12th Tech talk on Retirement Benefits
8 November 2024

Balancing Acts: Safe Withdrawal Rates in the Indian Context

Rajan Raju
Director, Invespar

&

Ravi Saraogi
Co-founder, Samasthiti Advisors
SEBI Registered Investment Adviser

Important Disclaimer

Nothing discussed in the webinar is investment advice of any sort, an offer to sell, or a solicitation to buy any investment product or strategy to anyone. The webinar is purely for informational purposes and is not investment advice or a recommendation to invest in any strategy or investment product.

The views expressed by the individuals are purely personal and not those of their organisations. Any data presented in the webinar is based on current market conditions, which will change and be superseded by subsequent market events or other reasons. All the materials and discussions are provided without any guarantee or implied warranties. Past performance is not a guarantee of future results. All investments involve risk, including the loss of entire capital.

Always consult with your financial and other advisers before investing.

Contents

How to design a good Retirement Plan?

Retirement Planning Methodologies Need an Upgrade

The typical approach towards retirement planning suffers from severe flaws

- Point estimates
- Use of averages
- Hides sequence of returns
- Understates volatility

Most retirement calculators use simple PV-FV frameworks

Typical Solution for Withdrawals

1. Calculate what is the Retirement Corpus available
2. Assume a rate of return
3. Assume a rate of inflation
4. Estimate for how many years retirement income will be needed
5. Calculate the monthly retirement income

Retirement Corpus = INR 100 lakhs

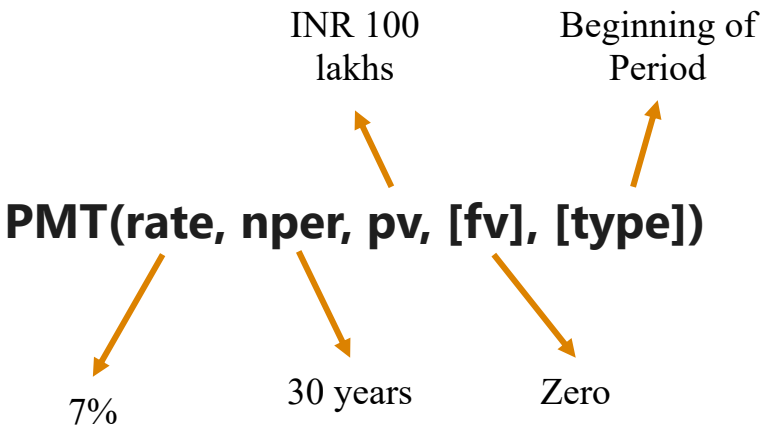
Average Rate of return (blended) = 7.8%

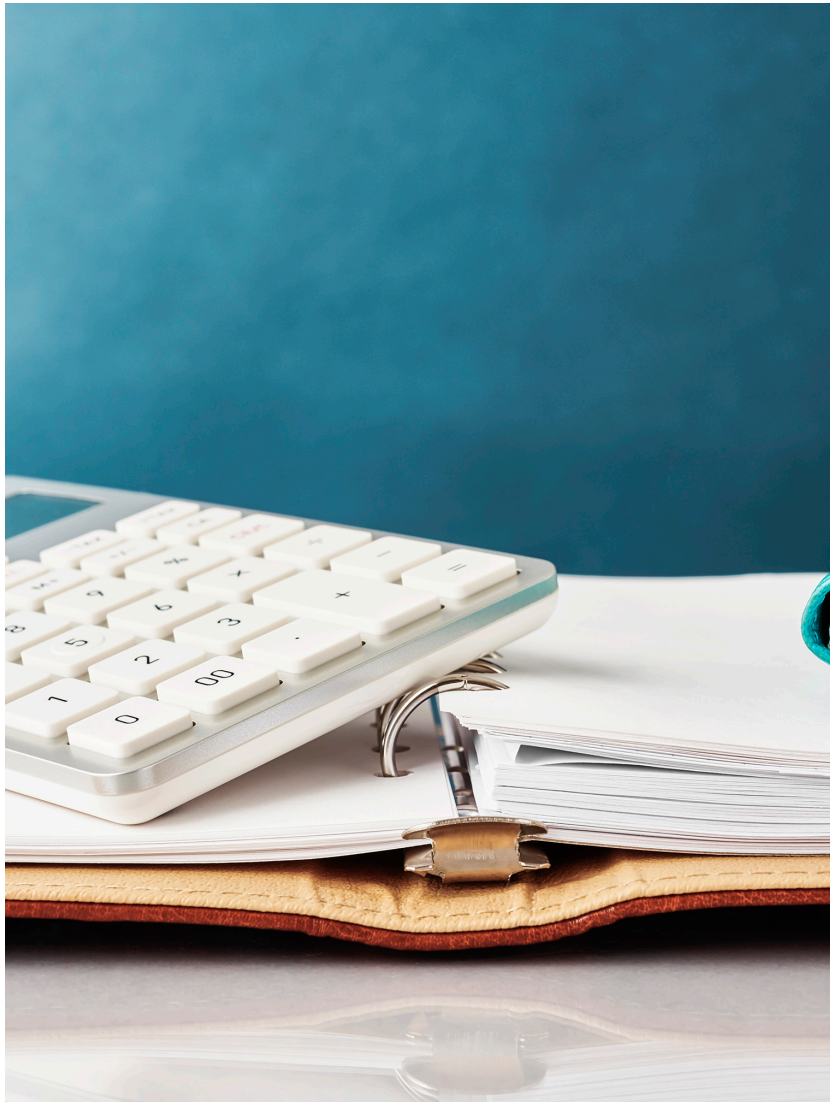
- Equity Return = 12%, Debt Return = 5%
- 60% in Debt, 40% in Equity

Inflation = 6%

Time Period = 30 years

Yearly Retirement Income: INR 7.8 lakhs





Retirement Corpus = INR 100 lakhs

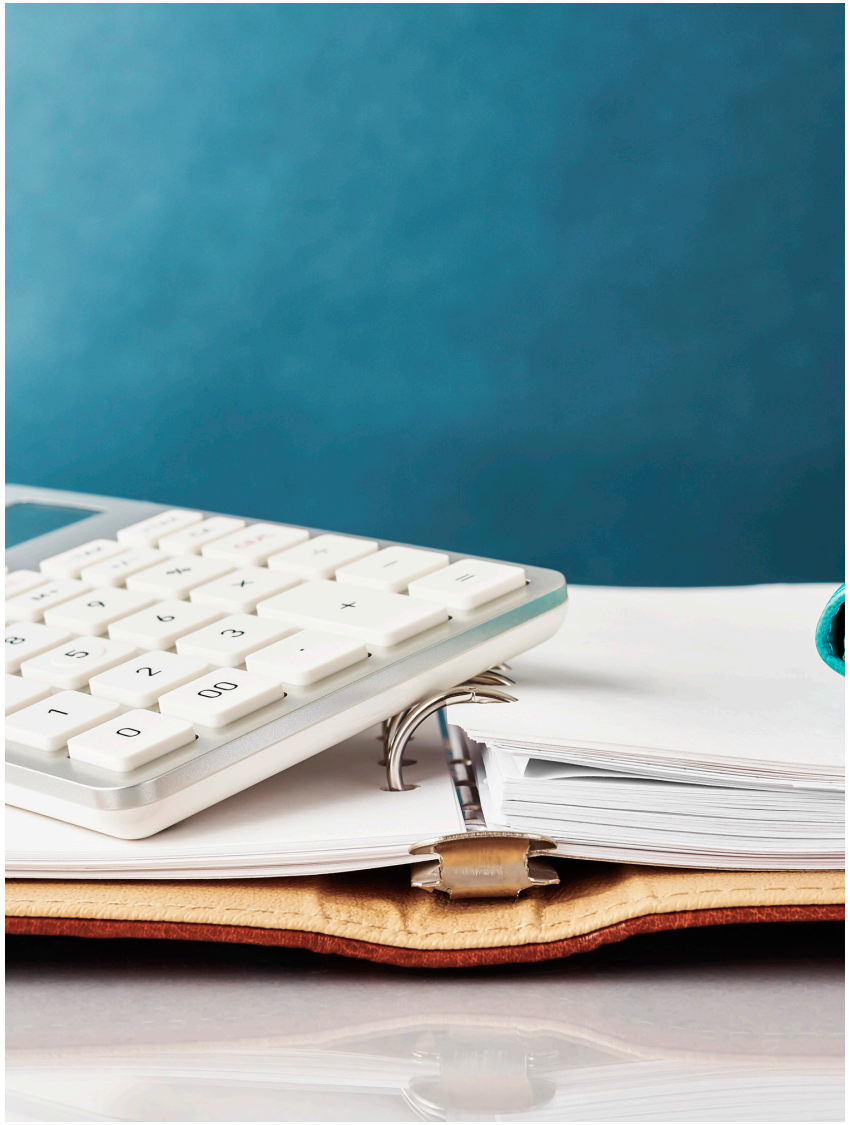
Average Rate of return (blended) = 7.8%

- Equity Return = 12%, Debt Return = 5%
- 60% in Debt, 40% in Equity

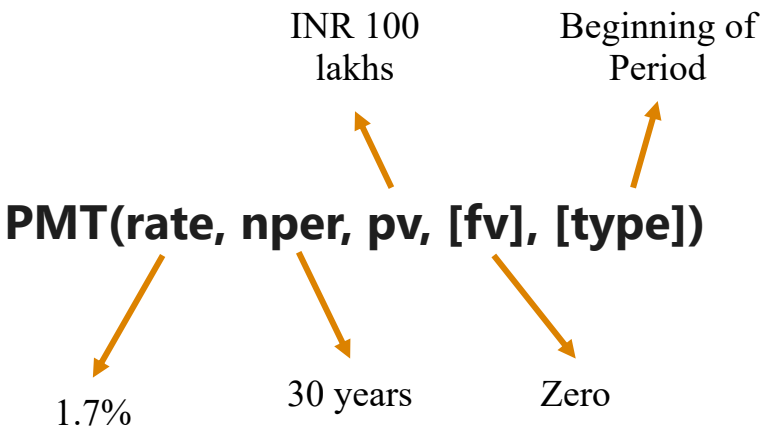
Inflation = 6%

Adjusted Rate = 1.7%

Time Period = 30 years



Yearly Retirement Income: INR 4.2 lakhs



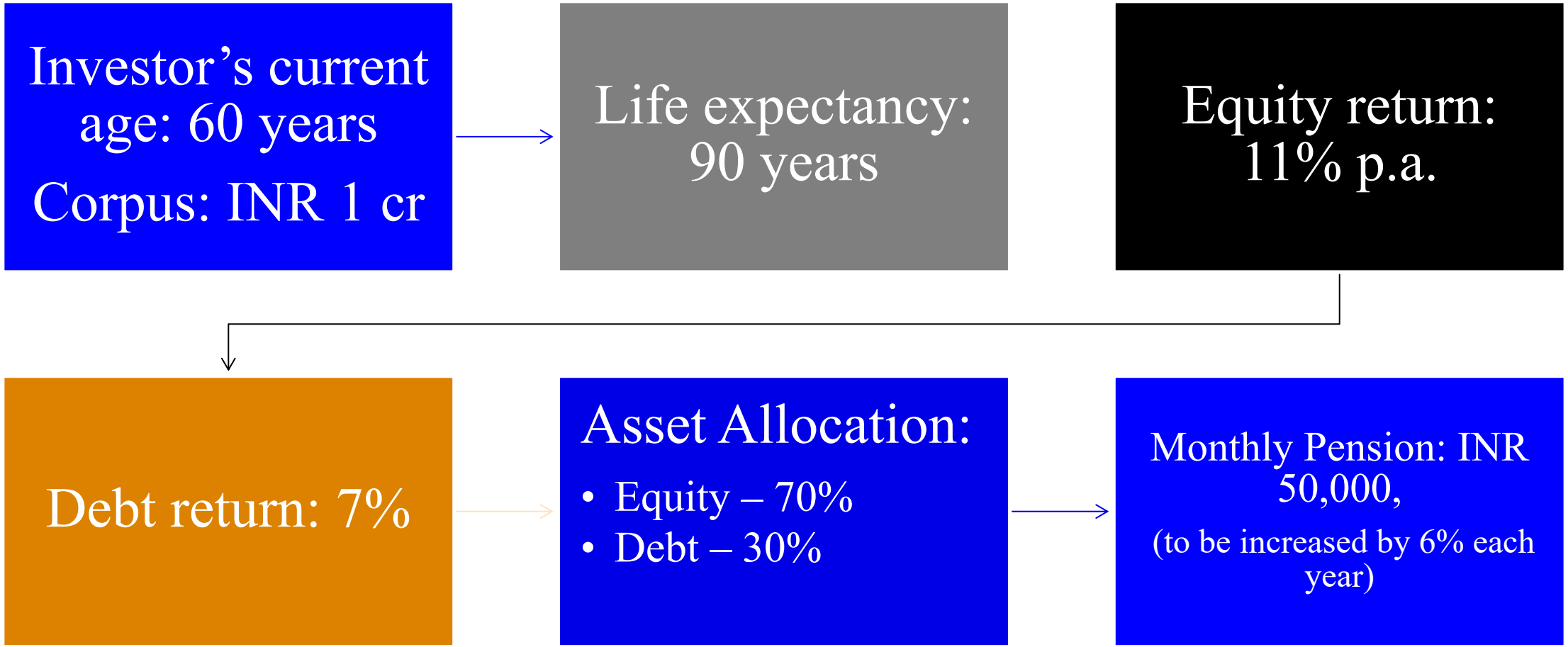
Even though Portfolio 1 & 2 has same average return, they have different terminal values

Averages hide sequence

Year	Portfolio 1					Portfolio 2				
	Portfolio Return	**Opening Value**	**Income**	**Expenditure**	**Closing Value**	**Portfolio Return**	**Opening Value**	**Income**	**Expenditure**	**Closing Value**
Year 0					100					100
Year 1	20%	100.0	20.0	-5.0	115	-15%	100.0	-15.0	-5.0	80
Year 2	25%	115.0	28.8	-5.0	139	5%	80.0	4.0	-5.0	79
Year 3	25%	138.8	34.7	-5.0	168	25%	79.0	19.8	-5.0	94
Year 4	5%	168.4	8.4	-5.0	172	25%	93.8	23.4	-5.0	112
Year 5	-15%	171.9	-25.8	-5.0	**141**	20%	112.2	22.4	-5.0	**130**
Avg. Return	**12%**				**Avg. Return**	**12%**				

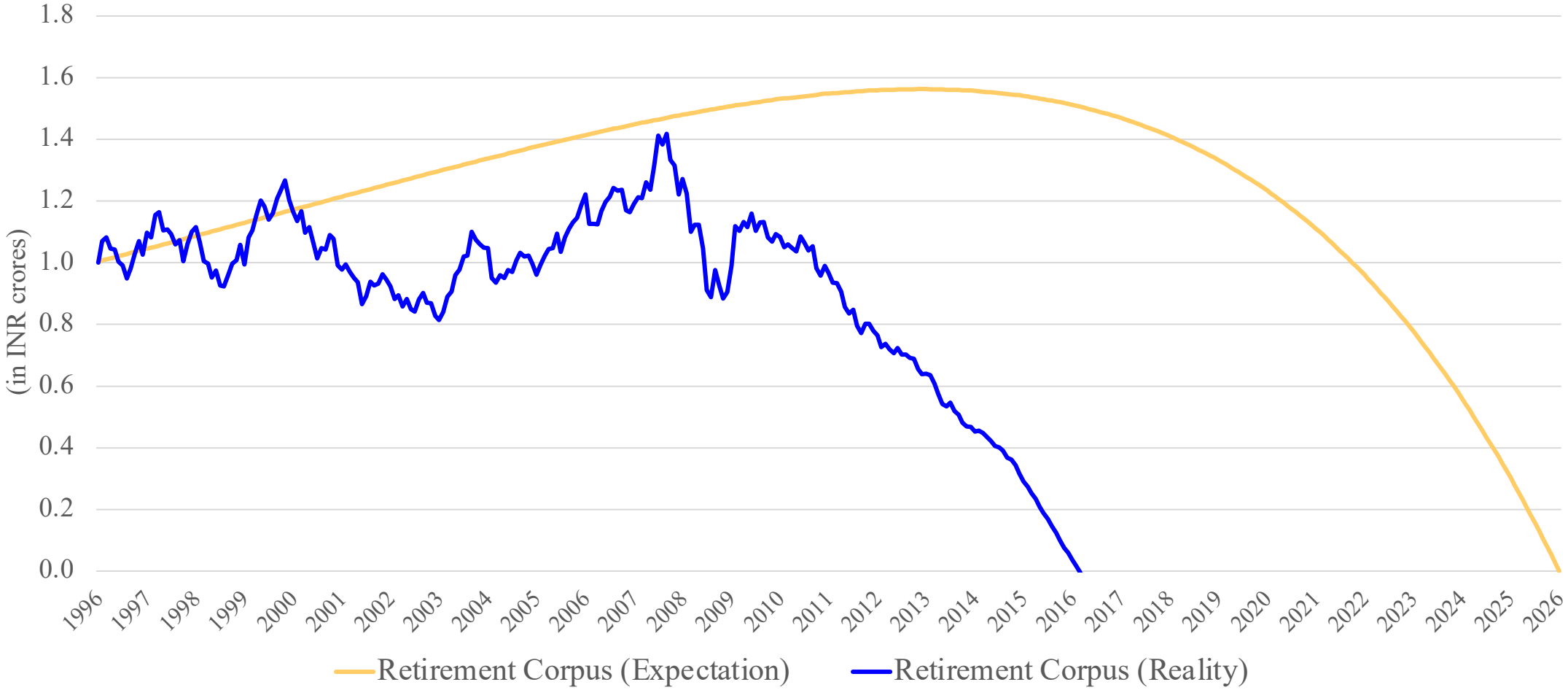
The Year 1996:

Planner's Analysis



Expectation vs Reality

(Using actual market data)



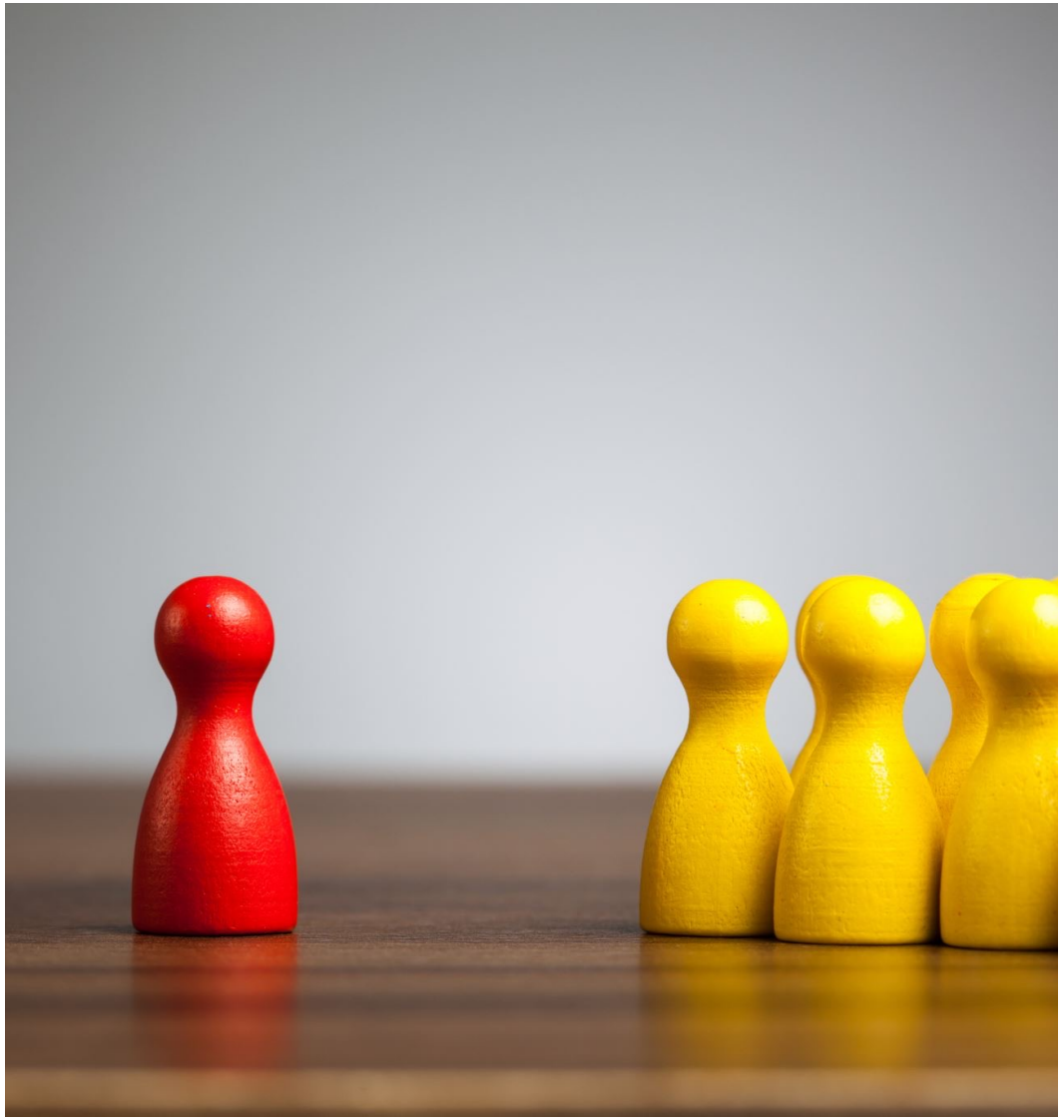
What went wrong?

Planner got her return projections right, yet the retirement portfolio prematurely exhausted itself

Planner had projected equity returns of 11% each year. In fact, between 1996 and 2016, the actual equity return had indeed been 11%.

Planner also assumed debt returns of 7% each year. The actual debt return that the investor's portfolio had earnt from 1996 to 2016 was close to 9.5%.

We need a new approach that considers sequence of return risk, and this approach is the **Safe Withdrawal Rate**

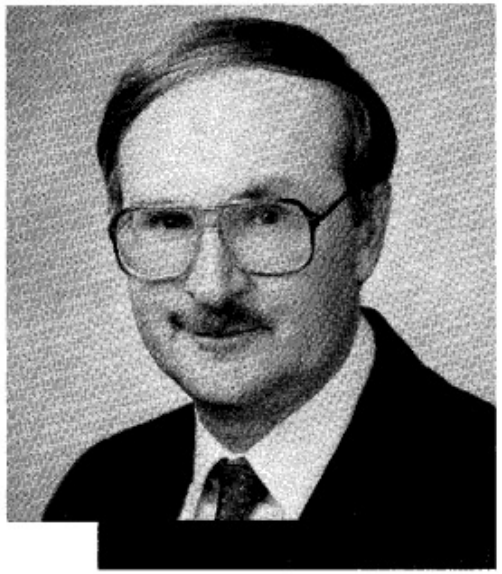


How to Calculate the Safe Withdrawal Rate for India

DETERMINING WITHDRAWAL RATES USING HISTORICAL DATA

by William P. Bengen

At the onset of retirement, investment advisors make crucial recommendations to clients concerning asset allocation, as well as dollar amounts they can safely withdraw annually, so clients will not outlive their money. This article utilizes historical investment data as a rational basis for these recommendations. It employs graphical interpretations of the data to determine the maximum safe withdrawal rate (as a percentage of initial portfolio value), and establishes a range of stock and bond asset allocations that is optimal for virtually all retirement portfolios. Finally, it provides guidance on "mid-retirement" changes of asset allocation and withdrawal rate.



WILLIAM P. BENGEN

The year is 2004. You have done a creditable job of building your financial planning practice over

However, you cannot help feeling a gnawing concern that you have overlooked something....

planner into trouble was assuming that *average* returns and *average* inflation rates are a sound basis for computing how much a client can safely withdraw from a retirement fund over a long time.

As Larry Bierwirth pointed out in his excellent article in the January 1994 issue of the this publication ("Investing for Retirement: Using the Past to Model the Future"), it pays to look not just at averages, but at what actually has happened, year-by-year, to investment returns and inflation in the past. He demonstrated that the long-term effects of certain financial catastrophes, such as the Depression or the 1973-1974 recession, can overwhelm the averages. Such "events" cannot be ignored, and the client should be made aware of them.

In this article, I will build on Bierwirth's work, approaching it from a slightly different tack. Using the con-

Safe Withdrawal Rate is 4%

Nominal & Real Rolling Returns

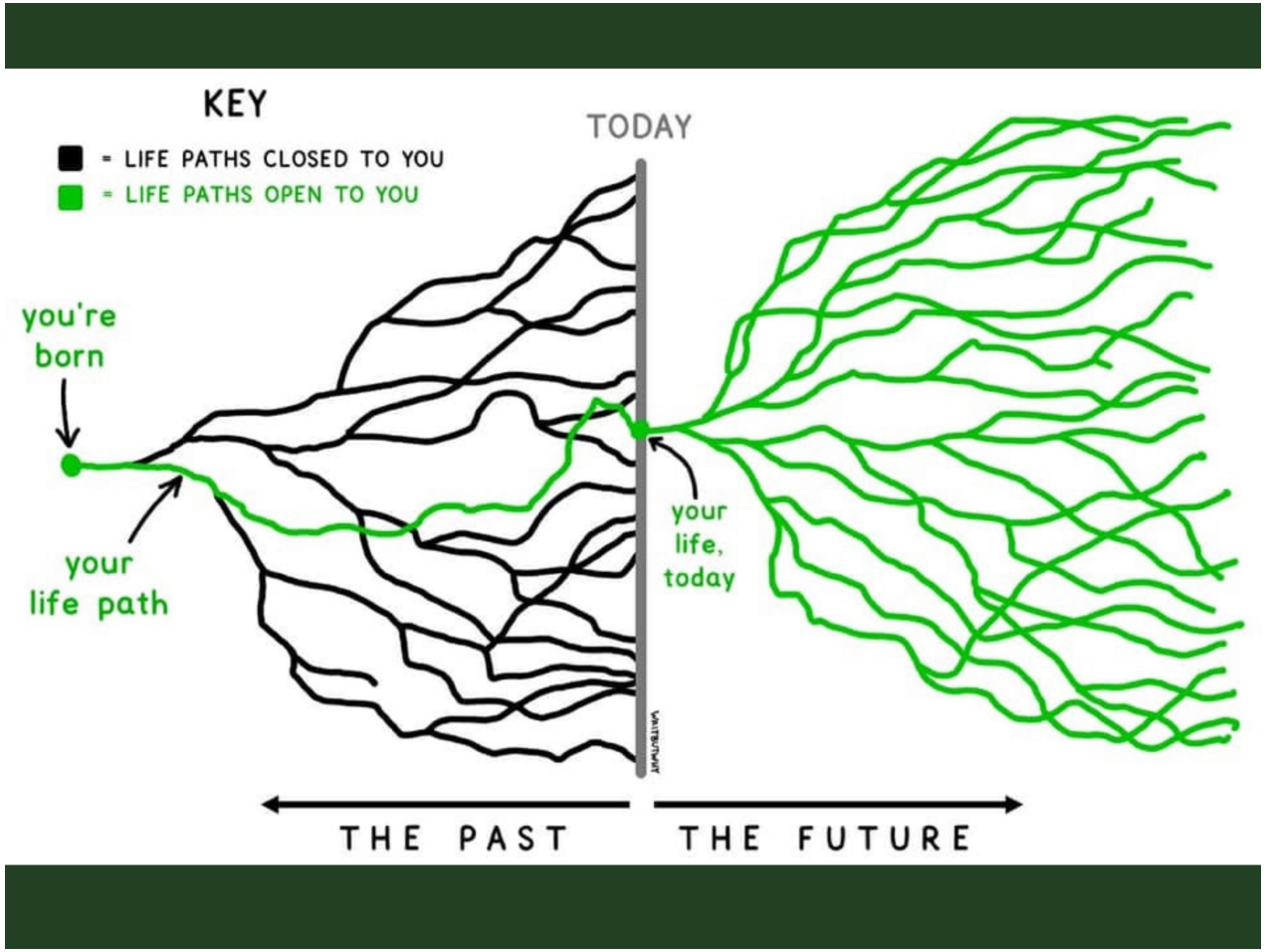
Period (yrs)	Asset	Nominal Return							Real Return						
		Mean	Std	Max	Min	Raw Sharpe	Pct Negative	nobs	Mean	Std	Max	Min	Raw Sharpe	Pct Negative	nobs
5 year	Equity	12.57	9.65	46.99	-5.14	1.30	2.91	309	5.56	9.89	40.04	-13.28	0.56	27.83	309
	Gold	9.49	8.39	27.91	-4.33	1.13	18.77	309	2.59	7.53	16.41	-10.70	0.34	35.92	309
	HPI	8.66	4.71	17.98	3.24	1.84		33	2.60	3.72	8.94	-2.68	0.70	30.30	33
	Bonds	8.64	1.02	11.16	5.52	8.47		141	1.57	2.35	4.86	-4.28	0.67	25.53	141
	FD	7.69	0.85	9.62	6.17	9.06		240	1.15	1.93	5.25	-1.98	0.60	28.33	240
10 year	Equity	13.29	4.70	22.71	4.18	2.83		249	6.15	4.72	16.59	-2.36	1.30	11.65	249
	Gold	10.54	5.20	20.02	1.62	2.03		249	3.53	4.46	12.28	-5.09	0.79	22.09	249
	HPI	8.79	1.77	11.57	6.57	4.98		13	2.53	1.31	4.59	0.98	1.93		13
	Bonds	8.72	0.41	9.30	7.61	21.31		81	1.79	0.83	3.17	0.16	2.14		81
	FD	7.81	0.35	8.42	7.15	22.32		180	0.69	0.97	2.98	-0.66	0.71	27.78	180
15 year	Equity	13.45	2.52	18.48	6.54	5.34		189	6.09	2.44	10.88	-0.01	2.49	0.53	189
	Gold	11.68	2.07	15.31	6.58	5.65		189	4.42	1.82	7.41	-0.01	2.44	0.53	189
	Bonds	8.39	0.16	8.75	8.16	53.27		21	1.13	0.19	1.51	0.86	6.07		21
	FD	7.81	0.13	8.16	7.58	59.05		120	0.68	0.28	1.31	0.35	2.47		120

Source: "Asset Returns in India: A Historical Survey, 2023 Inflation's Shadow", Raju & Raju (2023), https://papers.ssrn.com/abstract_id=4641106

Variability in Equity Returns in India

Source: Authors calculations

Methodology



Source: "Life Paths", Rob Thomas

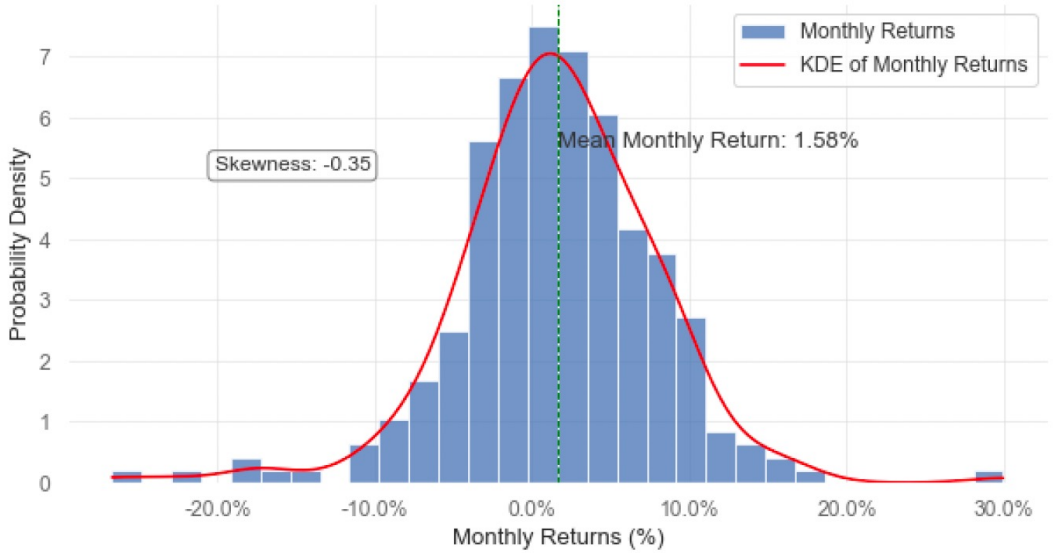
Approaches

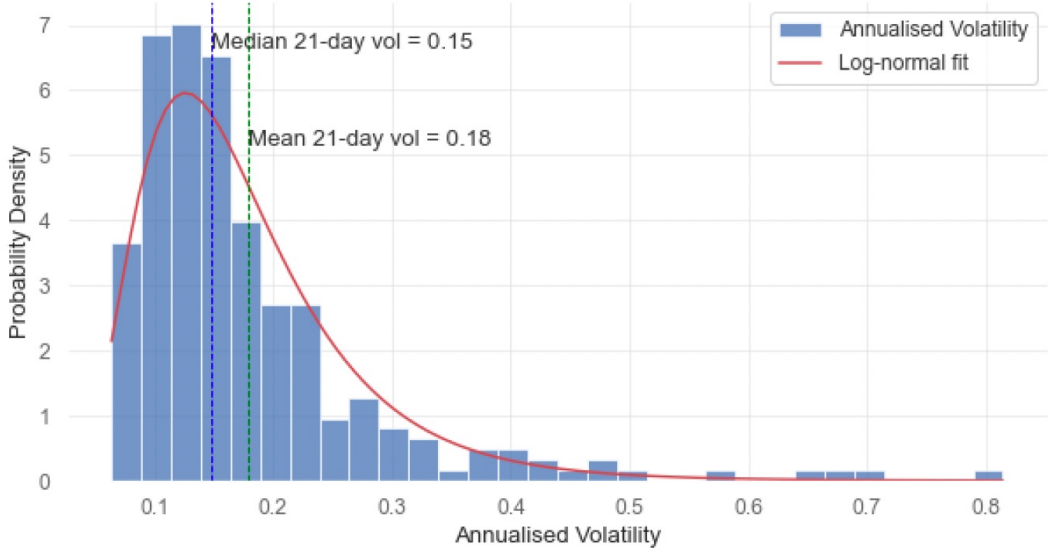
Averages (arithmetic versus geometric)

	Period	Nominal Returns			Real Returns		
		Arithmetic Mean	Geometric Mean	Std Dev	Arithmetic Mean	Geometric Mean	Std Dev
Equity	Dec 1992-Aug 2023	16.27	12.51	29.92	8.99	5.31	28.55
Gold	Dec 1992-Aug 2023	9.91	9.00	14.47	2.87	2.02	13.44
FD	Sep 1998-Aug 2023	7.74	7.73	1.48	1.47	1.44	2.71
Bonds	Dec 2006-Aug 2023	8.36	8.28	4.17	1.16	1.05	4.81
HPI	Jun 2010-Jun 2023	9.75	9.51	7.50	3.14	2.97	6.09
Inflation	Dec 1992-Aug 2023	6.86	6.82	3.09			

Note: Table from "Asset Returns in India: A Historical Survey, 2023 Inflation's Shadow", Raju and Raju (2023).

Distributions matter: Volatility





Source: "Unbalanced Acts: Rethinking Naive Use of Historical Returns in Retirement Portfolio Strategies", Raju (2024), https://papers.ssrn.com/abstract_id=4814141

- Normality is not the norm
- Geometric means are a better proxy for compounding

$$\text{Expected Geometric Return} \approx \text{Expected Arithmetic Return} - \tfrac{1}{2}\,\text{Volatility}^2$$

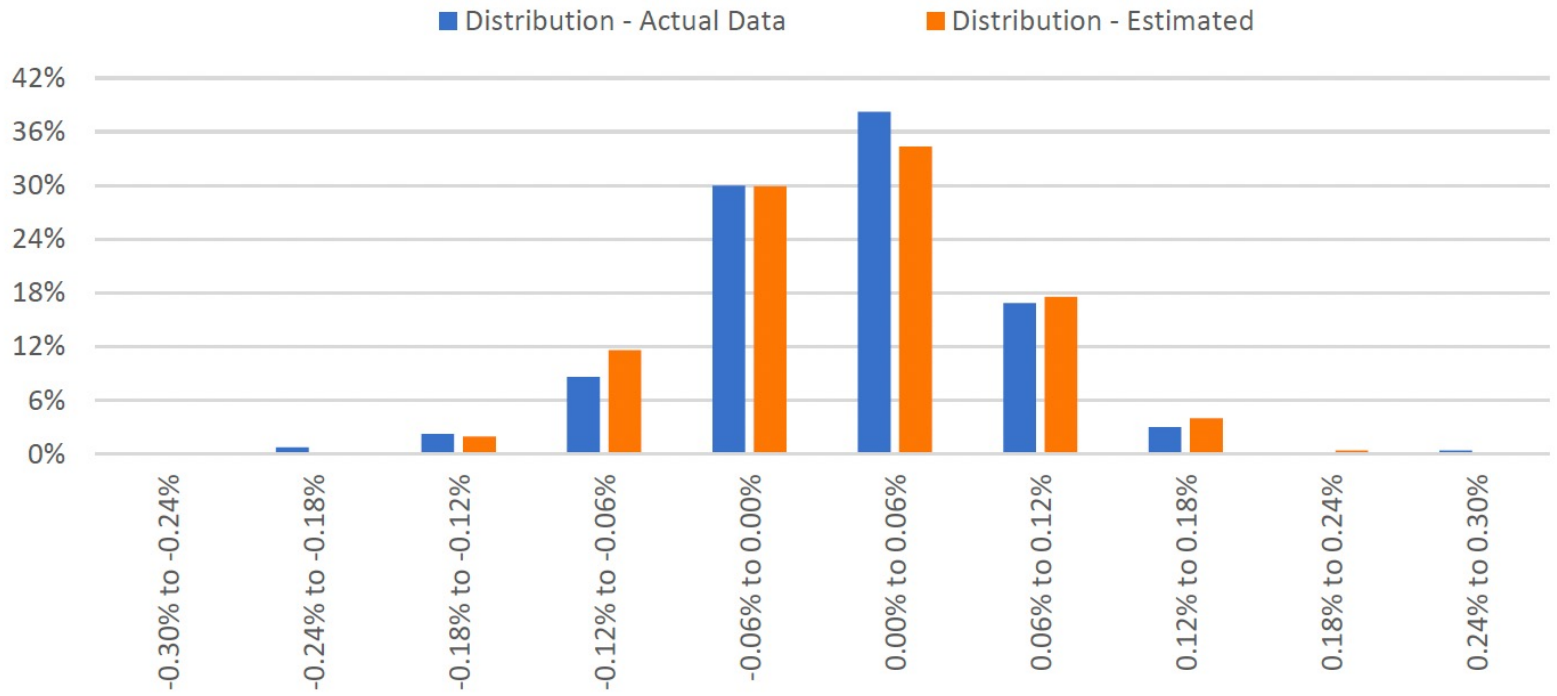
Distributions matter: Skewness

	Mean	Median	Skew-ness	% Pos-itive	% > T-bill	% > VW Mkt return
Panel A: Bootstrapped single stock portfolio						
Annual	0.294	0.038	3.07	52.2	48.6	41.9
Decade	6.174	-0.034	34.02	49.2	37.0	22.1
Full Period	135.809	0.481	72.04	55.5	34.6	14.4
Panel B: Value weighted bootstrapped 5-stock portfolios						
Annual	0.252	0.141	1.50	60.5	55.8	45.8
Decade	4.540	1.433	12.19	76.6	58.0	32.3
Full Period	45.977	10.229	24.65	92.3	70.1	27.1
Panel C: Value weighted bootstrapped 25-stock portfolios						
Annual	0.228	0.175	1.00	66.1	60.4	48.5
Decade	4.320	2.322	3.24	93.1	73.0	41.0
Full Period	39.842	21.649	8.79	99.7	92.7	37.3
Panel D: Value weighted bootstrapped 50-stock portfolios						
Annual	0.218	0.179	0.81	68.1	61.9	49.2
Decade	4.130	2.488	2.80	96.9	77.9	43.4
Full Period	37.433	24.579	4.94	100.0	97.0	40.2

The numbers of stocks indicated in the panel caption are selected at random for each month and value-weighted portfolio returns are computed each month for the selected stocks. These returns are linked over calendar year, nonoverlapping decade, and full sample period horizons. The procedure is repeated 20,000 times. Each linked return is compared to zero, to the actual holding return on 91-day RBI T-bills, and to the actual holding return to the value weighted market.

Source: "Stock Returns in India: A Working Paper", Raju (2024), https://papers.ssrn.com/abstract_id=4969249

Theoretical Distributions: Assumptions matter



Source: "Computing the Safe Withdrawal Rate for a Retirement Portfolio in India", Saraogi (2022), https://papers.ssrn.com/abstract_id=4216077

Simulations

- Use historical data
  - History rhymes

+ No subjective judgements and minimises assumptions/biases

+ Statistical methods enables formal hypothesis testing

+ Design choices
  - Type of simulation
  - Number of iterations

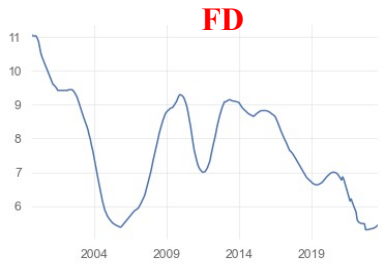
Monte Carlo and Bootstrapping

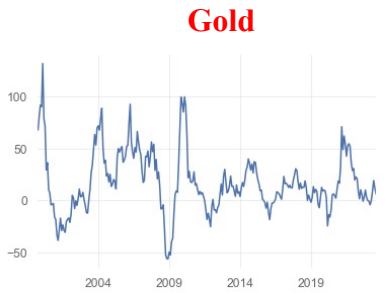
Actual	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Equity Returns	A	B	C	D	E	F	G	H	I	J	K	L
Debt Returns	A	B	C	D	E	F	G	H	I	J	K	L

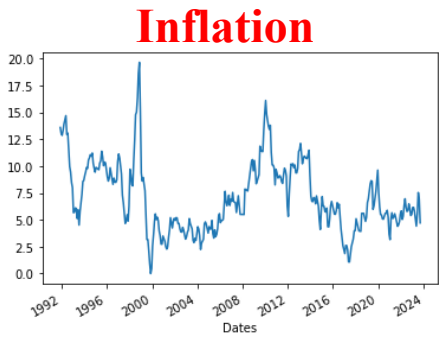
Monte Carlo	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Equity Returns	K	A	F	D	I	G	J	L	A	E	B	C
Debt Returns	D	I	G	J	K	A	F	A	E	B	C	L

Circular Bootstrapping	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Equity Returns	C	D	E	G	H	I	A	B	C	E	F	G
Debt Returns	C	D	E	G	H	I	A	B	C	E	F	G

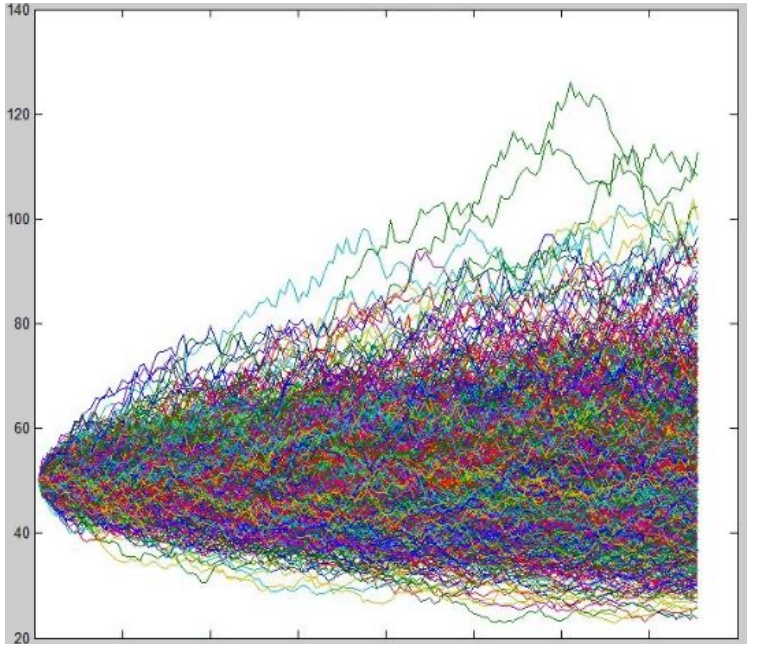
Uncertainty and Horizon







Simulation



Calculating the Safe Withdrawal Rate for India

Simulation Methodology

Monte Carlo Simulation: Uses random sampling from historical data.

Circular Bootstrap: Resamples historical data to maintain temporal correlations..

Assumptions

Annual rebalancing, Tax on FD 30%, Equities 10%

Duration: 25, 30, 35 years.

Equity, FD, and Gold as asset classes.

Iterations

50,000 per method.

Results

Failure rates and sustainable withdrawal rates.

Results

Table 3: Portfolio AWR Across Various Scenarios With 95% Target Portfolio Success Rate

Retirement Years	Circular Bootstrap			Monte Carlo Simulation		
Portfolio Allocation	25	30	35	25	30	35
0:100	4.2	3.6	2.9	3.7	3.0	2.6
10:90	4.3	3.7	3.2	3.8	3.2	2.8
20:80	4.4	3.8	3.3	3.8	3.2	2.8
30:70	4.4	3.8	3.4	3.7	3.1	2.7
40:60	4.5	3.8	3.4	3.5	3.0	2.6
50:50	4.4	3.7	3.4	3.3	2.8	2.5
60:40	4.3	3.7	3.3	3.1	2.6	2.3

Source: Calculations by the authors.
Notes: The table presents the annual withdrawal rates (expressed as percentages) for retirement portfolios in different combinations of withdrawal rates and equity-to-fixed deposit allocations. The rate shown is the annual withdrawal rate that allows for a 95% target success rate for our proportion of portfolios that deplete their funds before the designated retirement period ends. The results are shown for retirement durations of 25, 30, and 35 years and equity-to-fixed deposit allocations of 0:100 to 40:60 in increments of 10%. The analysis includes both Monte Carlo Simulation and the circular bootstrap methods. The rate is increased in 10 basis point increments in the calculations.

Source: "Balancing Acts: Safe Withdrawal Rates in the Indian Context", Raju & Saraogi (2024), https://papers.ssrn.com/abstract_id=4697720

Key Takeaways

- The widely accepted 4% rule, predominant in Western contexts, is not suitable for the Indian market. Instead, a more conservative withdrawal rate, ranging between 3.0% and 3.5%, emerges as more appropriate for Indian retirees.
  - The higher structural inflation
  - The higher volatility of asset returns, especially equity.

Key Takeaways

- Retirees are faced with a dilemma. The low real returns on Fixed Deposits imply that retirees are forced to take on market risks just to beat inflation. And market risks can be significant, to a point that retirees may lead a significantly lower quality of life than planned for.

- Fixed deposits are the current go-to conservative product for retirees, given their familiarity, access, and confidence in the product. Additional fixed-income alternatives providing meaningful opportunities for retirement portfolios to target duration and credit premia are required, allowing for higher real returns without adding too much volatility.

Key Takeaways

- Neither a conservative 100% Fixed Deposit portfolio, nor a 100% equity portfolio is likely to give the balance between beating inflation and avoiding long and significant drawdowns. Both these impact the ability to maintain a given quality of life during retirement.

- As we increase the share of equity, the withdrawal rates first increase, and then decline. Based on our analysis, an equity allocation of 40-50% looks appropriate to balance expected returns and expected volatility.

- But this is only a general comment: our methodology allows for portfolios to be constructed for specific circumstances and risk tolerance.

Key Takeaways

- Taxation on nominal returns is a further drag on the retiree,
    - The nominal return of 5% accompanied by inflation of 7%, means the investor at the 30% tax bracket is losing (7%-5%) + (5%*30%) = 3.5%.
- The tax burden is more 'punitive' on the safer fixed deposits, which provide more cash flow certainty. The lower long-term capital gains tax may bias the retiree to increase allocation to the more volatile equities, increasing the probability of a significant and non-recoverable capital loss.

Key Takeaways

- Increased diversification of retirement portfolios is preferable across long time horizons. Introducing gold allocation in your portfolio can improve withdrawal rates

- The long planning horizons, high volatility, and structurally higher inflation make retirement planning a complex exercise. We caution against using very simplistic and naive heuristics or rules of thumb.

- Retirees, financial planners, policymakers, and product providers should use multiple models and frameworks for better retirement products.

- The underfunding of retirement portfolios is a systemic risk, which India needs to solve urgently before it is too late.

Diversification: The only free lunch

Table 5: Failure Rates for 30:10:60 Equity:Gold:Fixed Deposit Portfolios

AWR	Retirement Years	Circular Bootstrap	Monte Carlo Simulation
3.00	25		<1
	30		1
	35		5
3.25	25		1
	30		3
	35		9
3.50	25		1
	30		6
	35	8	15
3.75	25		3
	30		11
	35	17	24
4.00	25		5
	30	17	18
	35	33	35

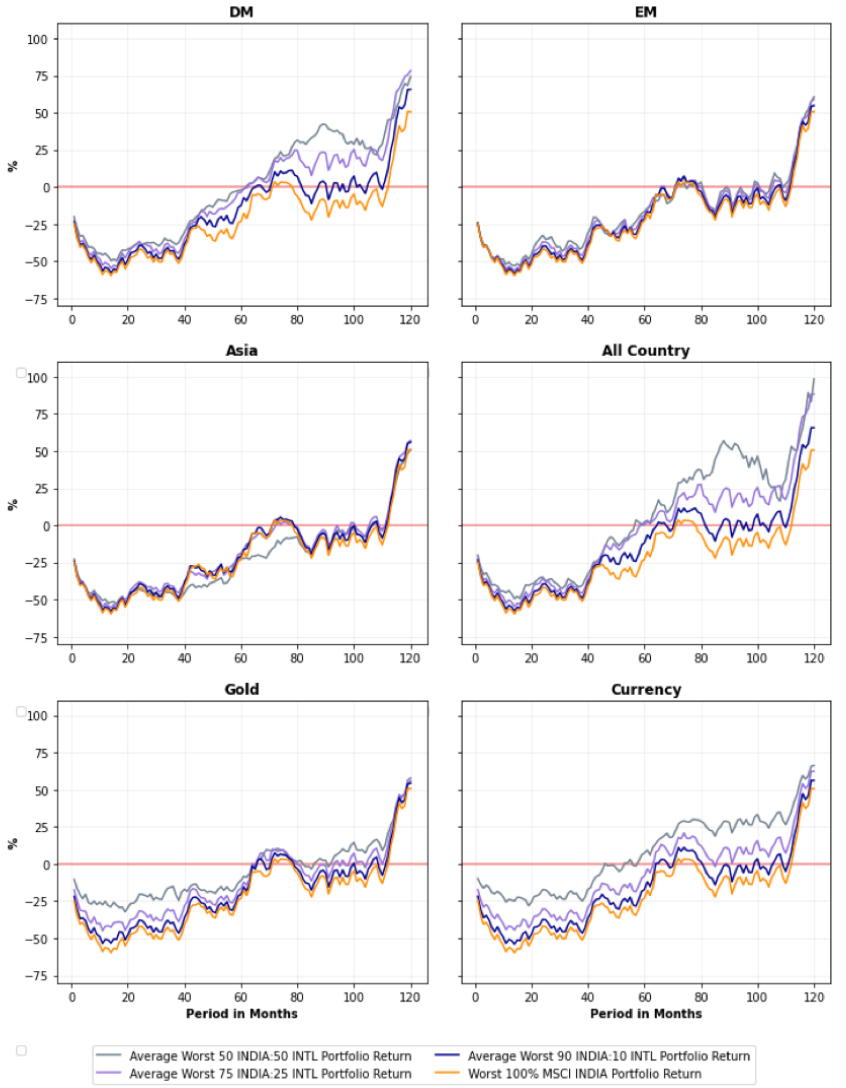
Source: "Balancing Acts: Safe Withdrawal Rates in the Indian Context", Raju & Saraogi (2024), https://papers.ssrn.com/abstract_id=4697720

Diversification

- It works eventually
- Sequence of Return risks remain

Source: "International Diversification in Equity Portfolios: An Indian Perspective", Raju (2023), https://papers.ssrn.com/abstract_id=4323893

Fig. 5. Average Worst Returns over Various Holding Periods for 100% IN and 90:10, 75:25, and 50:50 India: INTL Portfolios: December 1992 to December 2022



Shocks ripple through time: -10% Year 1

AWR	Retirement Years	Circular Bootstrap	Monte Carlo Simulation
3.50	25		6
	30	8	9
	35	10	14
3.75	25	25	15
	30	57	22
	35	59	29
4.00	25	58	26
	30	76	35
	35	77	44

Source: Calculations by the authors.
Notes: The table presents the failure rates (expressed as percentages) for the 40:60 Equity:Fixed Deposit retirement portfolios in different combinations of withdrawal rates and retirement durations of 25, 30, and 35 years. Unlike Table 2, year 1 of the n-period equity returns are set at -10% for all 50,000 simulations, and the rest of the methodology is the same.

Source: "Balancing Acts: Safe Withdrawal Rates in the Indian Context", Raju & Saraogi (2024), https://papers.ssrn.com/abstract_id=4697720

Behavioural Biases in Retirement Planning

Behavioural biases influence retirement planning decisions.

Cognitive biases leading to reasoning fallacies

Belief-perseverance biases (confirmation, representativeness, hindsight bias)

Information-processing biases (time perception, framing, self-attribution, availability, anchoring)

Emotional biases influence reasoning based on certain feelings

Overconfidence, disposition, loss aversion, gamblers fallacy, and affinity biases

Examples of Behavioural Biases

- Why should I worry about sequence of return risk. After all compounding is the eighth wonder of the world.
- Isn’t gain of 10% followed by a loss of 5%, the same as loss of 5% followed by a gain of 10%
- Volatility Drag? Why should I worry, since I will use a conservative 12% return for equities while historically I have realised 15% pa gains over the last 5 years
- I have a significant exposure to real estate assets and gold in my retirement portfolio. Isn’t that a good portfolio
- I want to keep by retirement principal intact. My retirement will require to be funded by the returns of my portfolio.

Strategies to Mitigate Biases

Education: Increase awareness of biases and their impacts.

Financial Data/Tools: Access to and understanding of methods

Financial Advice: Seek advice from financial professionals.

Diversification: Thoughtful diversified portfolio to mitigate risks.

Annuity Rates vs SWRs

Annuity Service Provider - Scheme Name					
	With Return of Purchase Price (With ROP) ₹			Without Return of Purchase Price (Without ROP) ₹	
Annuity Service Provider	Annuity for Life	Joint Life Annuity	NPS - Family Income	Annuity for Life	Joint Life Annuity
Aditya Birla Sun Life Insurance Co. Ltd	8,04,766 (6.9%)	0 (0%)	8,04,766 (6.9%)	9,94,290 (8.52%)	0 (0%)
Bajaj Allianz Life Insurance Co. Ltd	8,19,245.83 (7.02%)	Not Applicable	7,15,014 (6.13%)	9,01,699 (7.73%)	Not Applicable
Canara HSBC Life Insurance Co. Ltd.	7,67,952 (6.58%)	Not Applicable	7,35,732 (6.31%)	9,45,231 (8.10%)	Not Applicable
Edelweiss Tokio Life Insurance Co. Ltd	Not Available	Not Available	Not Available	Not Available	Not Available
HDFC Life Insurance Co. Ltd	8,04,220 (6.89%)	Not Applicable	8,04,220 (6.89%)	10,58,421 (9.07%)	Not Applicable
ICICI Prudential Life Insurance Co. Ltd	8,16,324 (7.00%)	Not Applicable	6,95,436 (5.96%)	8,67,960 (7.44%)	Not Applicable
IndiaFirst Life Insurance Co. Ltd	8,26,814.86 (7.09%)	Not Applicable	Not Applicable	10,16,978.76 (8.72%)	Not Applicable
Kotak Mahindra Life Insurance Co. Ltd	7,65,990 (6.57%)	Not Applicable	7,65,990 (6.57%)	9,63,256 (8.26%)	Not Applicable
Life Insurance Corporation of India	7,86,240 (6.74%)	Not Applicable	Not Applicable	10,56,615 (9.06%)	Not Applicable
MAX Life Insurance Co. Ltd	8,24,208 (7.06%)	Not Applicable	8,24,208 (7.06%)	10,57,504 (9.06%)	Not Applicable
PNB Metlife India Insurance Co. Ltd	7,23,133.65 (6.20%)	Not Applicable	7,23,133.65 (6.20%)	8,85,607.94 (7.59%)	Not Applicable
SBI Life Insurance Co. Ltd	7,52,905.0 (6.45%)	12,596.0 (0.11%)	0 (0%)	9,13,419.0 (7.83%)	0 (0%)
Shriram Life Insurance Co. Ltd.	8,22,680.00 (7.05%)	62,139.00 (0.53%)	8,22,680.00 (7.05%)	10,84,043.00 (9.29%)	62,139.00 (0.53%)
Star Union Dai-ichi Life Insurance Co. Ltd	7,38,205 (6.33%)	Not Applicable	Not Applicable	9,99,433 (8.57%)	Not Applicable
TATA AIA Insurance Co. Ltd	8,14,857 (6.98%)	Not Applicable	Not Applicable	8,83,467 (7.57%)	Not Applicable

Source: https://cra-nsdl.com/CRAOnline/aspQuote.html , as accessed on Oct 2024

- As per typical actuarial estimates, one unit of pension costs 22x
- In India, based on current annuity rates, one unit of non-increasing pension costs 12x. (increasing annuity is conspicuously missing from the Indian pension sector)
- How do we reconcile the actuarial rates with the established Safe Withdrawal Rates?

Conclusion

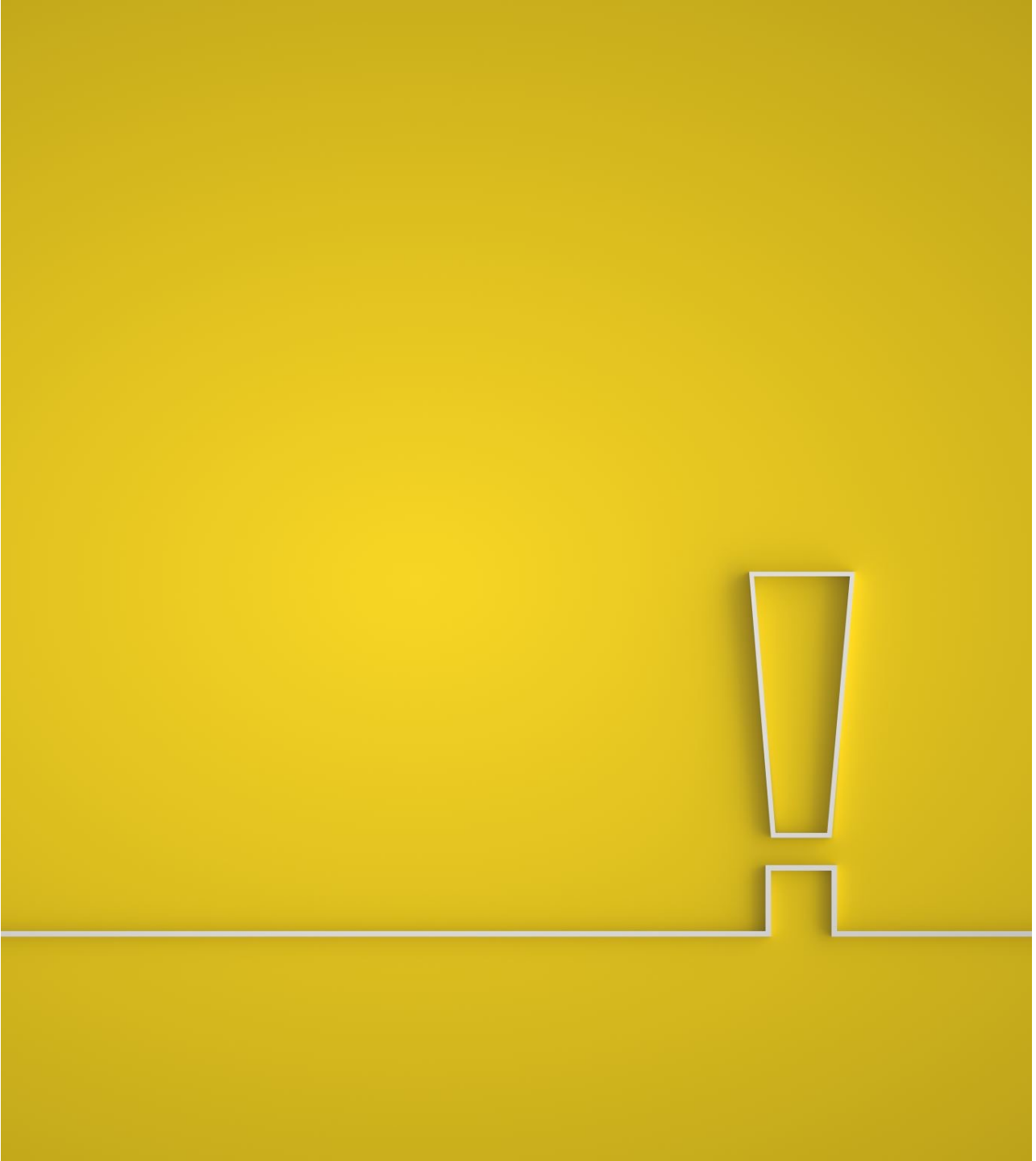
The problem of generating a pension-like income from a retirement corpus is a complex problem

Using the concept of Safe Withdrawal Rate, we can construct robust retirement portfolios that can withstand market volatility

As our financial markets are young, with limited data availability, it is difficult to calculate historical Safe Withdrawal Rate

We are forced to use an approach which combines historical data with simulations

High structural inflation along with high asset return volatility is the culprit behind the low Safe Withdrawal Rate in India



We welcome your questions and comments

Thank you