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An International Perspective on Safe Withdrawal Rates: The Demise of the 4 Percent Rule?

by Wade D. Pfau, Ph.D.

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Executive Summary

- Numerous studies about sustainable withdrawal rates from retirement savings have been published, but they are overwhelmingly based on the same underlying data for U.S. asset returns since 1926.
- From an international perspective, the United States enjoyed a particularly favorable climate for asset returns in the 20th century, and to the extent that the United States may experience mean reversion in the current century, "safe" withdrawal rates may be overstated in many studies.
- This paper explores the issue of sustainable withdrawal rates using 109 years of financial market data for 17 developed market countries in an attempt to provide a broader perspective about safe withdrawal rates, as financial planners and their clients must consider whether they will be comfortable basing decisions on the impressive and perhaps anomalous numbers found in past U.S. data.
- The paper uses a historical simulations approach, considering the perspective of individuals retiring in each year of the historical period. Because the assumed retirement duration is 30 years and the data end with 2008, retirements take place between 1900 and 1979. For each country and in each retirement year, the paper optimizes across the three domestic financial assets, finding the fixed asset allocation that provides the highest sustainable withdrawal rate over the next 30 years, while controlling for a number of other structured assumptions.
- From an international perspective, a 4 percent real withdrawal rate is surprisingly risky. Even with some overly optimistic assumptions, it would have only provided "safety" in 4 of the 17 countries. A fixed asset allocation split evenly between stocks and bonds would have failed at some point in all 17 countries.

For retirement savings that are not annuitized, an important and difficult question for retirees regards finding a safe withdrawal rate that will provide as much retirement income as possible without exhausting their savings. The starting point for advice on this issue in the modern era is Bengen (1994), who famously motivated the 4 percent withdrawal rule using historical simulations. He later coined the term "SAFEMAX" to describe the highest withdrawal rate as a percentage of the account balance at retirement that could be adjusted for inflation in each subsequent year and would allow for at least 30 years of withdrawals during all of the rolling historical periods in his dataset. Several years later, Cooley, Hubbard, and Walz (1998) showed with historical simulation based on the same underlying data that a 4 percent withdrawal rate with

an underlying portfolio of 50 percent stocks and 50 percent bonds provides a 95 percent chance for success. Scott, Sharpe, and Watson (2009) argued against the 4 percent withdrawal rule

as being an expensive and inefficient means for achieving retirement spending goals, but noted how widely it has been adopted by the popular press and financial planners as an appropriate rule

Table 3: Sustainable Withdrawal Rates with Perfect Foresight Assumption for Retirees, 1900–1979

	SAFEMAX	SAFEMAX Year	10th Percentile	Withdrawal Rate = 4%		Withdrawal Rate = 5%	
				# Years in Worst Case	% Failures Within 30 Years	# Years in Worst Case	% Failures Within 30 Years
Canada	4.42	1969	5.04	30	0.0%	23	8.8%
Sweden	4.23	1914	4.92	30	0.0%	20	11.3%
Denmark	4.08	1937	4.6	30	0.0%	20	28.8%
United States	4.02	1969	4.7	30	0.0%	20	22.5%
South Africa	3.84	1937	4.88	27	1.3%	17	11.3%
United Kingdom	3.77	1900	4.17	26	3.8%	17	27.5%
Australia	3.68	1970	4.91	25	2.5%	18	10.0%
Switzerland	3.59	1962	4.08	26	5.0%	18	40.0%
The Netherlands	3.36	1941	4.14	22	2.5%	17	37.5%
Ireland	3.28	1911	3.41	21	25.0%	15	45.0%
Norway	3.13	1915	3.46	20	32.5%	13	61.3%
Spain	2.56	1957	3.07	19	36.3%	15	68.8%
Italy	1.56	1944	2.61	6	62.5%	5	76.3%
Belgium	1.46	1911	1.78	11	40.0%	9	68.8%
France	1.25	1943	2.62	7	42.5%	7	71.3%
Germany	1.14	1914	1.52	9	25.0%	8	41.3%
Japan	0.47	1940	0.54	3	37.5%	3	40.0%

Note: Assumptions include perfect foresight, a 30-year retirement duration, no administrative fees, annual inflation adjustments for withdrawals, and annual rebalancing.

Source: Own calculations from Dimson, Marsh, and Staunton (1900–2008) data.

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A Broader Framework for Determining an Efficient Frontier for Retirement Income

by Wade D. Pfau, Ph.D., CFA

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Executive Summary

- This paper outlines a different way to think about building a retirement income strategy that dramatically moves away from the concepts of safe withdrawal rates and failure rates. The focus is how to best meet two competing financial objectives for retirement: satisfying spending goals and preserving financial assets.
- Much of the current failure-rate framework fails to consider the retiree's entire balance sheet of income-generating assets, such as Social Security and immediate annuities; ignores lost potential enjoyment from spending more early in retirement; and ignores the magnitude and severity of "failure."
- The process described in this paper focuses on allocating assets between a portfolio of stocks and bonds, inflation-adjusted and fixed single-premium immediate annuities (SPIAs), and variable annuities with guaranteed living benefit riders (VA/GLWBs).
- This process incorporates unique client circumstances, bases asset return assumptions on current market conditions, uses a consistent fee structure for a fair comparison between income tools, operationalizes the concept of diminishing returns from spending by incorporating a minimum-needs threshold and a lifestyle spending goal, and uses survival probabilities to calculate outcomes. It also incorporates client preferences to balance the competing financial objectives for the final choice among the collection of allocations that define the efficient frontier for retirement income.
- The paper presents results for a 65-year-old couple whose lifestyle needs require a 4 percent inflation-adjusted withdrawal rate from retirement-date assets. Their efficient frontier generally consists of combinations of stocks and fixed SPIAs. Perhaps surprisingly, bonds, inflation-adjusted SPIAs, and VA/GLWBs are not part of the efficient frontier in the couple's optimal retirement income portfolio.

William Bengen's seminal 1994 article on sustainable withdrawal rates in the *Journal of Financial Planning* provided a much needed reality check on popular retirement discourse by demonstrating how the sequence of returns risk causes the sustainable withdrawal rate from a portfolio of volatile assets to fall below the average return to those assets. Bengen described the SAFEMAX, which he defined as the sustainable withdrawal rate from the worst-case scenario in history. It was closer to 4 percent than to numbers like 7 percent bandied about in the media at that time. Bengen's research answered an important question about sustainable spending rates. Several years later, Cooley, Hubbard, and Walz (1998) published a study popularly known as the Trinity study. It introduced a small but significant modification to Bengen's work. Rather than reporting the historical worst-case scenario, the Trinity authors calculated success rates and corresponding failure rates for different withdrawal rate and asset allocation strategies over differing retirement durations. Based on the U.S. historical data since 1926, success rates are the percentage of rolling historical periods in which some financial wealth remained at the end.
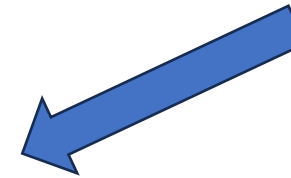
Financial wealth depletion becomes synonymous with a failed retirement in this framework, as seen, for instance, when Terry (2003) wrote, "I believe that most investors would find even a

Figure 2: Retirement Income Frontier for a 65-year-old Couple with a 6% Lifestyle Goal, a 6% Minimum Needs Threshold, and a 2% Social Security Benefit as a Percentage of Retirement Date Assets

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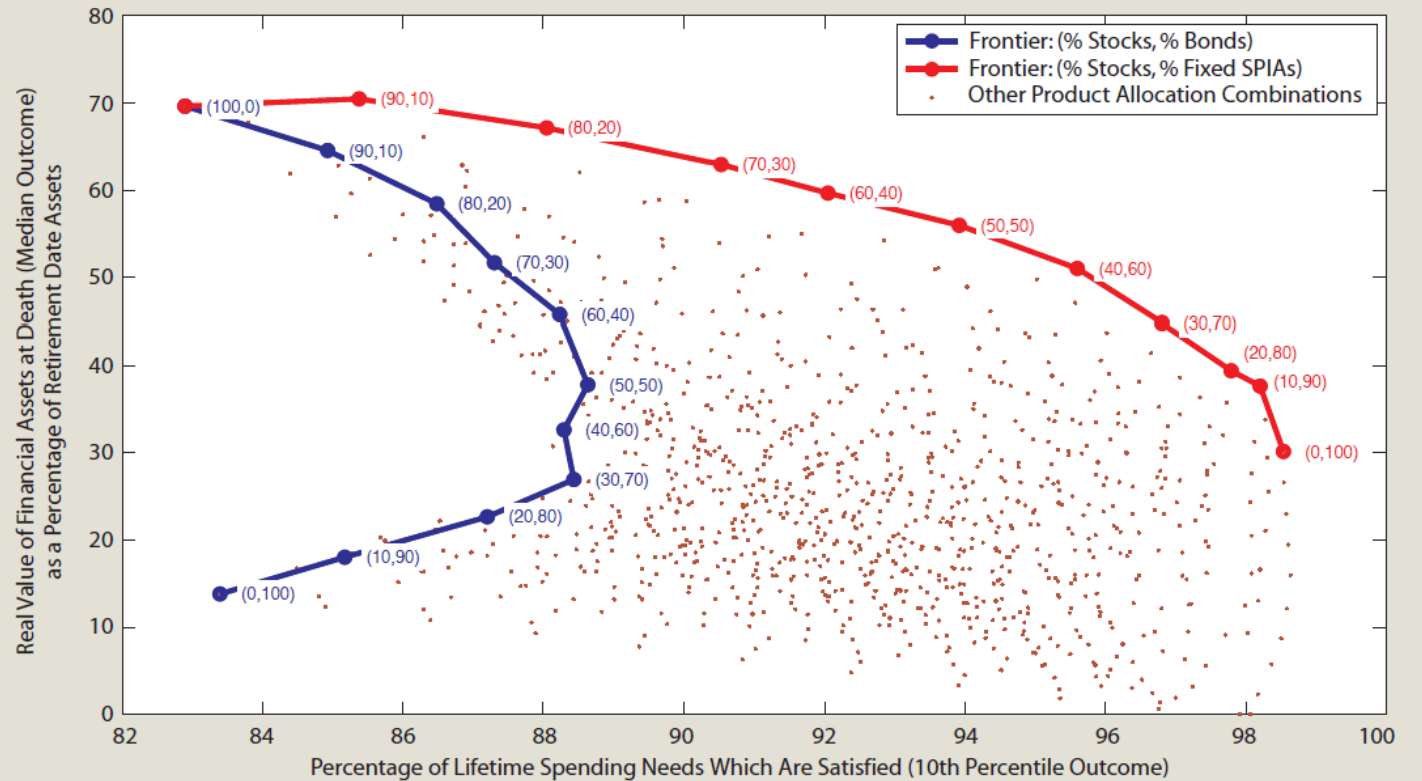
Key Retirement Risks

An Actuarial Problem

Longevity Risk

Unknown Planning Horizon

Macro/Market

Investment Volatility
Interest Rate Volatility
Public Policy & Taxation
Sequence of Returns

Inflation

Rising Costs of Living

Personal Spending

Health & Long-term Care
Help Other Family Members
Divorce
Fraud/Theft

Retirement Styles

How Do You Like to Draw Retirement Income?

Probability-Based

Depend on market growth through underlying investments

Safety-First

Rely on contractually-driven income for safety relative to unknown market outcomes

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How Much Plan Optionality Do You Prefer?

Optionality

Prefer flexibility to keep options open and take advantage of new opportunities

Commitment

Prefer to lock-in a solution that solves a lifetime income need

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RISA® Style Matrix

Managing Volatility & Longevity in Retirement

1. **Spend Conservatively**

2. **Spending Flexibility**

3. **Reduce Volatility**

4. **Buffer Assets**

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Variable Spending Strategies with Calibrated Downside Risk

Spending Strategy	Initial Spending Rate	Percentile of Distribution	Real Spending at Age 95	Real Portfolio Balance at Age 95	Change in Spending	Final Spending Relative to Initial Baseline	Downside Spending Volatility
Inflation-Adjusted Amounts (BASELINE)	3.62% (3.83% w/ 10% failure rate)	90th	$3.62	$379	0%	n/a	0%
		Median	$3.62	$117	0%	n/a	0%
		10th	$3.62	$10	0%	n/a	0%
Fixed Percentage Rule	8.54%	90th	$3.41	$40	-60%	-6%	-4.9%
		Median	$1.69	$19	-80%	-53%	-6.1%
		10th	$0.86	$10	-90%	-76%	-7.5%
Dollar Floor-and-Ceiling Rule	4.14%	90th	$6.21	$221	50%	72%	-0.6%
		Median	$3.57	$87	-14%	-1%	-1.9%
		10th	$3.52	$10	-15%	-3%	-3.4%
Ratcheting Rule	3.59%	90th	$8.04	$234	124%	122%	0.0%
		Median	$3.59	$101	0%	-1%	-1.8%
		10th	$3.59	$10	0%	-1%	-3.0%
Spending Guardrails Rule	4.53%	90th	$8.21	$191	81%	127%	0%
		Median	$4.48	$67	-1%	24%	0%
		10th	$2.70	$10	-41%	-26%	-1.6%
Inflation Rule	4.67%	90th	$4.67	$279	0%	29%	0%
		Median	$4.03	$67	-14%	11%	-0.4%
		10th	$2.09	$10	-55%	-42%	-2.3%
Modified RMD Rule (Adjustment Factor: 1.56x)	4.25%	90th	$7.79	$39	83%	115%	-2.7%
		Median	$3.84	$19	-10%	6%	-3.7%
		10th	$1.95	$10	-54%	-46%	-4.8%

Disclaimer: Full explanation of assumptions can be found in *Retirement Planning Guidebook*

Choosing a Portfolio Distribution Strategy

1. **Inflation-Adjusted Amounts**: It's a baseline for comparison, but not efficient or advisable in practice. Others do better

2. **Fixed percentage**: For those seeking heavy front-loading for discretionary spending and low legacy concerns

3. **Dollar floor-and-ceiling**: Nice compromise to get higher initial spending within a steady range

4. **Ratcheting rule**: A nice alternative to inflation-adjusted amounts

5. **Spending guardrails**: Harder to implement, but high initial spending

6. **Inflation-rule**: Guidance about when to reduce spending and by how much

7. **Modified RMD rule**: Academically-optimal consideration for discretionary expenses when legacy concerns are low

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Who Should Worry Most About Sequence Risk?

- Fewer reliable income sources outside the investment portfolio
- Less flexibility to make spending reductions
- Fewer reserves assets to cushion spending shocks
- A greater desire to build in a margin of safety for the plan
- More stressed about short-term market volatility
- More concerned about outliving their retirement assets

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Who Might Consider an Annuity?

❑ Retirement style -- income protection or risk wrap

❑ Income gap -- not enough reliable income (Social Security, pensions, etc) for core expenses

❑ Low risk tolerance – Stronger annuity case with low stock allocation

❑ Concerns about outliving your money – More annuity benefit as the alternative is to spend even less from investments

❑ View annuities as a bond replacement… use higher stock allocation with remaining investment assets

❑ Seek "dementia insurance"

❑ Take the time to understand how the annuity works

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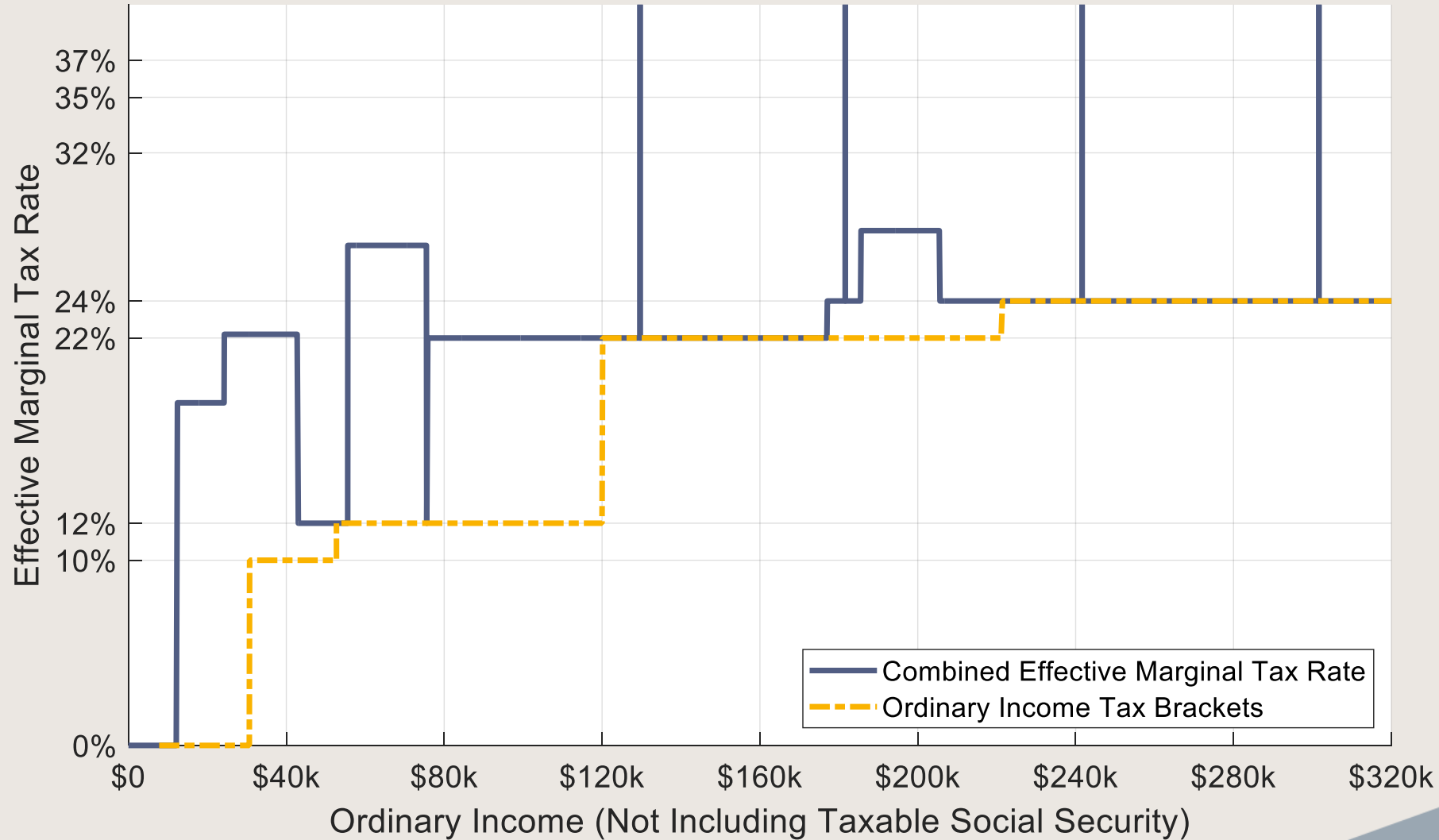
Fitting Annuities in the RISA® Style Matrix
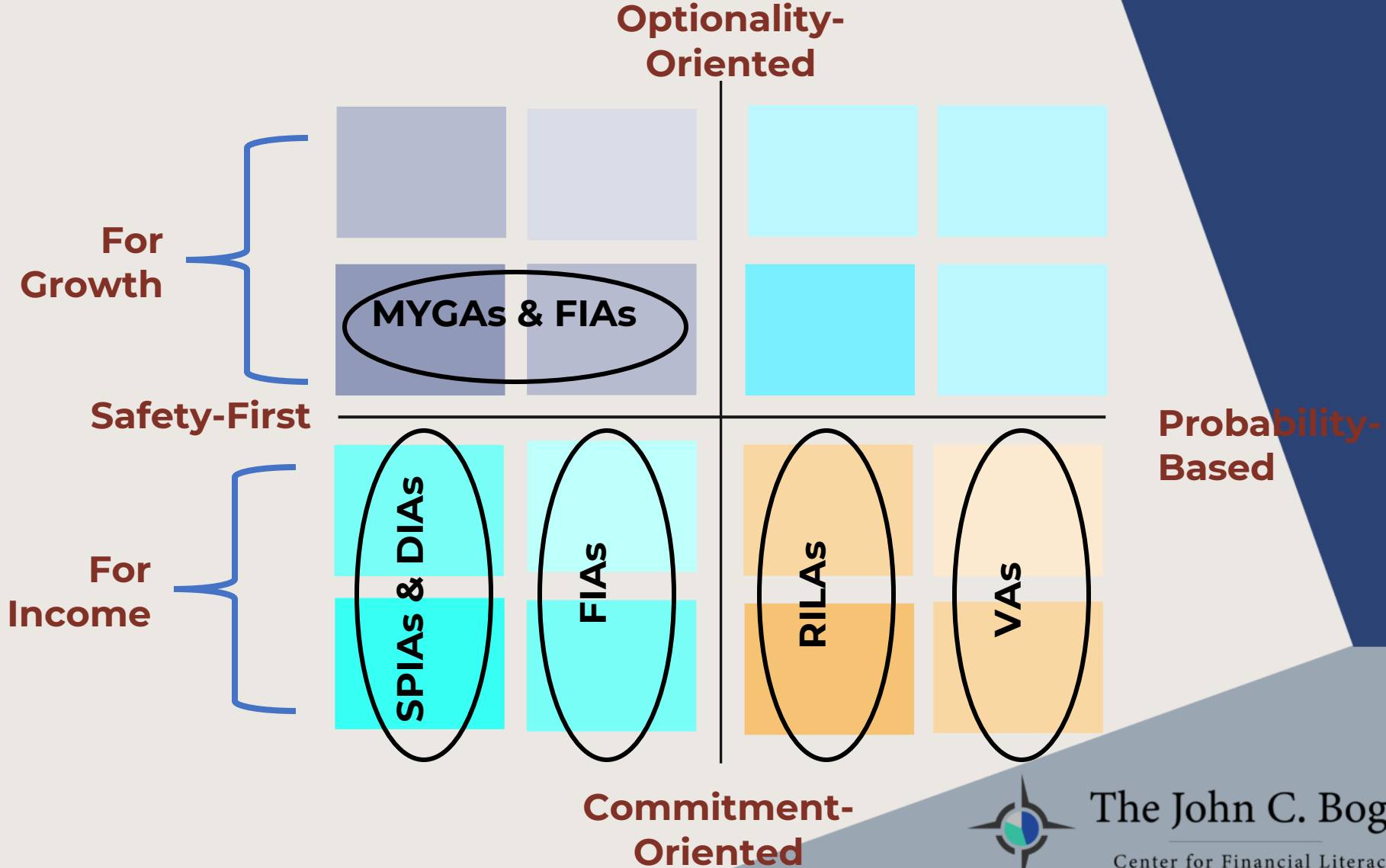
Who Might Consider Whole Life Insurance?

❑ Probably not many

❑ Requires a strong commitment orientation (lifetime commitment)
- o Income protection: supports purchase of single-life income annuity
- o Risk wrap: buffer asset approach

❑ Willing to view cash value as a replacement for bonds and are comfortable using a higher stock allocation with remaining investment assets.

❑ Facing high tax rates in retirement

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Combined Tax Map

Married Filing Jointly, 2023, Social Security: $52,200, Preferential Income: $20,000

Effective Marginal Tax Rate (y-axis): 0%, 10%, 12%, 22%, 24%, 32%, 35%, 37%

Ordinary Income (Not Including Taxable Social Security) (x-axis): $0, $40k, $80k, $120k, $160k, $200k, $240k, $280k, $320k

Legend:
— Combined Effective Marginal Tax Rate
-·- Ordinary Income Tax Brackets

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Sequence Risk and the Impact of Skipping Distributions (i.e. draw from buffer asset)
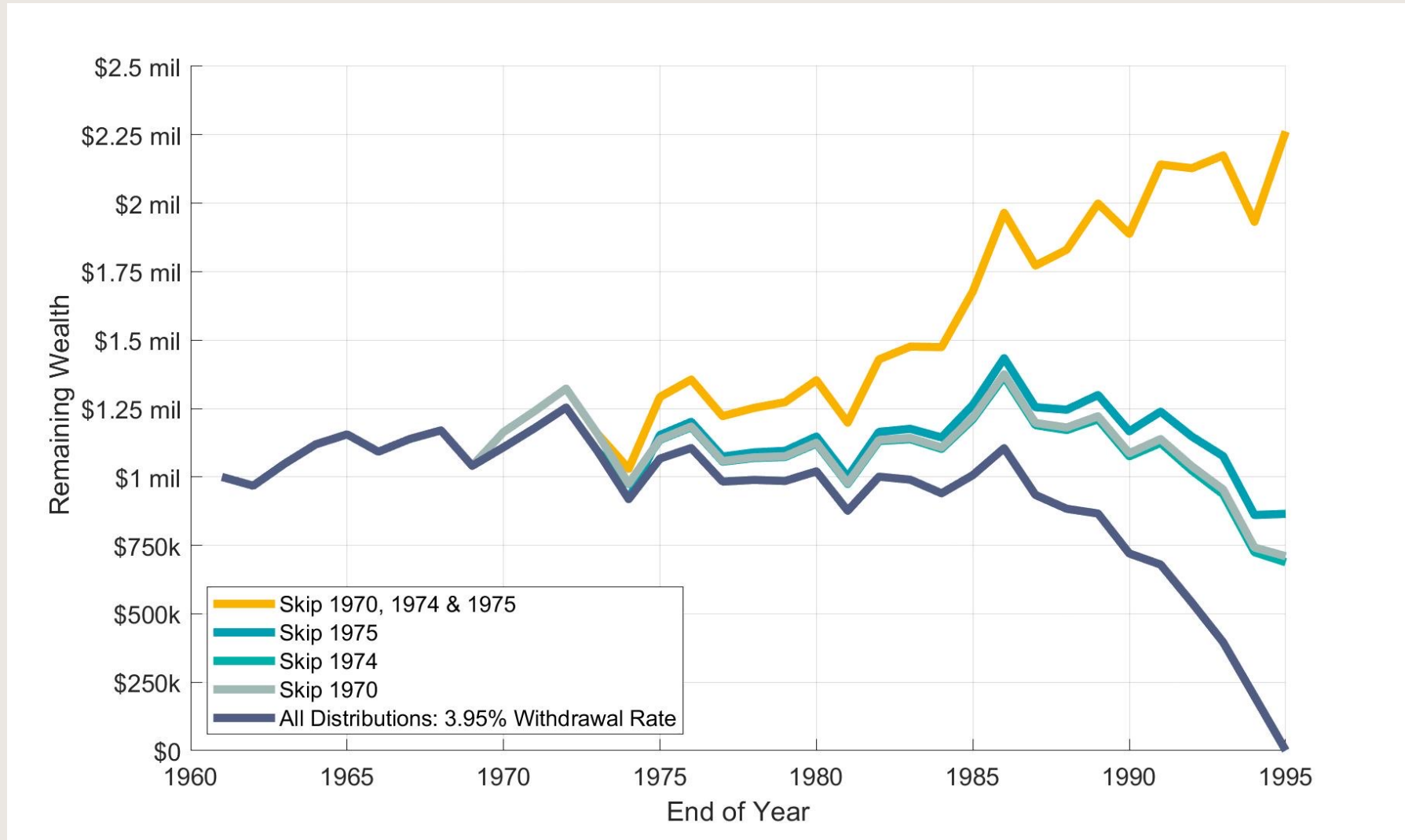
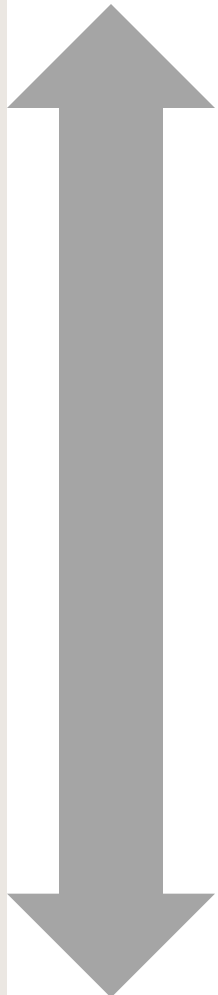*Sequence Risk and the Portfolio Impact of Skipping a Year of Distributions*
Using Robert Shiller's Data, 1962-1995, Asset Allocation: 60% Large-cap Stocks, 40% 10-Year Treasuries
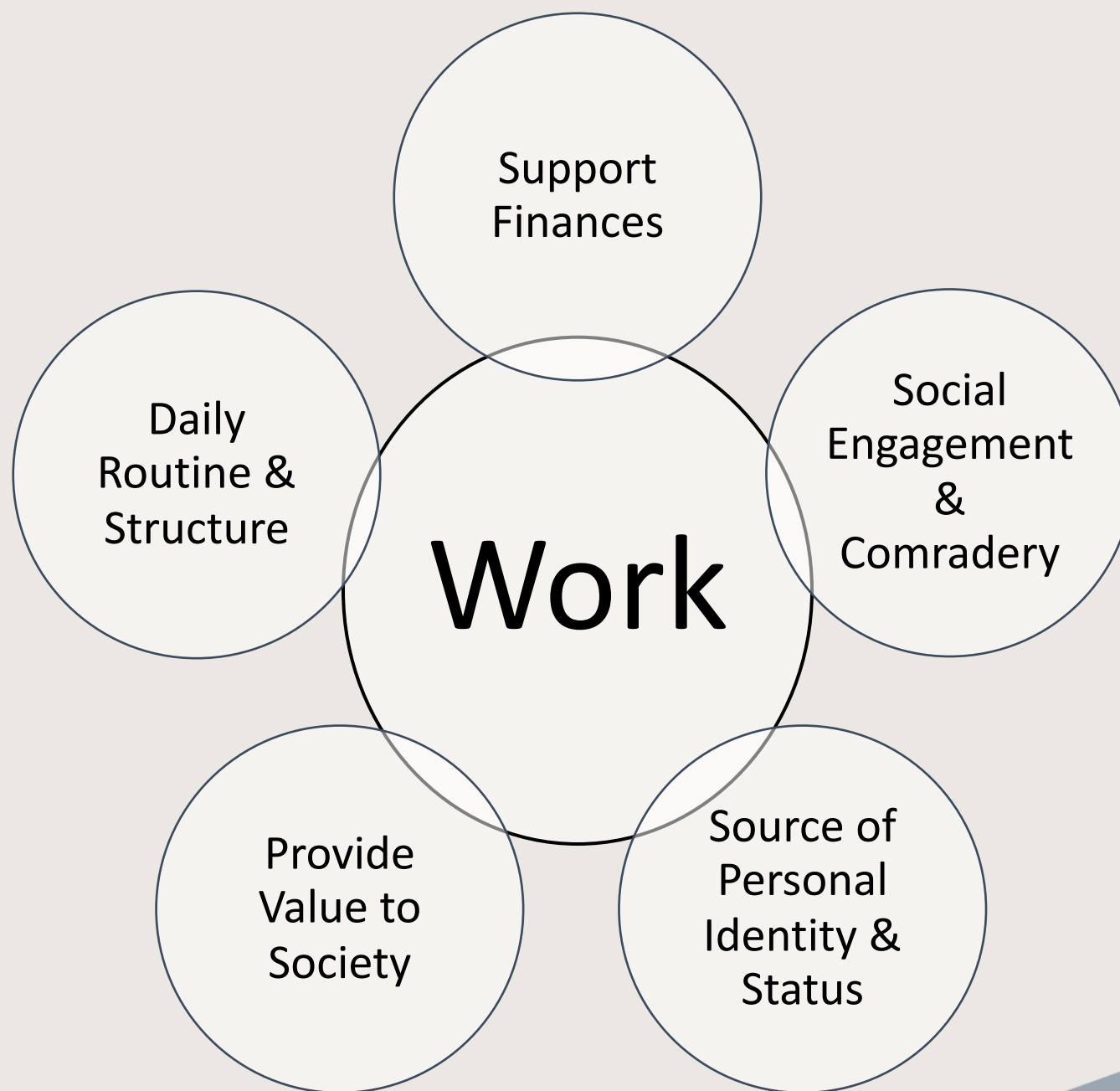
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The Spectrum of Potential Reverse Mortgage Uses

Portfolio/Debt Coordination for Housing	Refinance an Existing Mortgage Transition from Traditional Mortgage to Reverse Mortgage Fund Home Renovations to Allow for Aging in Place HECM for Purchase for New Home
Portfolio Coordination for Retirement Spending	Spend Home Equity First to Leverage Portfolio Upside Potential Coordinate HECM Spending to Mitigate Sequence Risk Use Tenure Payments to Reduce Portfolio Withdrawals
Funding Source for Retirement Efficiency Improvements	Tenure Payments as Annuity Alternative Social Security Delay Bridge Tax Bracket Management & Taxes for Roth Conversions Premiums for Existing Long-Term Care Insurance Policies
Preserve Credit as Insurance Policy	Support Retirement Spending After Portfolio Depletion Protective Hedge for Home Value Provides Contingency Fund for Spending Shocks (In home care, health expenses, divorce settlement)