Safe Withdrawal Rates

- The impact of risk tolerance
  - What if clients are more tolerant of risk of "failure"
    - Risk of failure really equates to risk of adjutsment?
  - Spitzer, Strieter, & Singh (2007) showed clients willing to tolerate 25% probability of "adjustment" could start as high as 5.5% - 6.0% SWR
  - Cooley, Hubbard, & Walz (2007) showed 5%+ SWR for 25% probability of "adjustment"
  - Finke, Pfau, & Williams (2011) showed SWR could rise as high as 7% for clients with high risk tolerance
    - However, this does entail a high "risk" of significant adjustments
    - When is the "safe" withdrawal rate just a starting point for adjustments and not a baseline?

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Safe Withdrawal Rates

- The impact of market valuation
  - Kitces (2008) showed that market valuation has an impact on safe withdrawal rates
    - Suggests higher safe withdrawal rates when retiring at moderate or favorable valuation levels

Rules for adjusting Safe Withdrawal Rates	
P/E10	*Safe withdrawal rate impact*
Above 20.0 "overvalued"	Utilize base safe withdrawal rate of 4.5%
Between 12.0 and 20.0 "fairly valued"	Increase safe withdrawal rate by 0.5% to 5.0%
Below 12.0 "undervalued"	Increase safe withdrawal rate by 1.0% to 5.5%

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Safe Withdrawal Rates

- The impact of annuities
  - Pfau (2011) examined variable annuities with living benefit riders
    - Problems w/ lack of inflation adjustments on income base
    - Costs of guarantees created high likelihood of relying on guarantee, but inferior income to other 'pure' annuities?
    - 'Value' varies as product pricing changes?
  - Ameriks, Veres, & Warshawsky (2001) showed that partial annuitization may increase withdrawal rates
    - But Kitces & Pfau (2013) show that much of annuitization benefit is actually a rising equity glidepath effect?
  - Longevity annuities may help to manage time horizon?

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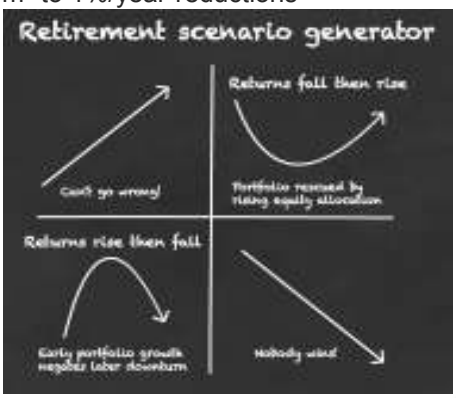
Safe Withdrawal Rates

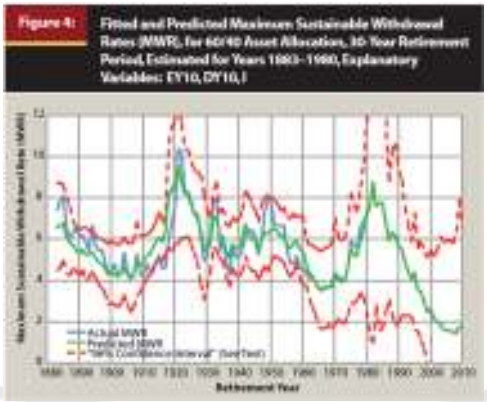
- Tactical Asset Allocation & Glide Paths
  - Is there value to systematically reducing equity exposure over time?
  - Bengen (1996) found "little harm" to 1%/year reductions
  - Blanchett (2007) tested 43 glide paths, found static better than declining glidepath.
  - Pfau & Kitces (2014) found rising equity glidepath may be better than static or declining!
  - Kitces (2009) showed 0.2% withdrawal rate benefit by making tactical valuation adjustments



Source: Monevator blog - http://monevator.com/buy-shares-in-retirement/

Safe Withdrawal Rates

- The impact of interest rates
  - Pfau (2011) extended market valuation work to dividend yield, valuation (earnings yield), and interest rates
    - SWR as low as 2% w/ combined low rates + high valuations?
    - Wide confidence interval due to magnitude of uncertainty



Safe Withdrawal Rates

- Leaving a Legacy
  - Bengen (2006) showed only relatively modest spending reductions required to leave a legacy at end of time horizon
    - 20bps reduction for 100% principal preservation after 30 years
    - May be used as a "safety margin" as well
    - 96% of scenarios leave 100% principal even w/ standard safe withdrawal rate!

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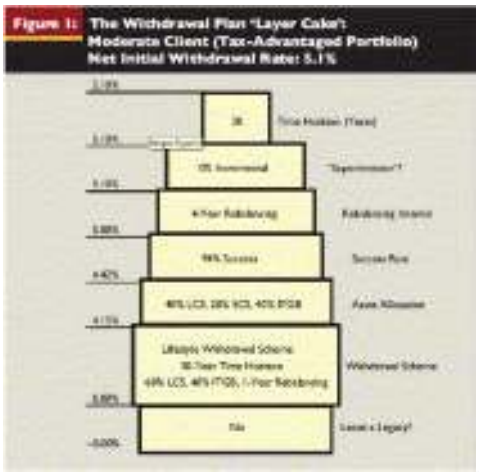
Safe Withdrawal Rates

- Bringing it all together
  - Bengen (2006): Withdrawal rate factors can be stacked to adjust overall SWR
  - May be positive or negative adjustments



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Safe Withdrawal Rates

- Current research summary:

Base Withdrawal Rate	4.0% - 4.5%
Adjustments	
Fees/Alpha	-1% to 1%
Taxes	-0.25% to -0.75%
Legacy/Longevity Hedge	0% to -0.4%
Time Horizon	-0.5% to 1%
Diversification	0.5% to 1%
Spending Flexibility	0% to 1%
Risk Tolerance	0% to 1%
Valuation Environment	0% to 1%
Tactical Asset Allocation	0% to 0.2%
Final Withdrawal Rate	**Sum Total of Adjustments**

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Safe Withdrawal Rates

- Sample scenario:
  - Conservative client couple
  - Pays fees of 1.2%
    - Assuming no alpha creation
  - Moderate tax rate of 15% on capital gains and 25% on ordinary income; all taxable accounts
  - Couple is already late 60s; planning 25-year time horizon
  - Extensive diversification across asset classes

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Safe Withdrawal Rates

- Sample scenario (con't):
  - Couple has some spending flexibility in discretionary expenses if market declines
    - But doesn't want to increase likelihood of spending adjustments even further
  - Valuation environment and interest rates are moderate relative to historical standards
  - Couple is willing to make tactical adjustments to protect against high-risk environments
  - Couple would like to leave at least full principal as legacy (and to serve as safety margin)

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Safe Withdrawal Rates

- Sample client couple scenario:

Base Withdrawal Rate	**4.0%**
Negative Adjustments	
1.2% fees	-0.4%
Moderate Taxes	-0.5%
Legacy/Longevity Hedge	-0.25%
Positive Adjustments	
25-year Time Horizon	0.5%
Significant Diversification	0.75%
Some Spending Flexibility	0.5%
Moderate Valuation/Rates	0.5%
Tactical Asset Allocation	0.2%
Final Withdrawal Rate	**5.3%**

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Safe Withdrawal Rates

- Sample scenario (con't) – adjusting for account types:
  - Available accounts
    - $700,000 taxable
    - $500,000 IRA
    - $100,000 Roth IRA
  - Tax rate assumption: 25%
  - Safe withdrawal rate: 5.3%
    - (Adjusted down from 5.8% for taxes)

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Safe Withdrawal Rates

- Sample scenario (con't) – adjusting for account types:

	Account Value	Gross W/D Rate	Gross Cash Flow	Spendable Cash Flow
Taxable Account	$700,000	5.3%	$37,100	$37,100
IRA	$500,000	5.8%	$29,000	$21,750
Roth	$100,000	5.8%	$5,800	$5,800
Total	**$1,300,000**		**$71,900**	**$64,650**

- Brokerage account is assumed to "pay its own way"
- Taxes netted from gross IRA distribution of $29,000
- Roth is tax-free

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Safe Withdrawal Rates

- Important Caveats
  - Unclear whether all factors are additive
    - May be some interaction effects?
    - Decreasing marginal value of diversification?
    - Diversification impacted by time horizon?
    - Impact of taxes on fees and vice versa?
  - Not all factors have been fully tested
    - The future can always be different?
  - Some clients have materially uneven spending
    - E.g., onset of Social Security for an age-55 retiree?
    - Monte Carlo ultimately necessary for such scenarios

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Safe Withdrawal Rates

- Setting an appropriate baseline

Base Withdrawal Rate	**4.0% - 4.5%**
Adjustments	
Fees/Alpha	-1% to 1%
Taxes	-0.25% to -0.75%
Legacy/Longevity Hedge	0% to -0.4%
Time Horizon	-0.5% to 1%
Diversification	0.5% to 1%
Spending Flexibility	0% to 1%
Risk Tolerance	0% to 1%
Valuation Environment	0% to 1%
Tactical Asset Allocation	0% to 0.2%
Final Withdrawal Rate	**Sum Total of Adjustments**

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Are Safe Withdrawal Rates Still Relevant?

- Is the US special? Variability of SWRs internationally?

Country	SWR	SWR Year	10th Percentile	# Years Worst Case	% 30-yr Failures
Canada	4.42	1969	5.04	30	0.0%
Sweden	4.23	1914	4.92	30	0.0%
Denmark	4.08	1937	4.6	30	0.0%
United States	4.02	1969	4.7	30	0.0%
South Africa	3.84	1937	4.88	27	1.3%
United Kingdom	3.77	1900	4.17	26	3.8%
Australia	3.68	1970	4.91	25	2.5%
Switzerland	3.59	1962	4.08	26	5.0%
The Netherlands	3.36	1941	4.14	22	2.5%
Ireland	3.28	1911	3.41	21	25.0%
Norway	3.13	1915	3.46	20	32.5%
Spain	2.56	1957	3.07	19	36.3%
Italy	1.56	1944	2.61	6	62.5%
Belgium	1.46	1911	1.78	11	40.0%
France	1.25	1943	2.62	7	42.5%
Germany	1.14	1914	1.52	9	25.0%
Japan	0.47	1940	0.54	3	37.5%

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Are Safe Withdrawal Rates Still Relevant?

- What *Real* Returns *Are* SWRs Based Upon?

15-year Real Return	Starting 1907	Starting 1929	Starting 1937	Starting 1966	Avg of Bad Periods	Overall 140-year Avg
Stocks	-1.47%	1.07%	3.45%	-0.13%	**0.73%**	8.39%
Bonds	-0.39%	1.79%	-3.07%	1.08%	**-0.15%**	2.85%
Rebalanced	-0.70%	2.29%	1.23%	0.64%	**0.86%**	6.17%
Inflation	1.64%	1.69%	2.82%	5.38%	**2.88%**	2.23%

- 15-year TIPS… real return almost 0.75%
- 15-year equities…
  - Expected inflation close to current dividend yield
  - 0.73% (real) appreciation = S&P 500 around 2,100 in 2030!?

These results merely *replicate* 4% SWR?

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Are Safe Withdrawal Rates Still Relevant?

- So where do we stand?
  - Clearly in a low return environment
  - Riskier environment doesn't necessarily mean fatal
  - Like walking closer to the edge of the cliff

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Safe Withdrawal Rates

- Summary
  - Safe withdrawal rate research has been expanded significantly over the past 20 years
  - Adjusting factors based on client-specific circumstances can greatly refine recommendations
  - Can be an effective anchor for setting reasonable client expectations
  - Monte Carlo analysis and other tools may still be necessary for further refinement for unusual situations
    - In many situations, though, safe withdrawal rates with adjustments may be more than accurate enough!

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