



# MITIGATING SEQUENCE OF RETURN RISK

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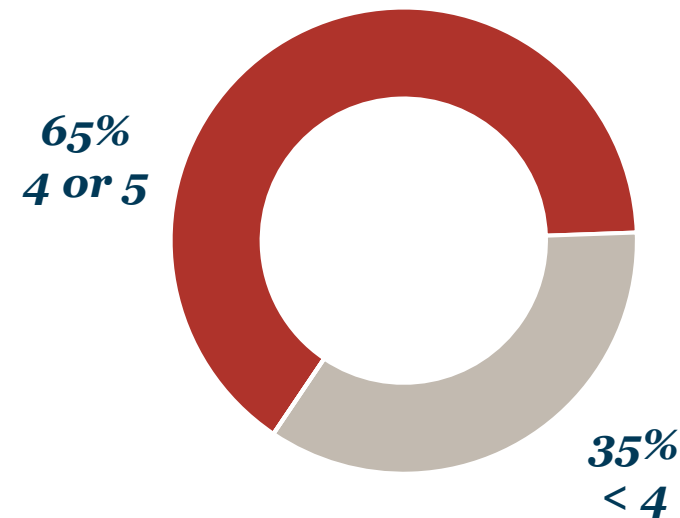
# ~100 RESPONSES TO INVITATION SURVEY

*91% response rate—thank you!*

Do you incorporate sequence risk when building portfolios?



On a scale of 1-5, how concerned are you about sequence of returns risk?  
(1 is least, 5 is most)



What is your preferred approach to mitigating sequence risk?

Most common results:

- ✓ Bucket strategies
- ✓ Bond ladders
- ✓ Cash reserve
- ✓ Asset allocation

# BEHAVIORAL STUMBLING BLOCKS

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*Moving your assets: Simple but not easy*

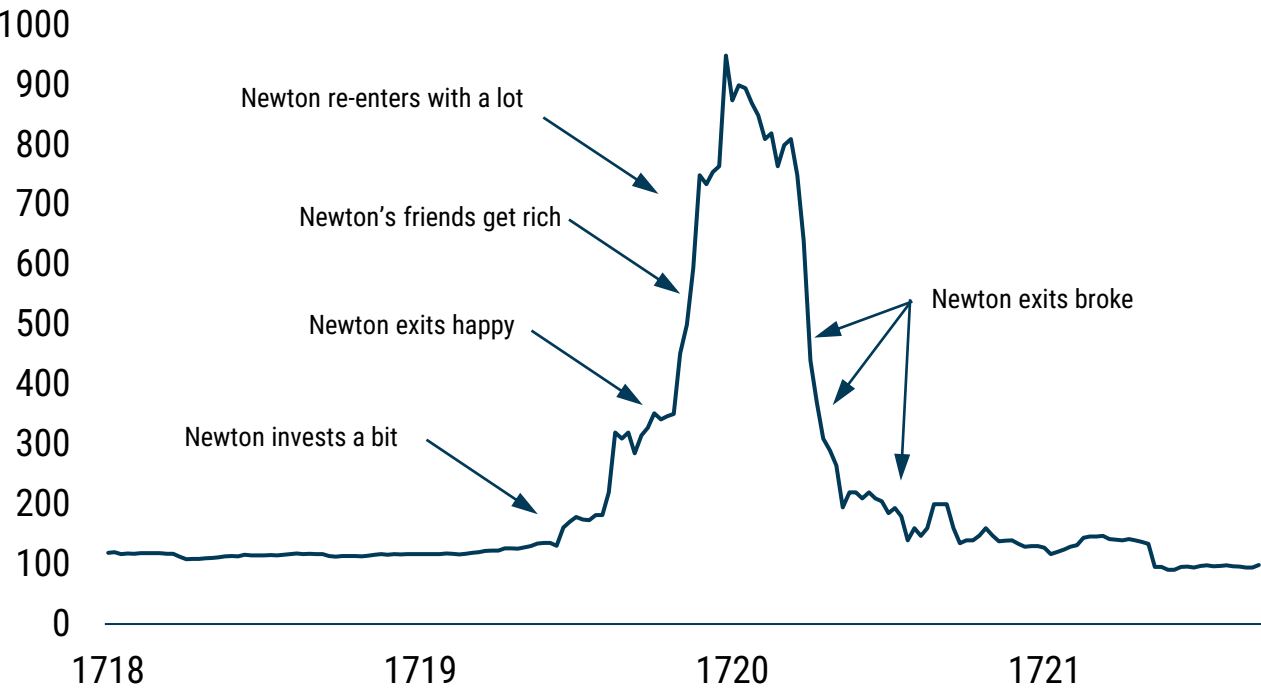


Source: Behavior Gap

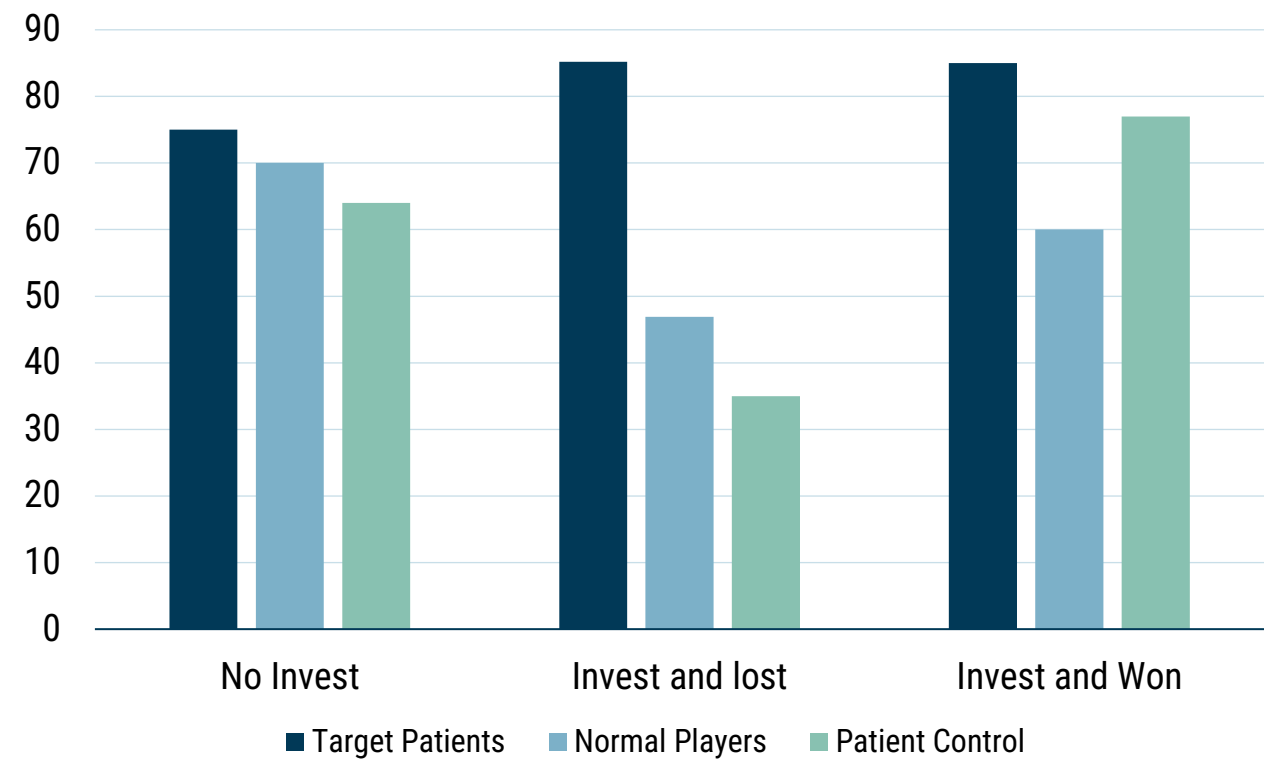
# RECENCY BIAS: WHAT'S PAST IS PROLOGUE

*Greed and Fear – welcome to the human condition*

NEWTON AND FOMO  
SOUTH SEA STOCK, DECEMBER 1718 – DECEMBER 1721



THE BRAIN DAMAGED HAVE THE EDGE!  
% OF PLAYERS INVESTING DIVIDED INTO THE OUTCOMES FROM THE PREVIOUS ROUND

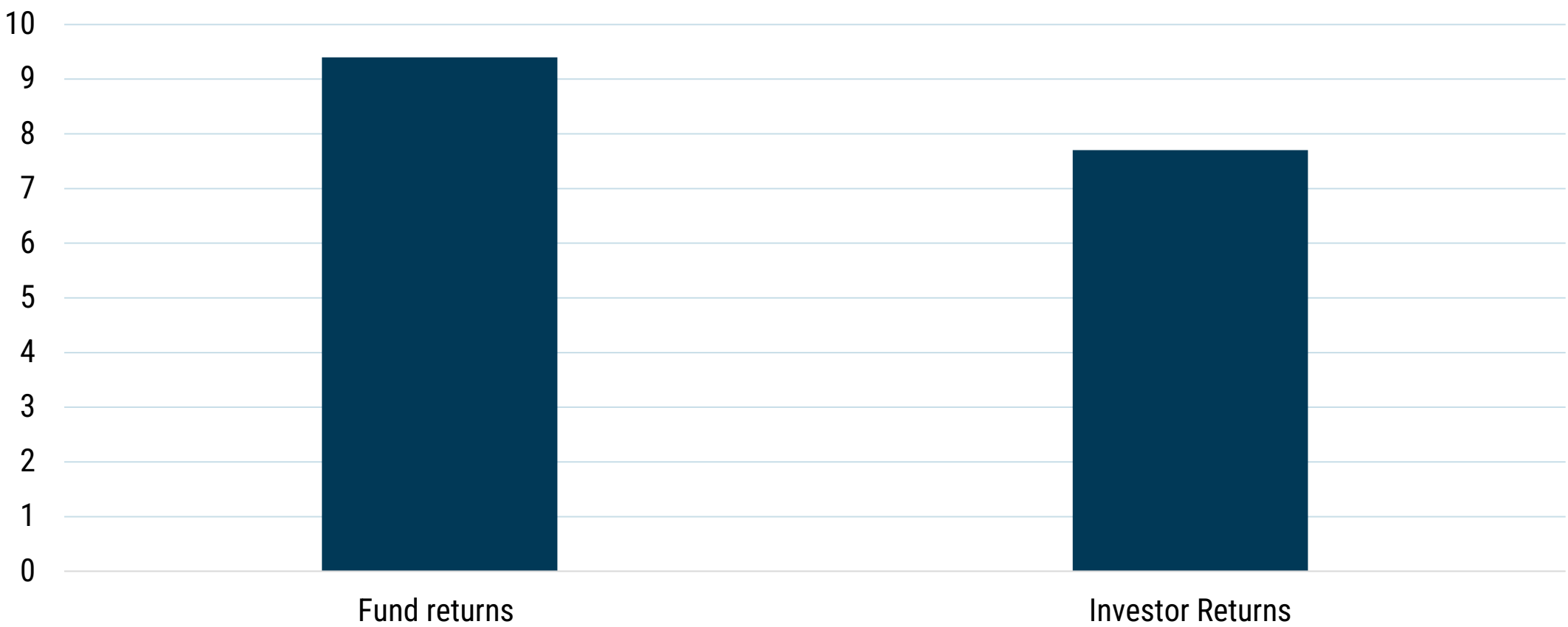


Source: Marc Faber, Editor and Publisher of "The Gloom, Boom & Doom Report" (left); Bechara et al. (2004) (right)

# STUDIES SHOW THE DANGERS OF POORLY TIMED DECISIONS

*Poor decision timing results in roughly a 2% p.a. drag on returns*

RETURNS % P.A. OVER THE LAST DECADE – U.S. FUNDS

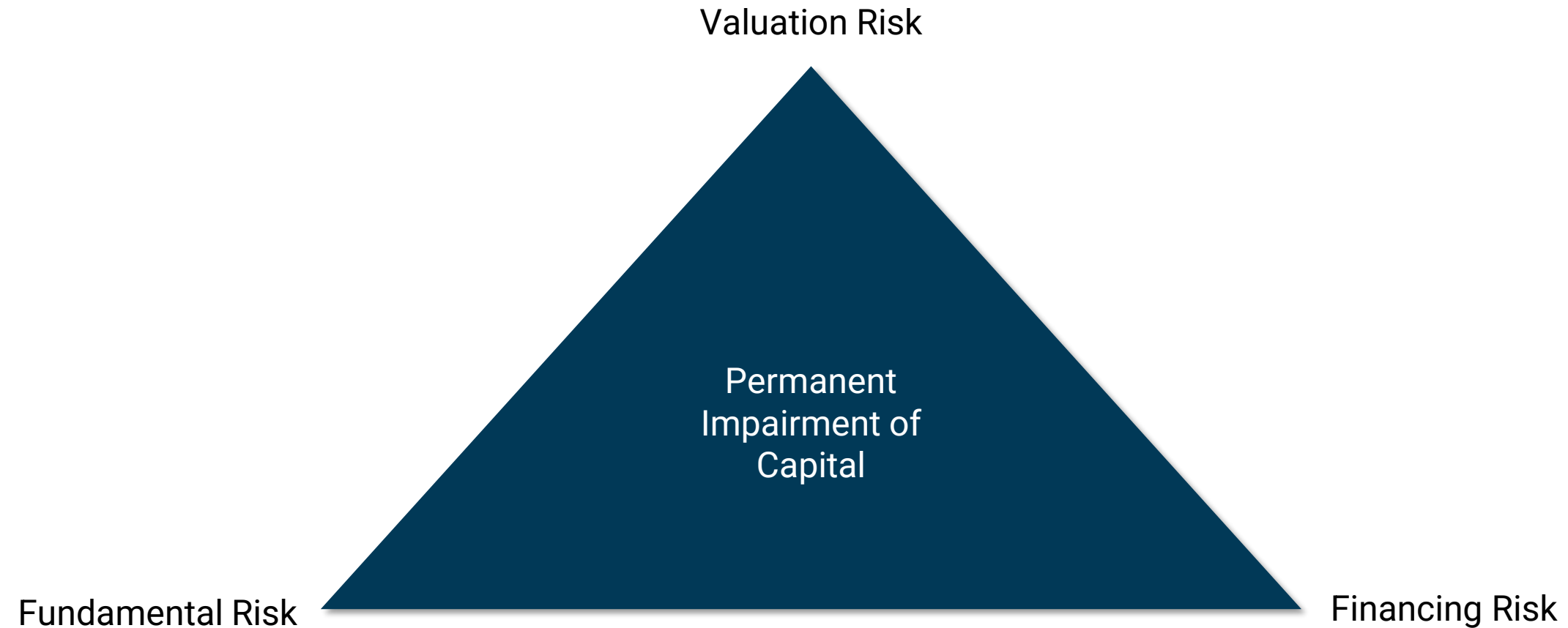


Source: Morningstar “Mind the Gap 2021”

# RISK: FINANCES' FAVORITE FOUR-LETTER WORD

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*But its least understood concept*



# SEQUENCE RISK IS A FINANCING RISK

## *The disarmingly simple arithmetic of sequence risk*

### **No cash flow, no sequence risk**

If you start with \$100, earn +10% in year 1, and -10% in year 2 you end up with \$99 =  $\$100 \times 1.10 \times 0.90$ .  
If the returns in years 1 and 2 are reversed, you still end up with \$99 at the end of year 2 because  $0.90 \times 1.10$  is equal to  $1.10 \times 0.90$ .

### **If you withdraw \$5 at end of year 1, you want high returns in year 1 (sell high)**

If you earn +10% in year 1 and -10% in year 2, you end up with \$94.5 =  $(\$110 - \$5) \times 0.90$ . If instead you earn the low return first and the high return second you get \$93.5 =  $(\$90 - \$5) \times 1.10$ , which is \$1 less than the first case.

### **If you contribute \$5 at end of year 1, you want low returns in year 1 (buy low)**

If you earn 10% in year 1 and -10% in year 2, you end up with \$103.5 =  $(\$110 + \$5) \times 0.90$ . If instead you earn the low return first and the high return second you get \$104.5 =  $(\$90 + \$5) \times 1.10$ , which is \$1 more than the first case.

# WAYS OF DEALING WITH SEQUENCE RISK

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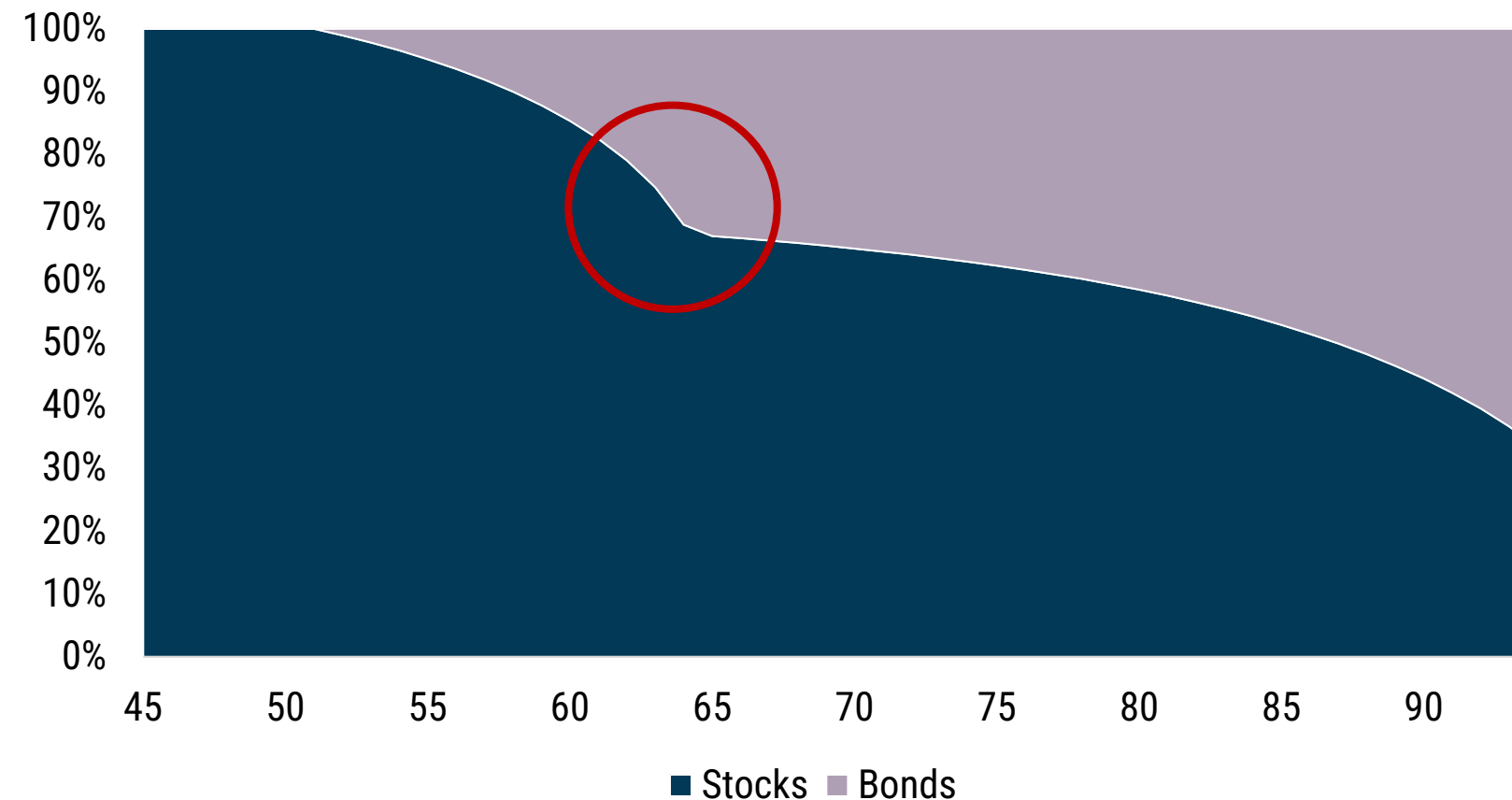
1. Frame your risk in a sensible way – ask the right question
2. Move your assets – buy low, sell high



# EXPECTED SHORTFALL AS A USEFUL LENS

*Minimizing the risk of “**not having what you need it**” leads to sensitivity to key life events*

A “MINIMAL SHORTFALL” GLIDEPATH



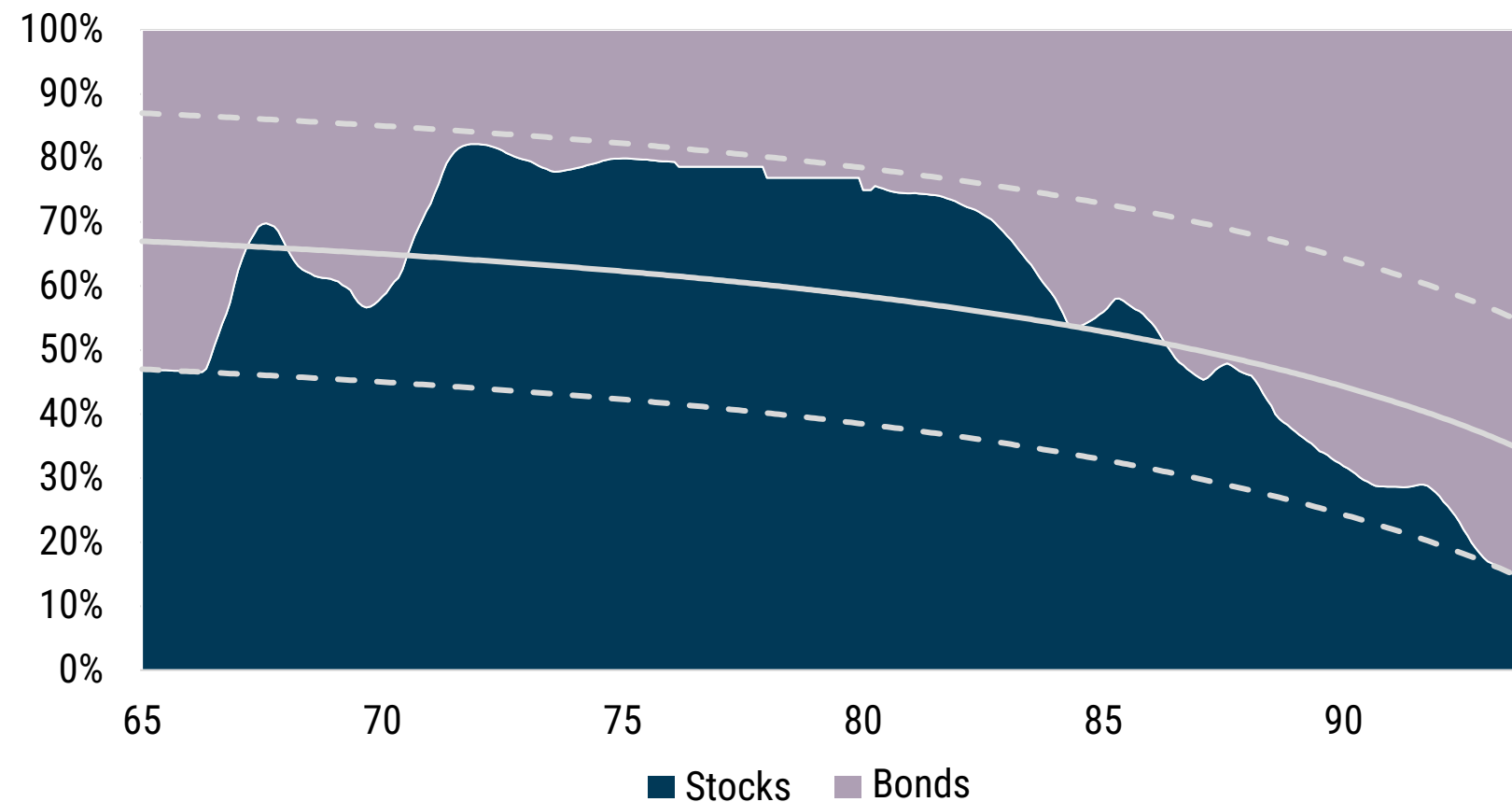
Weight in stocks falls at an accelerating rate as retirement approaches

Source: GMO  
Horizontal axis is age in years.

# MOVING YOUR ASSETS

*Within the context of minimizing shortfall risk*

VALUATION SENSITIVE OPTIMAL ESF (VSF)



Imposing  $\pm 20$ -point bands does not materially reduce the effectiveness of “moving your assets”

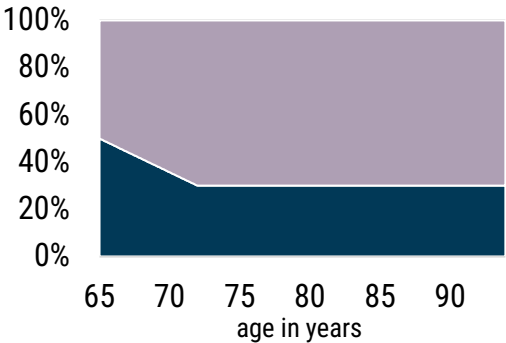
Source: GMO  
Horizontal axis is age in years.

# THE DERBY

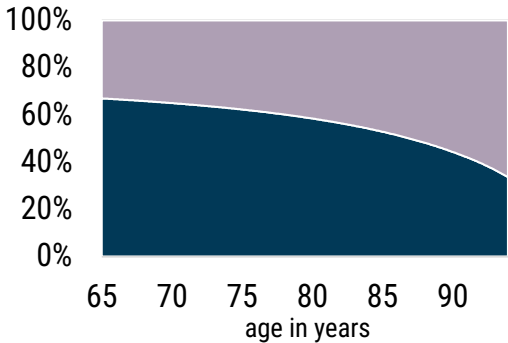
Start with \$1M at age 65, withdraw \$50,000\* every year

## THE THREE HORSES

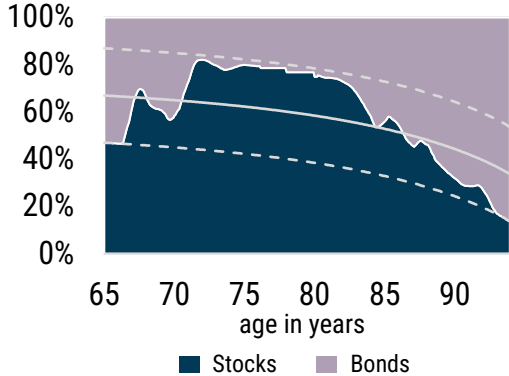
Common Glidepath



Optimal ESF



Valuation Sensitive Optimal ESF



## PROBABILITY OF RUIN

Withdrawal Rate	Common Glidepath	Optimal Shortfall	Valuation Sensitive Optimal Shortfall**
HISTORICAL BACKTEST			
3%	0%	0%	0%
4%	7.3%	3.1%	0.8%
5%	51%	25%	19%
MONTE CARLO SIMULATIONS			
3%	0.8%	0.5%	0.2%
4%	7.8%	4.3%	2.8%
5%	28%	18%	14%



Ask the right question



Move your assets

Source: GMO (charts left); Source: Robert Shiller, GMO (table right)

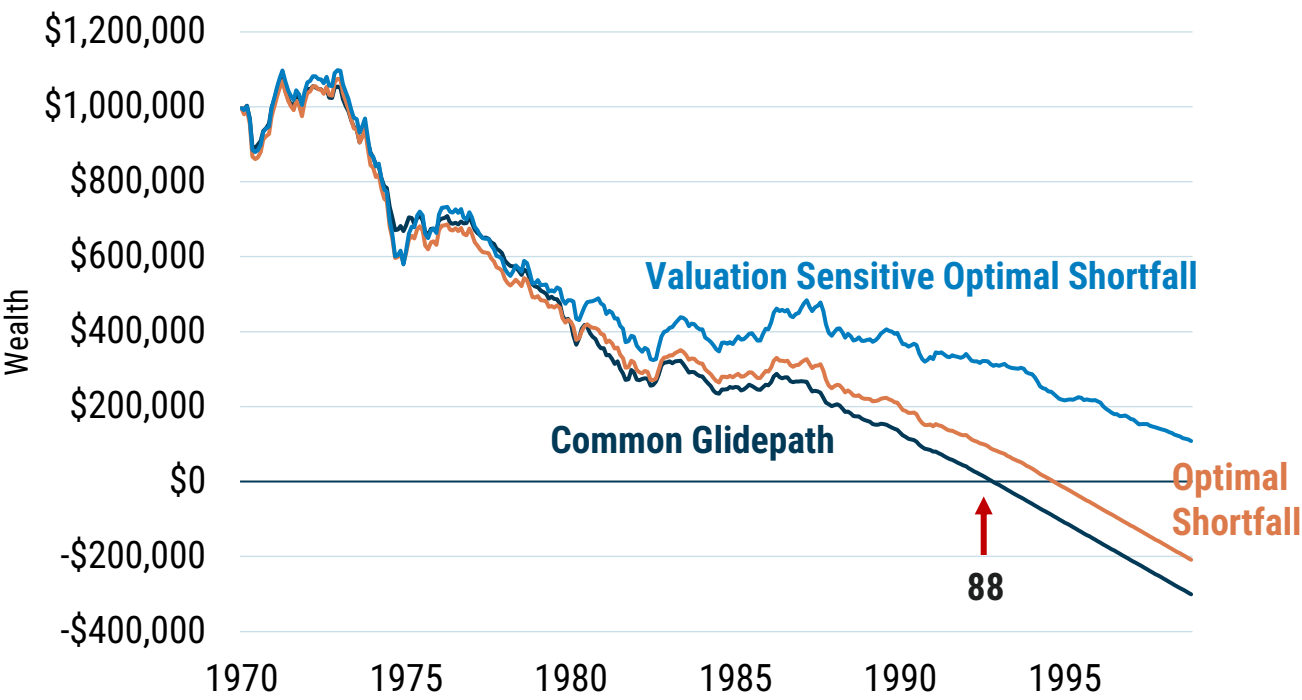
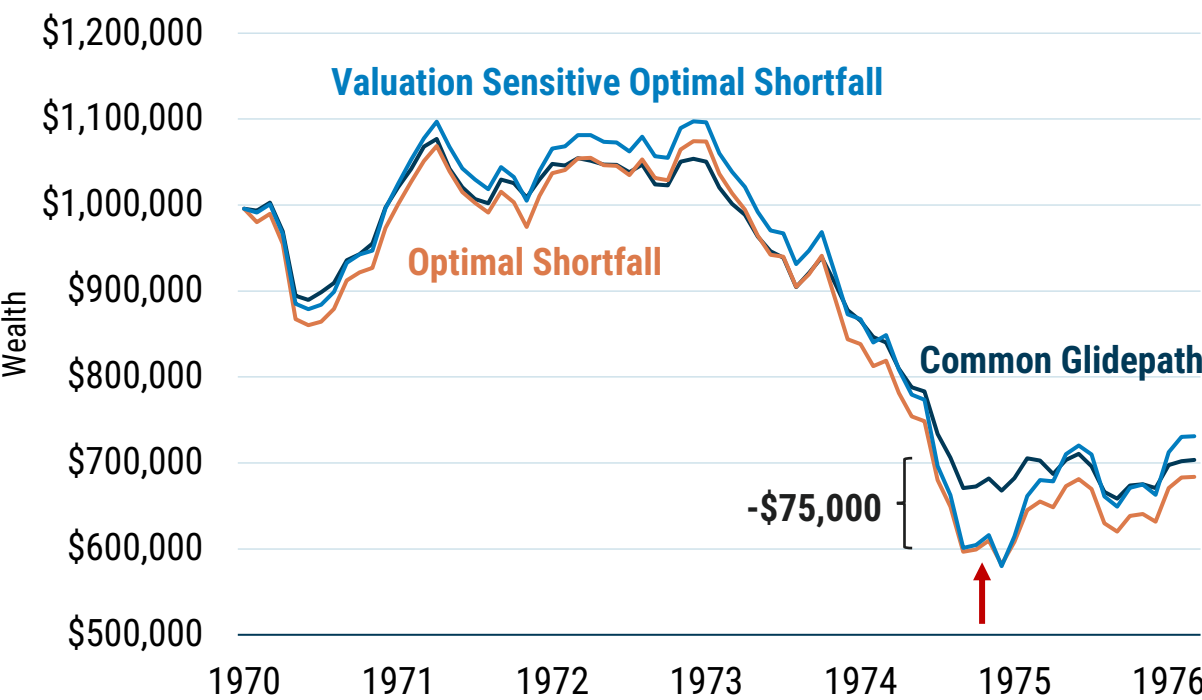
\*Withdraw \$50,000 in real terms

\*\*The stock weights in the Valuation Sensitive Optimal Shortfall results are constrained to lie between 20-percentage-point bands around the Optimal Shortfall stock weights (see Exhibit 4). For the historical backtests, the results for the unconstrained Valuation Sensitive Optimal Shortfall strategy are 0.7% and 18% for the 4% and 5% withdrawal rates, respectively. For the Monte Carlo simulations, the unconstrained results for the 4% and 5% withdrawal rates are 2.7% and 13%, respectively. Historical backtests use Robert Shiller data from 1926-2018. Monte Carlo results are based on 10,000 simulations.

# 1970s WASN'T JUST ABOUT BAD HAIR

*Arguably the worst time to retire was late 1960s, early 1970s*

## EVOLUTION OF WEALTH

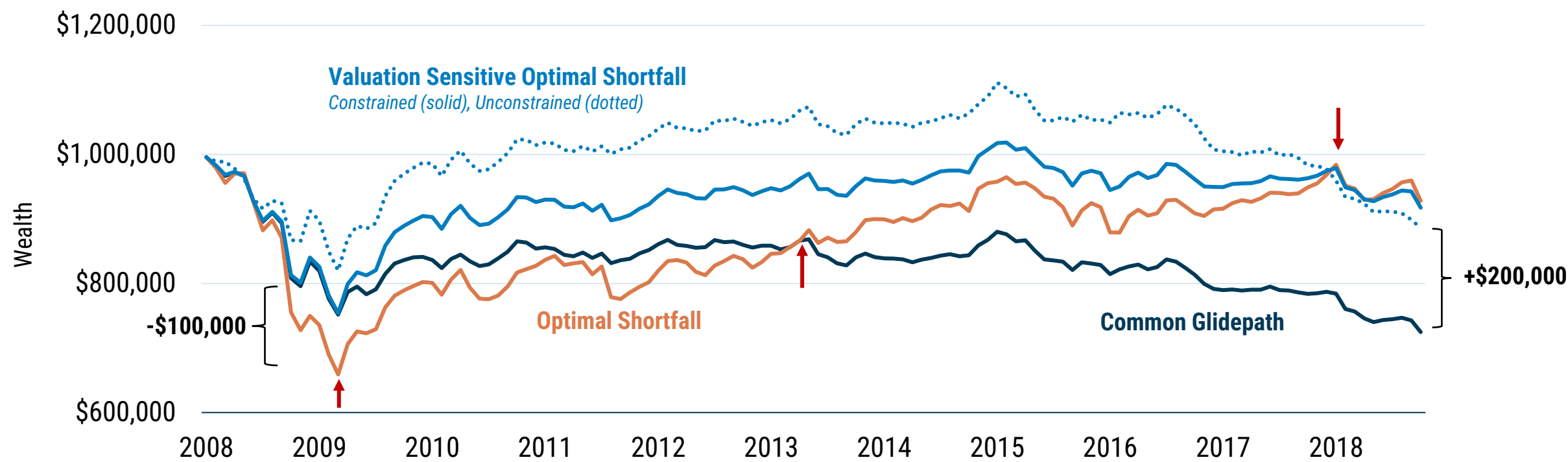


Source: GMO  
The red arrow labeled "88" indicates that for the Common Glidepath, wealth turns negative at age 88.

# RETIRING INTO THE TEETH OF THE GFC

*Stocks down ~50% out of the gate is pretty terrifying*

EVOLUTION OF WEALTH



Source: GMO

# FROM THEORY TO PRACTICE

The Nebo platform operationalizes minimizing shortfall, aligning the plan with the portfolio

nebo

by

GMO

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Advisors

Constraints

Models

Views

--- Clients ---

Portfolio

Needs

Glidepath

Strategies

Disclosures

acmeadmin: ACME, 45YO CLIENT

Acme, 45yo Client

Saved Glidepath Parameters

45

Current Age

500,000

Current Wealth

65

Retirement

5.0%

Pre-ret TCR

95

Longevity

3.0%

Post-ret TCR

100%

Max Stock

0%

Max Liquid Alt

Generate report

⚙

Explore Feasibility

Experiment with different cash flows and TCRs

Current Age 45

Retirement 65

Wid at 65

Real

Nominal

Current Wealth 500,000

Pre-ret TCR 5.0%

Set

4.7%

2,160,000

4,785,081

Specify wealth

Longevity 95

Post-ret TCR 3.0%

Set

440,000

3,213,968

Round to 1

Simple Cash Flows

Import Cash Flows

First year savings 25,000

growing (nominally) at 4.0%

Inflation 4.0%

Refresh

Net withdrawal at retirement (current \$) 100,000

growing (nominally) at 4.0%

Starting at 65

Threshold 20%

Save Parameters

Explore Viability

Rebuild glidepaths and run simulations to test viability

Glidepath

Simulations

My Glidepath (ESF)

My Glidepath (Fixed)

GP Returns (Equilibrium)

Pre-ret TCR 5.0%

Max stock 100%

Post-ret TCR 3.0%

Max liquid alts 0%

One Year G/L Range: Max Stock 100%

0.5%

2.5%

%

2.5%

0.5%

-45%

-34%

46%

57%

Rebuild Glidepath

Run Sims

Mean reversion

Weight (%)

Age

Stock

Long Term Bond

Short Term Bond

Liquid Alt

Cash Flows (Nom)		Cash Flows (Real)		Glidepath Sims		W/draw Sims		Savings Sims		Ret Age Sims	
Age	Year	Savings	Withdrawals	Other	Total Cash Flow	Wealth	W/draw rate				
45	2022	25,000	0	0	25,000	572,025					
46	2023	26,020	0	0							
47	2024	27,082	0	0							
48	2025	28,187	0	0							
49	2026	29,338	0	0							
50	2027	30,535	0	0							
51	2028	31,781	0	0							
52	2029	33,078	0	0							
53	2030	34,428	0	0							
54	2031	35,833	0	0							
55	2032	37,296	0	0							
56	2033	38,818	0	0							
57	2034	40,402	0	0							
58	2035	42,051	0	0							
59	2036	43,767	0	0							
60	2037	45,553	0	0							
61	2038	47,412	0	0							
62	2039	49,347	0	0							
63	2040	51,361	0	0							
64	2041	53,457	0	0							
65	2042	0	-231,637								
66	2043	0	-241,090								
67	2044	0	-250,929								
68	2045	0	-261,170								
69	2046	0	-271,828								
70	2047	0	-282,922								
71	2048	0	-294,468								
72	2049	0	-306,485								
73	2050	0	-318,993								
74	2051	0	-332,012								
75	2052	0	-345,561								

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Advisors

Constraints

Models

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--- Clients ---

Portfolio

Needs

Glidepath

Strategies

Disclosures

20-Sep-2022

Save

Use GMO

Use Equilibrium

	Asset Class	GMO Exp Ret	GMO Vol	GMO Stock Corr	GMO Bond Corr	Firm Exp Ret	Firm Vol	Firm Stock C
GMO Stock Model - US Only	Stock	-2.5%	17.5%	1.00	0.00	6.0%	17.5%	
GMO Stock Model - GEAF	Stock	4.5%	17.5%	1.00	0.00	6.0%	17.5%	
GMO Stock Model - Benchmark Free	Stock	8.5%	17.5%	1.00	0.00	6.0%	17.5%	
GMO Basic Long Term Bond	Long Term Bond	-0.4%	7.4%	0.00	1.00	2.5%	7.4%	
GMO Basic Short Term Bond	Short Term Bond	-0.4%	3.0%	0.00	0.50	1.5%	3.0%	
Acme Hedge Funds	Liquid Alt	2.6%	9.0%	0.39	0.00	3.7%	9.0%	
Acme Global Credit	Custom Alt	2.9%	8.4%	0.55	0.06	4.5%	8.4%	
Acme Real Asset	Custom Alt	1.1%	10.5%	0.45	0.00	4.2%	10.5%	

Return Correlations	GMO Stock Model - US Only	GMO Stock Model - GEAF	GMO Stock Model - Benchmark Free	GMO Basic Long Term Bond	GMO
GMO Stock Model - US Only	1.00	1.00	1.00	0.00	
GMO Stock Model - GEAF	1.00	1.00	1.00	0.00	
GMO Stock Model - Benchmark Free	1.00	1.00	1.00	0.00	
GMO Basic Long Term Bond	0.00	0.00	0.00	1.00	
GMO Basic Short Term Bond	0.00	0.00	0.00	0.50	
Acme Hedge Funds	0.39	0.39	0.39	0.00	
Acme Global Credit	0.55	0.55	0.55	0.06	
Acme Real Asset	0.45	0.45	0.45	0.00	

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# QUESTIONS & ANSWERS

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