NEEDS-BASED ALLOCATION: A NEW PLATFORM FOR PORTFOLIO CONSTRUCTION -ONE YEAR LATER

Martin Tarlie



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- 1. Conceptual overview
- 2. Needs-Based Allocation: the basic concept
- 3. NEBO: the platform

Our vision is to help people achieve financial well-being by helping financial advisors build better portfolios for all their clients.

### MAIN TAKEAWAYS

#### NEBO is an asset management platform that redefines risk

- 1. NEBO melds financial planning and asset management.
- 2. NEBO enhances human intelligence.
- 3. NEBO generates better portfolios for your clients.

"What do you need, and when do you need it?"

### WHY WE ARE SO OPTIMISTIC ABOUT NEBO

Many of our users are "always questioning their portfolios ..."

... having better-designed client portfolios are their own reward.

... Knowing that NEBO is ... calculating the allocation that seems most likely to succeed, makes them feel a lot more confident that they are doing the right thing for clients.

... It's hard to overstate how valuable that is to the advisor.

### **CONCEPTUAL OVERVIEW**

### FINANCIAL PLANNING & ASSET MANAGEMENT

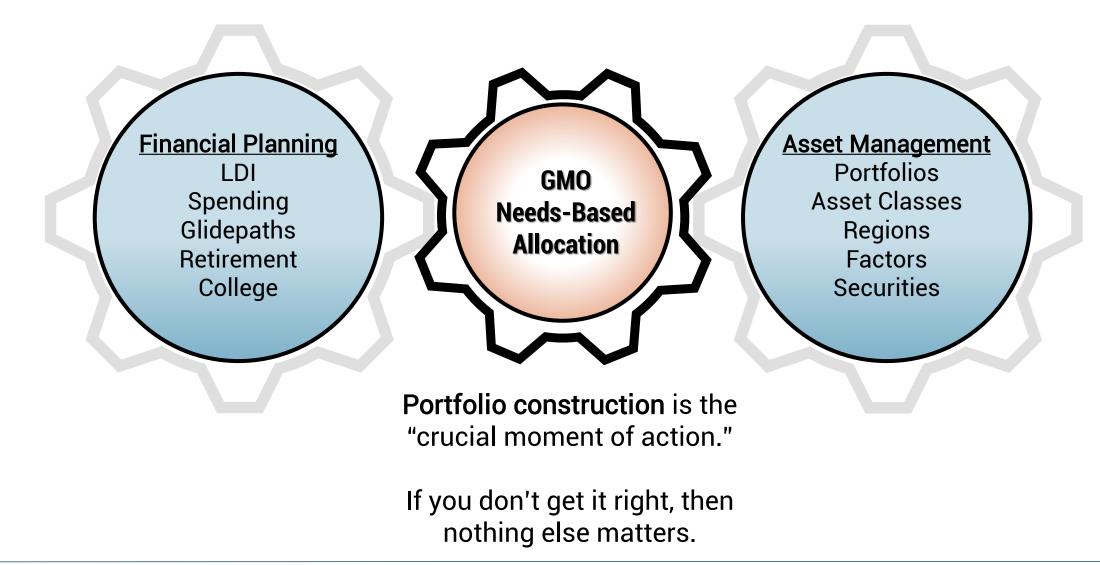
#### Currently...the left hand doesn't talk to the right hand





### FINANCIAL PLANNING & ASSET MANAGEMENT

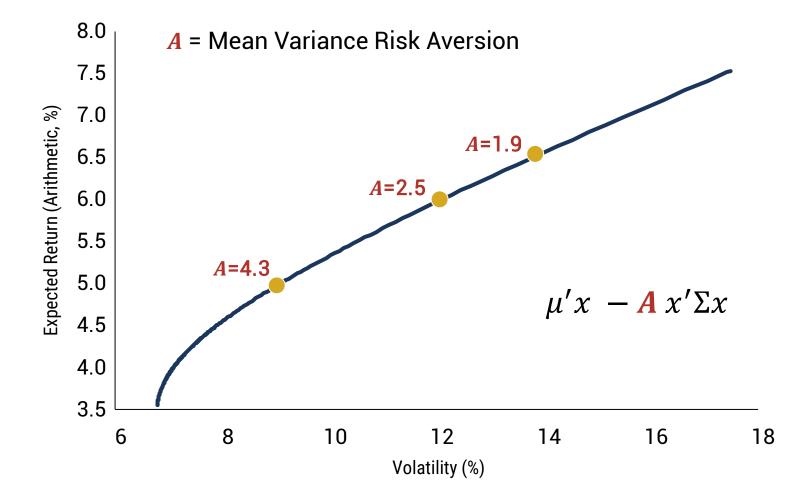
Needs-Based Allocation melds financial planning and asset management



## NEEDS-BASED ALLOCATION: THE BASIC CONCEPT

### THE EFFICIENT FRONTIER REVISITED

Horizon and TCR\* define the appropriate location on the frontier – NOT your risk aversion



<sup>\*</sup>TCR = "Target Compounding Rate" is the rate at which you need to compound your wealth over the investment horizon

Efficient frontier generated by a stock-bond portfolio. Expected real returns on stocks and bonds are 6% and 2.5%, and volatilities are 17.5% and 7.8%, with zero correlation. Expected returns are not mean reverting.

### **NEEDS-BASED ALLOCATION**

#### **Redefining risk**

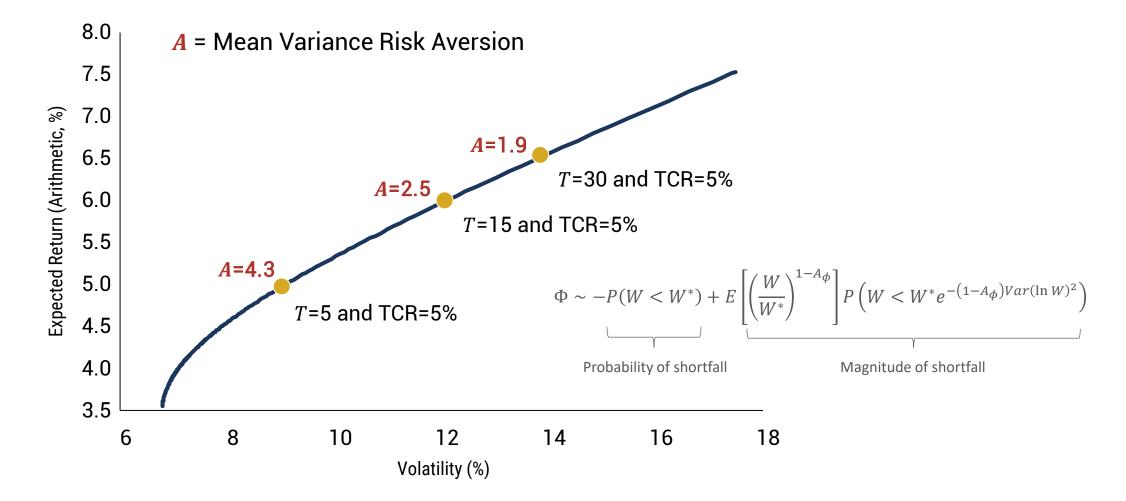
#### Risk = not having what you need, when you need it

- 1. Risk ≠ volatility.
- 2. Care more about shortfall than surplus.
- 3. Horizon matters
  - e.g., aging is a continuous life event!



### THE EFFICIENT FRONTIER REVISITED

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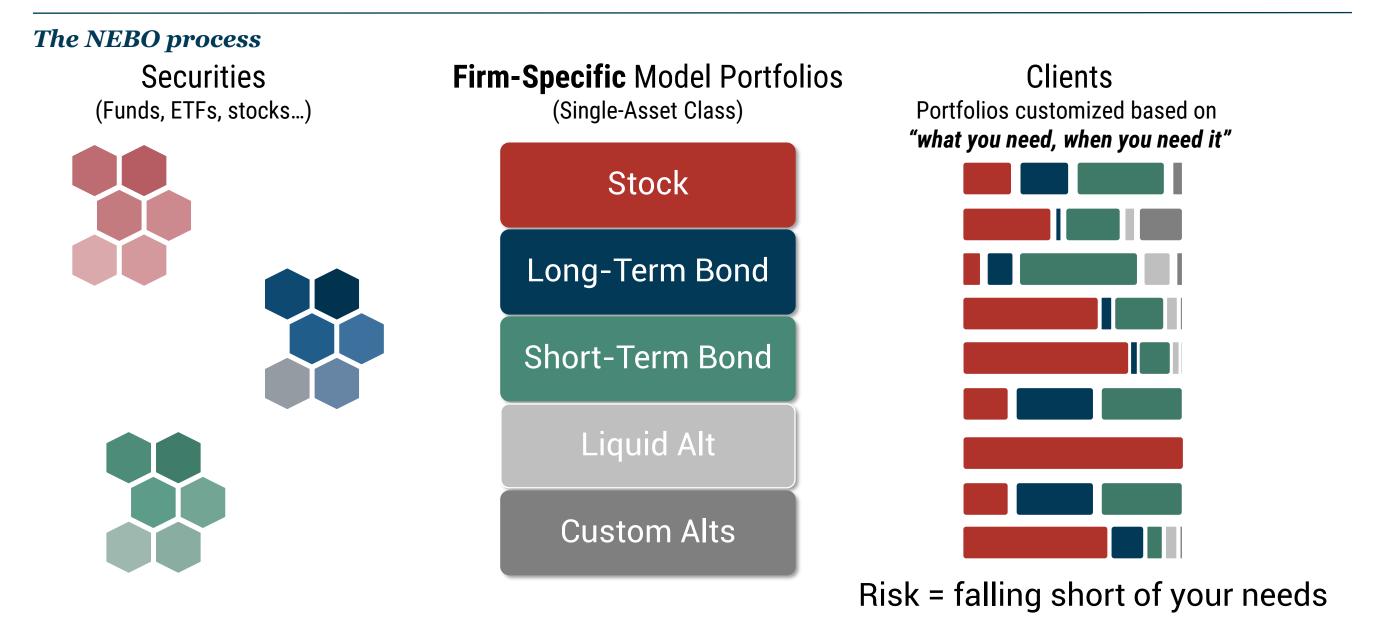
## NEBO: THE PRODUCT OF USER-LED DEVELOPMENT

### **BEFORE NEBO**

#### A common process

**Model Portfolios** Clients Securities (Funds, ETFs, stocks...) (Multi-Asset Class) Portfolios based on "risk" category High Risk Medium Risk Low Risk Risk = portfolio volatility

### AFTER NEBO



### THE POWER OF SINGLE ASSET CLASS BUILDING BLOCKS

#### Solves a hard financial engineering problem

Simplify and clarify portfolio structure

- Helps you see the forest through the trees
- Layers the decision-making process

Optimizers are bad at choosing between similar assets

- More robust optimization
- Tend to rely less on constraints



### PORTFOLIO CONSTRUCTION

#### Multi-period shortfall optimization is where the rubber meets the road

Constraints	Firm Model	s Firm Views	Clients	Vly Portfolio	My Needs	My Glidepa	th My Stocks	My Long	g Term Bonds	My Short Ter	m Bonds	My Liquid Alts	My Custom A	Alts Education	Disclosures
Acme, 60yo C	Client	<b>T</b>													
rtfolio Constru	iction														
		Asset Class Proper	ties Corr	elations	Term Structures	Efficient	Frontier				Constraints			Ages & TCRs	
28-Sep-202	21 🔻	Firm View 🔻	Exp Ret	Vol	Stock Corr	Bond Corr	Glidepath		Min Wgt	Max Wgt	G	ustom	•	Current Age	60 V
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Shor		Short Term Bond	1.5	% 3.0%	6 0.00	0.50	0.0%		0.09	5 100.0%				Pre-ret Real TCF	5.0%
		Liquid Alt	3.7				0.0%		0.09		One	Year G/L Range: Max	Vol 18%	Post-ret Real TCF	
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Exp	oort	Acme Real Asset	4.2	% 10.5%	6 0.45	0.00	0.0%		0.09	5 20.0%				Mean re	version
											-46%	-35% 46	i% 57%	Covariance Ma	atrix Status
	hanges ►2021										Expecter	d Inflation 3.0%			•
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- NEBO is not a "black box"
- NEBO is designed to answer this question:

"what do I need to believe in order to own this portfolio?"

- About the markets
- About the client
- NEBO helps you find the right balance between the art and science of portfolio management

The result is **better portfolios** for your client

### EFFICIENT PORTFOLIO MANAGEMENT

#### **Retire your spreadsheets!**

A	A	В	С	D	E	F	G
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6					inggressile iso	indenate oo	Conservative of
7	SuperClass	Benchmark					
8	STB	BBGBarc Us Govt/Credit 1-5 Yr			0.00%	17.50%	35.00%
9	ILTB	BBgBarc US Agg Bond			0.00%	17.50%	35.00%
0	Equity	MSCI ACWI			100.00%	65.00%	30.00%
1							
2				Expected Return	6.00%	4.60%	3.20%
3							
4							
5	Asset Class	Benchmark	Fund	Ticker			
6	Short-Term Corp/Gove Bonds	BBGBarc Us Govt/Credit 1-5 Y	Acme Short-Term Bond	AAAAA	0.00%	8.75%	17.50%
7	Short-Term Multisector/High Yield	ML BofA 0-2Y Duration BB-BI	Acme Short-Term High Yield	AAAAB	0.00%	8.75%	17.50%
8							
9	Intermediate-Term Credit	BBgBarc US Govt/Credit TR	Acme Intermediate Credit	AAAAC	0.00%	8.75%	17.50%
0	Multisector Credit	BBgBarc US Universal	Acme Multisector Credit	AAAAD	0.00%	8.75%	17.50%
21		_					
22	Domestic Large Core	Russell 1000	Acme Domestic Large Core	AAAAE	24.00%	15.60%	7.20%
23	Domestic Mid Core	Russell Mid Cap	Acme Domestic Mid Core	AAAAF	23.00%	14.95%	6.90%
4	Domestic Small Core	Russell 1000	Acme Domestic Small Core	AAAAG	23.00%	14.95%	6.90%
25	Foreign Large Core	MSCI ACWI Ex US	Acme Foreign Large Core	AAAAH	10.00%	6.50%	3.00%
26	Foreign Small/Mid Core	MSCI ACWI Ex USA Small	Acme Foreign Small/Mid Core	AAAAI	10.00%	6.50%	3.00%
27	Emerging Markets	MSCI Emerging Markets	Acme Emerging Markets	AAAAK	10.00%	6.50%	3.00%
8		2.2					
9					100.00%	100.00%	100.00%
80							
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2			Acme Domestic Mid Core	AAAAF	23.00%	23.00%	23.00%
3			Acme Domestic Small Core	AAAAG	23.00%	23.00%	23.00%
4			Acme Foreign Large Core	AAAAH	10.00%	10.00%	10.00%
:5			Acme Foreign Small/Mid Core	AAAAI	10.00%	10.00%	10.00%
6			Acme Emerging Markets	AAAAK	10.00%	10.00%	10.00%
7			in the Energing Flances				
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й				STB	0%	18%	35%
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**Excel** 

#### VS.

#### **NEBO**

Constraints	Firm Models	Firm View	/s Clients	My Po	ortfolio My Ne	eds My Glider	oath My Sto	ocks My L	ong Term Bonds.	My Short	Term Bonds	My Liquid Al	ts My Custom	Alts E	Education	Disclosu
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	shortia		Liquid Alt		0.3%	8.0% 0.		00 1.8%		0.0%	20.0%					Real TCR
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### INVESTMENT SCHEMA – ONBOARDING HAS TREMENDOUS VALUE

#### Our best thinking, customized to your firm's investment philosophy

eadmin																
Constraints	Firm Models	Firm Views	Clients	My Portfolio	My Needs	My Glidepath	My Stocks	My Long Term Bonds	My Short Term Bonds	My Liquid Alts	My Custom A	ts Education	Disclosures			
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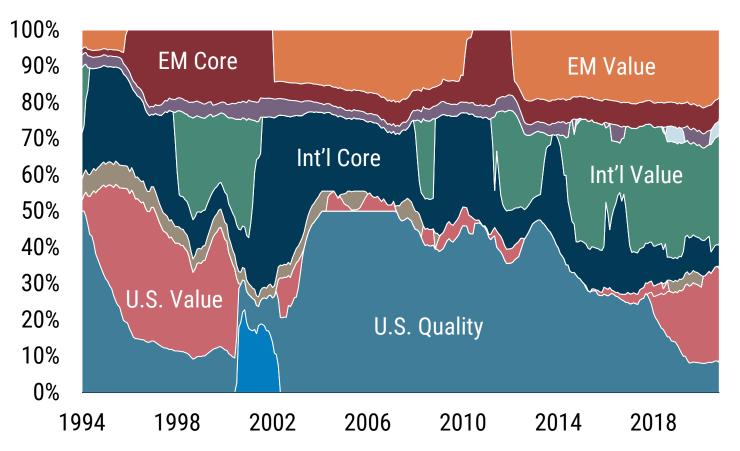
• Open architecture

- Reflects your investment philosophy
- Suite of customizable, single-asset class strategies ("building blocks")
  - Global equity
  - Unconstrained equity
  - Regional equity factor strategies
  - Global credit (e.g., High Yield, BB, EMBIG)
  - Real assets: (e.g., REITS, TIPS, Infra, Resources, Comm)
- NEBO can handle privates & illiquids

### HYPOTHETICAL EQUITY ALLOCATION STRATEGY

#### An example of dynamic regional and factor allocations

#### EQUITY ALLOCATION STRATEGY



- Builds on our 30-year history of managing global equity strategies
- Customizable to your constraints
- Dynamic regional and factor weights

Avg Alpha	0.91%
Tracking Error	3.5%
Information Ratio	0.26

#### As of 10/21 | Source: GMO

Past performance, whether hypothetical or actual is not predictive of future returns. Please see disclosures at the end of this presentation.

### CUTTING-EDGE FINANCIAL PLANNING

#### Simple to use and packs a lot of firepower

Constraints Firm Models	Firm Views	Clients 1	Vly Portfolio	My Needs	My Glidepath	My Stocks	My L	ong Term Bond:	My Short Ter	m Bonds N	y Liquid Alts M	y Custom Alts	Education	Disclosures
Acme, 51yo Client	•	Save Change	es .			Ge	nerate repo	ort 🗌 🖳		Savings Sims		Sce	nario	
What I Need & When I Need It	Selecting We	alth Targets	Calculate T	CRs		Plan F	easibility	Glidepath	Withdrawal Rate	es Savings	Retirement Ag	es		
Specify returns (TCRs)	Pre	e-retirement Real* TCR 5.0%		Post-ret Real*	TCR 3.0%			Thres	hold 20%	•	The plan is consider (i) nominal wealth nominal wealth (ii) TCRs do not e	h at longevity exce h at retirement, or o	eds the thresho current wealth if	ld times either already retired.
		0.070												
Current Wealth 500,000	1,4	490,000 (Real	*)	740	0,000 (Real*)	Cash	Flows (Nor	minal) Glide		hdrawal Sims	Savings Sims	Ret Age Sims		
Current Age 51 V	2	270,000 (Nom	(Isni	2 850	0,000 (Nominal)	Age	Year	Savings	Withdrawal	Other	Total Cash F	low Wealth	W/	draw rate
	Target at			Target at 95		51	2021	25,000	0		0 25,000	566,749		-
	ranger dt			anger at 00		52	2022	25,761	0		0 25,761	639,832		
Round to 10,000 V			aw rate irement	* Real, i.e.	current dollars, means	53	2023	26,546	0		0 26,546	719,802		
					adjusted for inflation	54	2024	27,354	0		0 27,354	807,258		
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Simple Cash Flows Impor	ewoney Cash Fi	ows impor	t woneyGuide	impon	Spreadsneet	56	2026	29,046	0		0 29,046	1,007,28	1	
Annual savings 2	5,000 growing (n	ominally) at	3.0% Inflat	tion 3.0%		57	2027	29,930	0		0 29,930	1,121,31	7	
Net withdrawal at retirement (current \$)	0,000 growing (n	ominally) at	3.0% NOT	E: All values in ta	ble are nominal	58	2028	30,842	0		0 30,842	1,245,78	6	
retirement (current 5)						59	2029	31,781	0		0 31,781	1,381,58	7	
My Glidepath (ESF) My G	idepath (Fixed)	Returns				60	2030	32,749	0		0 32,749	1,529,69	6	
wy Gildepatri (ESP) wy G	idepatri (Fixed)	Returns				61	2031	33,746	0		0 33,746	1,691,16		
Real TCRs	C	onstraints	One	Year G/L Range:	Max Stock 100%	62	2032	34,774	0		0 34,774	1,867,15		
Pre-retirement 5.0%	Max stock	▼ 100%	▼ 0.5%	2.5% (% 🔻	2.5% 0.5%	63	2033	35,833	0		0 35,833	2,058,88		
Post-retirement 3.0%	Max liqu	id alts 20%	▼ _45%	-34%	45% 56%	64	2034	36,925	0		0 36,925	2,267,72		
Rebuild Glidepath	Run Sims	3000	•		Mean reversion	65	2035	0	-94,099		0 -94,099	2,313,35		1%
				¥	Weathreversion	66	2036	0	-96,964		0 -96,964	2,358,93		1%
100						67	2037	0	-99,917		0 -99,917	2,404,37		2%
						68	2038	0	-102,960		0 -102,960	2,449,57		2%
80-						69	2039	0	-106,096		0 -106,096	2,494,41		3%
						70	2040	0	-109,327		0 -109,327	2,538,78		3%
⊊ 60 <sup>-</sup>						71	2041	0	-112,657		0 -112,657	2,582,56		4%
- 09 - 09 - 09						72	2042	0	-116,088		0 -116,088	2,625,61		4%
Bia∧ 40-						73	2043	0	-119,623		0 -119,623	2,667,77		5%
> +0						74	2044	0	-123,266		0 -123,266	2,708,89		6%
Stock						75	2045	0	-127,020		0 -127,020	2,748,79		6%
20 Long Term Br						76	2046	0	-130,888		0 -130,888	2,787,28		7%
Liquid Alt						77	2047	0	-134,874		0 -134,874	2,824,15		8%
55 60	65	70 7	5 80	85	90	78	2048	0	-138,982		0 -138,982	2,859,19		9%
		Age				79	2049	0	-143,215		0 -143,215	2,892,16	1 -5.	0%

#### Flexible parameters

- Needs can be wealth, spending, or possibilities
- Plan feasibility
- Bequest

Integrated with eMoney and MoneyGuidePro

Custom glidepaths that account for market conditions

#### Extensive array of Monte Carlo simulations

- Mean reversion
- Historically consistent volatility profile of stocks and bonds

#### Next-generation sensitivity analyses

- Withdrawal rates vs. probability of success
- Savings
- Retirement age

### FROM THE ASSET MANAGEMENT ANGLE

**Enhanced Human Intelligence** 

... having **better-designed client portfolios** are their own reward.

... Knowing that NEBO is ... calculating the allocation that seems most likely to succeed, makes them feel a lot more confident that they are doing the right thing for clients.

... It's hard to overstate how valuable that is to the advisor.

#### Enhanced Human Intelligence

... for most clients with portfolio sustainability issues, the **problem is one with their lifestyle expenses**.

... NEBO shows how in tough environments like this, **decreasing withdrawals is more meaningful than shifting your AA** and taking more risk.

... tendency is to focus on the investment part. We'd like to **focus on the most impactful things**: like decreasing spending and focusing on the cash flows.

### **BETTER PORTFOLIOS FOR YOUR CLIENTS**

#### Almost a decade of deep research to solve the portfolio construction problem

 Asking the right question cuts your probability of ruin in half

+100 bps

2. Moving your assets cuts your probability of ruin by another third

+ 50 bps

3. Dynamic asset/factor allocation

+ 50 – 100 bps

Total estimated "alpha"

+ 150 - 250 bps\*



\* Our research is consistent with numerous studies estimating the economic benefits of (portfolio-related) financial advice: Morningstar Gamma, Vanguard Advisor Alpha, Envestnet Capital Sigma

### MAIN TAKEAWAYS

NEBO is an asset management platform that redefines risk

- 1. NEBO melds financial planning and asset management.
- 2. NEBO enhances human intelligence.
- 3. NEBO generates **better portfolios** for your clients.

"What do you need, and when do you need it?"

- 1. We are looking for a handful of new partners to join us
- 2. If this piques your interest, please reach out!

The industry is waking up to this approach ...

### APPENDIX

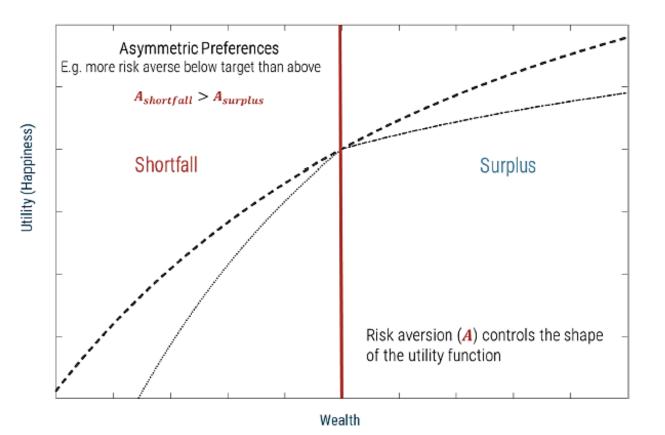
### WHAT'S WRONG WITH THE CURRENT PARADIGM?

#### If it's broken, fix it!

The Current Problems	Why It Matters	The NEBO Solutions
Financial planning and asset management are disconnected	Slippage between financial plan and optimal client portfolio	NEBO melds financial planning and asset management
Risk = volatility	But risk ≠ volatility	Risk = not having what you need when you need it
Portfolios are the result of a "hand waving" process that focuses on volatility and combines mean-variance optimization with Monte Carlo simulation	Volatility matters but is related to fear of short-term losses. It should not be the force driving the portfolio	Portfolios optimize shortfall with constraints for short term loss aversion
MVO is single period – but people's lives are not!	MVO is not solving the investor's fundamental problem – running out of money	Shortfall optimization is multi-period and focuses on minimizing shortfall and the risk of ruin
Monte Carlo simulations overstate long term stock risk and understate long term bond risk	Historically, real stock volatility rises more slowly with horizon than real bond volatility	Monte Carlo simulations – and optimizations – reflect historical patterns of long-term volatility of stocks and bonds

### **PORTFOLIO CONSTRUCTION**

#### *Risk* = not have what you need when you need it\*



#### ASYMMETRIC PREFERENCES

### How much do you care about falling short?

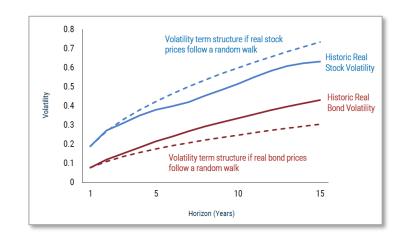
- Risk is falling short of target, not volatility.
- Both probability and magnitude matter.
- Expected shortfall incorporates investment horizons, whereas mean variance is myopic.\*\*

\*For further details, see Tarlie (2017), "Investment Horizon and Portfolio Selection", https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2854336 \*\* For further details, see Tarlie (2020), "A Case Study in Portfolio Optimization: A Classic Problem Revisited", https://papers.ssrn.com/sol3/papers.cfm?abstract\_id=3697948

### FEATURES THAT CLIENTS AND PROSPECTS LOVE

#### State-of-the-art Monte Carlo simulations\*, withdrawal rate simulator, etc.

enyadmin: STREAMLINE, 2030 ionstraints Firm Models Firm Views Clients My Portfolio My Needs My Glidepath	My Stocks My Long Term Bonds My Short Term Bonds My Liquid Alts My Custom Alts Education Disclosure	<ul> <li>Create customized outp</li> </ul>
Streamline, 2030   Save Changes		- Create customized outp
Vhat I Need 8: When I Need It Pre-retirement Post-retirement Real*TCR Real*TCR	Plan Feesibility Withdrawal Rates The plan is considered feasible if Threshold 20% Threshold 20% The plan is considered feasible if (i) normal wealth at largering exceeds the threshold times either	to share with clients
Specify returns (TCRs)   5.0%  3.0%	(ii) TCRs do not exceed 6%	
Lurrent Weath         1.000.000         1.780,000         (Real*)         740,000         (Real*)           Current Age         56 ▼         2,310,000         (Nominal)         2,360,000         (Nominal)           Target at         55 ▼         Target at         55 ▼         Target at         55 ▼         Target at	Cath Rovs (Nominal) Glidepath Simulations Withdraval Rate Simulations Summary Details Returns	
Round to 10,000   Round to 10,	Prob of success (Wealth > 0) at age 95 86% PTAIT PEASIDIIILY	Withdrawal Rates
Import eMoney Cash Flows         Import MoneyGudePro         Import Spreadsheet           Annual survices         20.000         growing (norminality) at [2.9%]         Instation [2.9%]           Met withframed at [37.000]         growing (norminality) at [2.9%]         NOTE All values in table are norminal.	Median Weath at age 95 (current dollars)         2.40,731           050 percentile at age 95 (current dollars)         11,222,911           511 percentile at age 95 (current dollars)         707,413           Avig Median Weath in Reterment (current dollars)         2.043,375           Avig Median Weath in Reterment (current dollars)         2.043,375           Avig Median Weath in Reterment (current dollars)         7.500           Target weath In of S2         1.500	% based on a minimulational (2000 - minimulational field international field intern
Ily Glidepath Calculate TCRs Selecting Wealth Targets Selecting Wealth Targets	Avg. Age to First Reach S 63	
Real TCRs         Constraints           Pre-editionment (5.0%)         Max stock × 100%, v           Past-retirement (3.0%, v)         Max stock × 100%, v           Result Constraints         0.5%, 2.5%, (%, v) 2.5%, 0.5%, 4.5\%, 4.5\%,	Short Term My Glidepe 1 Vex Dravidovi (Bottom 1st parcentile) 201.302 1 Vex Weath Volatily 15% Withdrawal Rate 1	minal) Glidepath Simulations Withdrawal Rate Simulations vs Prob of Success
00 U Dimon 00 U D	Wealth (25pcte, Median, 75pcte) 4 000 000 3 000 000 1 000 000 6 0 70 80 90 100	Withdrawal rate         Prob of Success           3.0%         97.2%           3.5%         94.1%           4.0%         89.5%           4.5%         84.0%           5.0%         77.1%
		5.0% 4.5% 3.5%



\* Conventional Monte Carlo simulations do not account for the fact that stocks get relatively less volatile, and bonds relatively more volatile with horizon

### IMPROVED DECISION-MAKING THROUGH REVERSE ENGINEERING

#### Enhancing CIO/PM decision-making by asking the right questions

How to use NEBO to drive consistency between question (inputs/beliefs) and answer (portfolio)

- Start with a candidate portfolio (answer).
- Figure out what question that portfolio answers: what do I need to believe to own this portfolio?
  - a) For portfolios this is highly non-trivial because the question has both financial planning and asset management elements.
  - b) It is very easy to lose track of things NEBO helps you stay focused on the key inputs/beliefs.
- Are those inputs/beliefs reasonable?
  - a) If not, modify them and then look at the new answer.
  - b) Does the new answer make sense? If not, go back and alter your inputs/beliefs until you arrive at consistency between your question and your answer.

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Hypothetical results are adjusted to reflect the reinvestment of dividends and other income and, except where otherwise indicated, are presented gross-of fees and include the effect of hypothetical transaction costs, but not management fees, performance fees or expenses, if any. Actual fees are disclosed in Part 2 of GMO's Form ADV.

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