
Holistic Asset Allocation for Individuals

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The Unique Perspective of the Private Investor

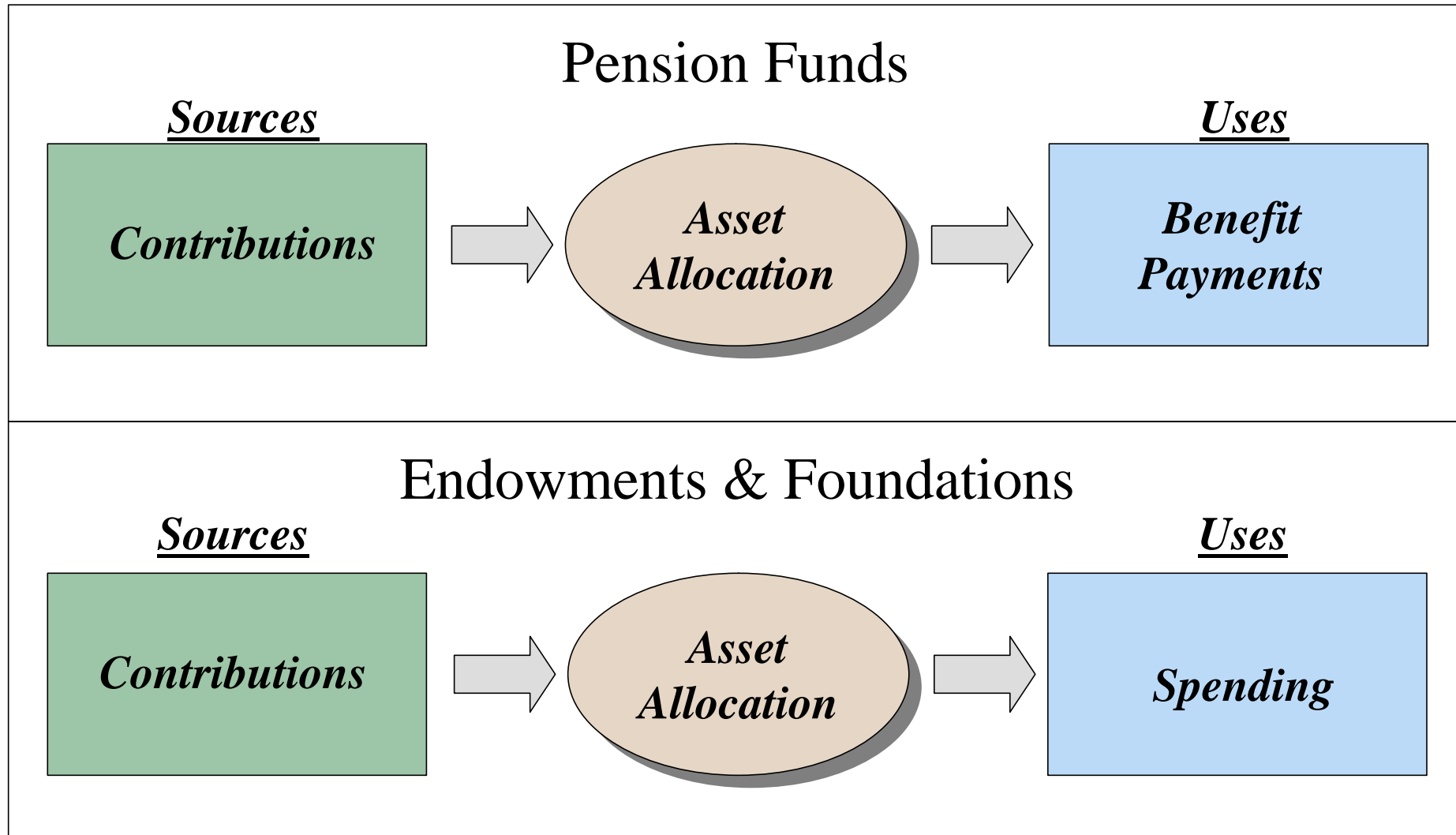
How do you deal with complex sources and uses of capital?

- Multiple Asset Locations
- Multiple Goals

Do you solve this problem by

- Creating Multiple Portfolio Buckets or,
- Trying to come up with a Unified Asset Allocation?

Asset Allocation for Institutions – Minimal Complexity



Asset Allocation for Private Individuals Requires Solving Two Problems Simultaneously

Asset Location

Deferred Compensation

IRAs & 401(k)s

Taxable Personal Assets

Trust Funds

Insurance & Annuities

Investment Goals

Retirement Income

Lifestyle Expenditures (Toys)

Charitable Gifts

Next Generation

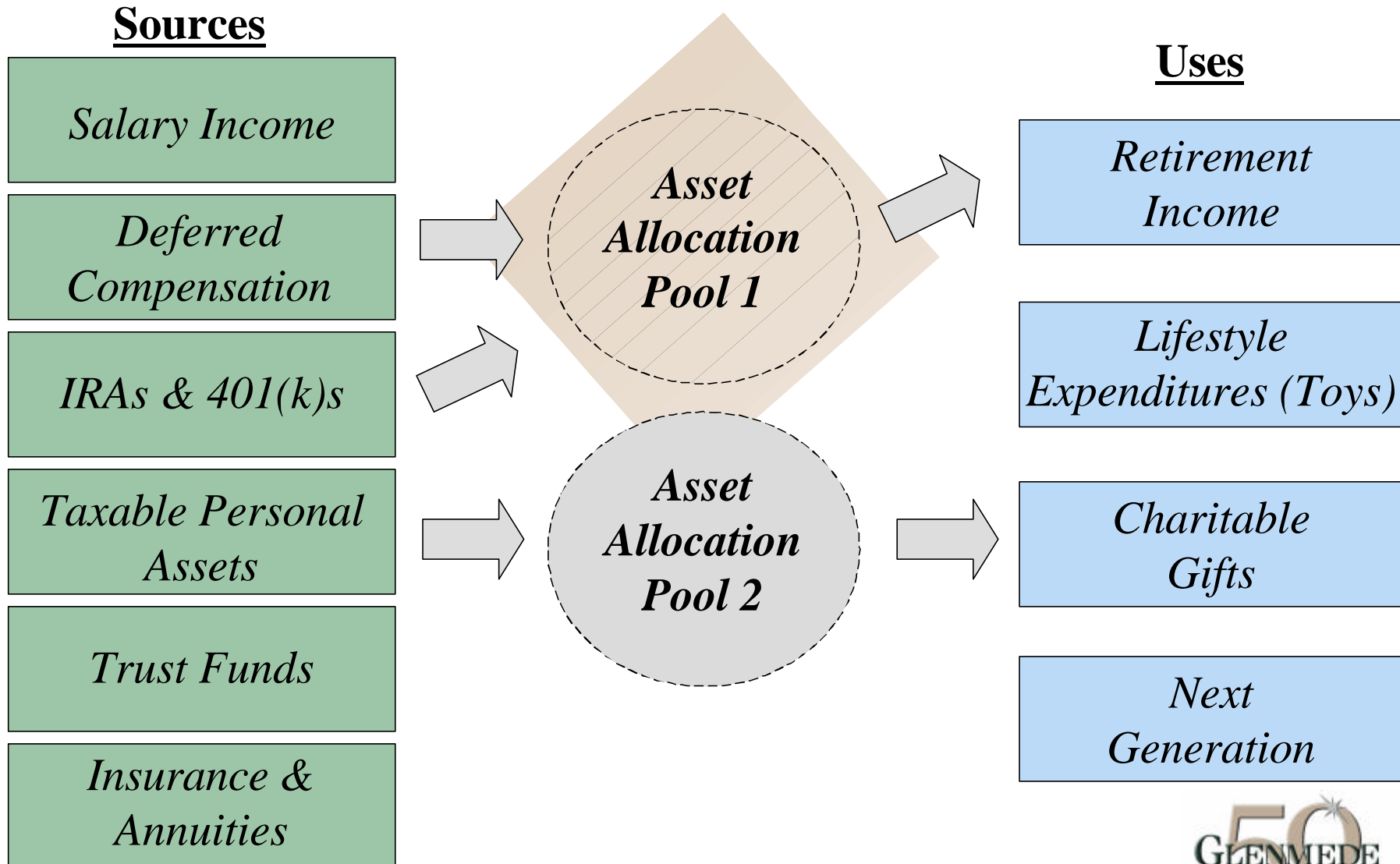
?
Asset Allocation
?

The Literature on Optimizing Investment Goals and Asset Location is Quite Extensive

- ◆ Asset Location Research
 - Brunel
 - Reichenstein
 - Shoven
- ◆ Investment Goal Research
 - Statman
 - Brunel
 - Chhabra
 - Nevins
- ◆ Takeaway: Put Tax Inefficient Assets in Tax Deferred Vehicles
- ◆ Takeaway: Asset Allocation for Private Investors needs to plan and invest for Multiple Goals (and utilize a Behavioral Finance Framework)

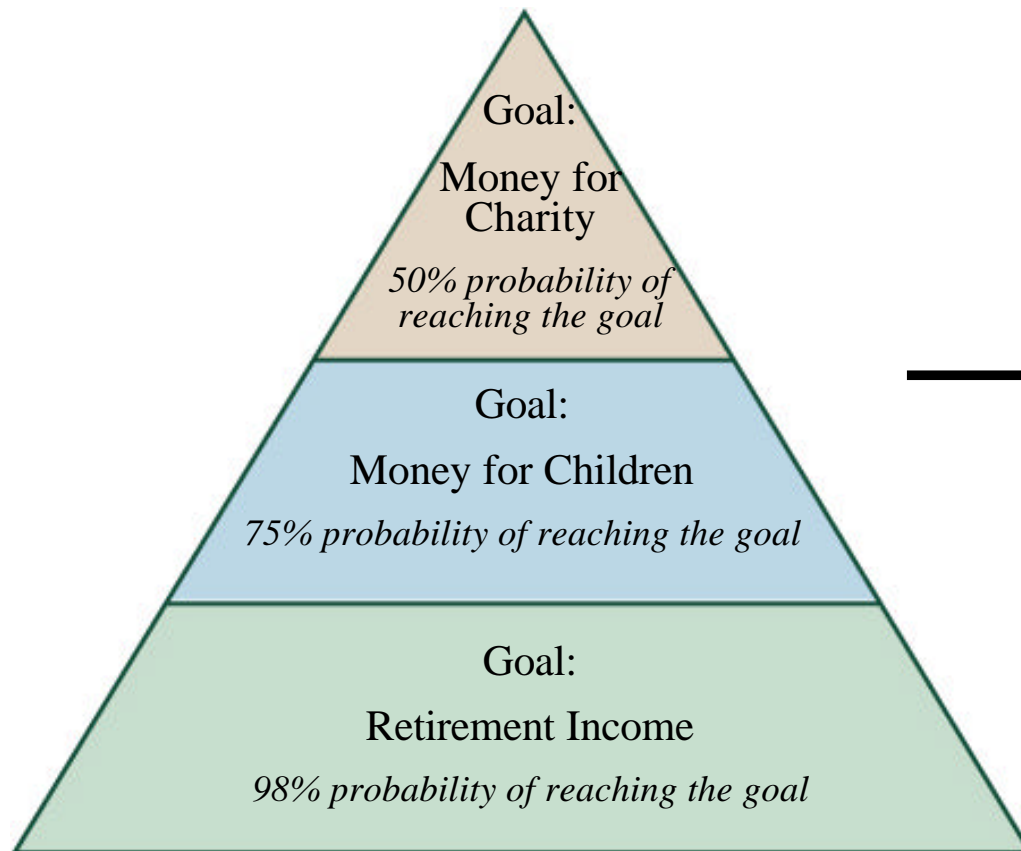
Asset Allocation Bucketing

Creating Discreet Pools



Behavioral Portfolio Theory provides theoretical backing for the Bucketing Approach

Mental Accounting Pyramid



- ◆ “Rational” Investors may prefer Efficient Frontier. “Normal” Investors may prefer buckets.
- ◆ Separate investment strategies and accounts are designed to meet different goals.

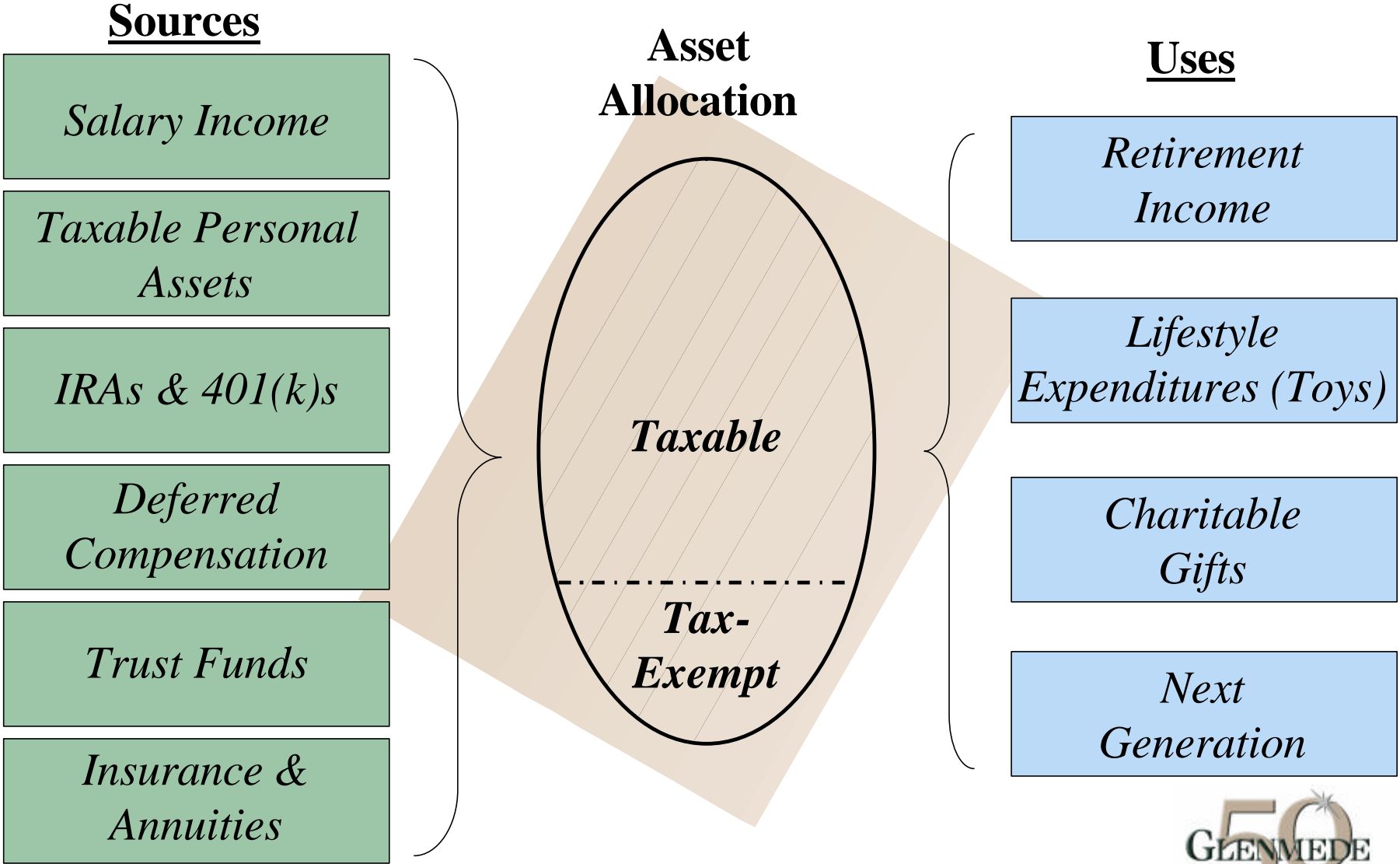
Source: Statman and Wood, *Investment Temperament*, *Journal of Investment Consulting*

Some Questions

- ◆ By assigning specific goals to specific pools, is the client underutilizing the benefits of scale?
 - Liquidity and Size Constraints on Investments
 - Covariance between buckets
- ◆ How is the client going to feel if the investment strategy more than meets the charitable goal but falls behind on the targets for the children? Have we got the client's priorities straight?
- ◆ Is there a difference for an advisor between acknowledging “irrational behavior” and suggesting a framework that perpetuates it?

A Holistic Approach

Creating a Unified Asset Allocation Strategy



A Simplified Problem

Client Assets

Taxable	\$8,000,000
Tax-Exempt	<u>2,000,000</u> (in an IRA)
Total	\$10,000,000

Client Goals

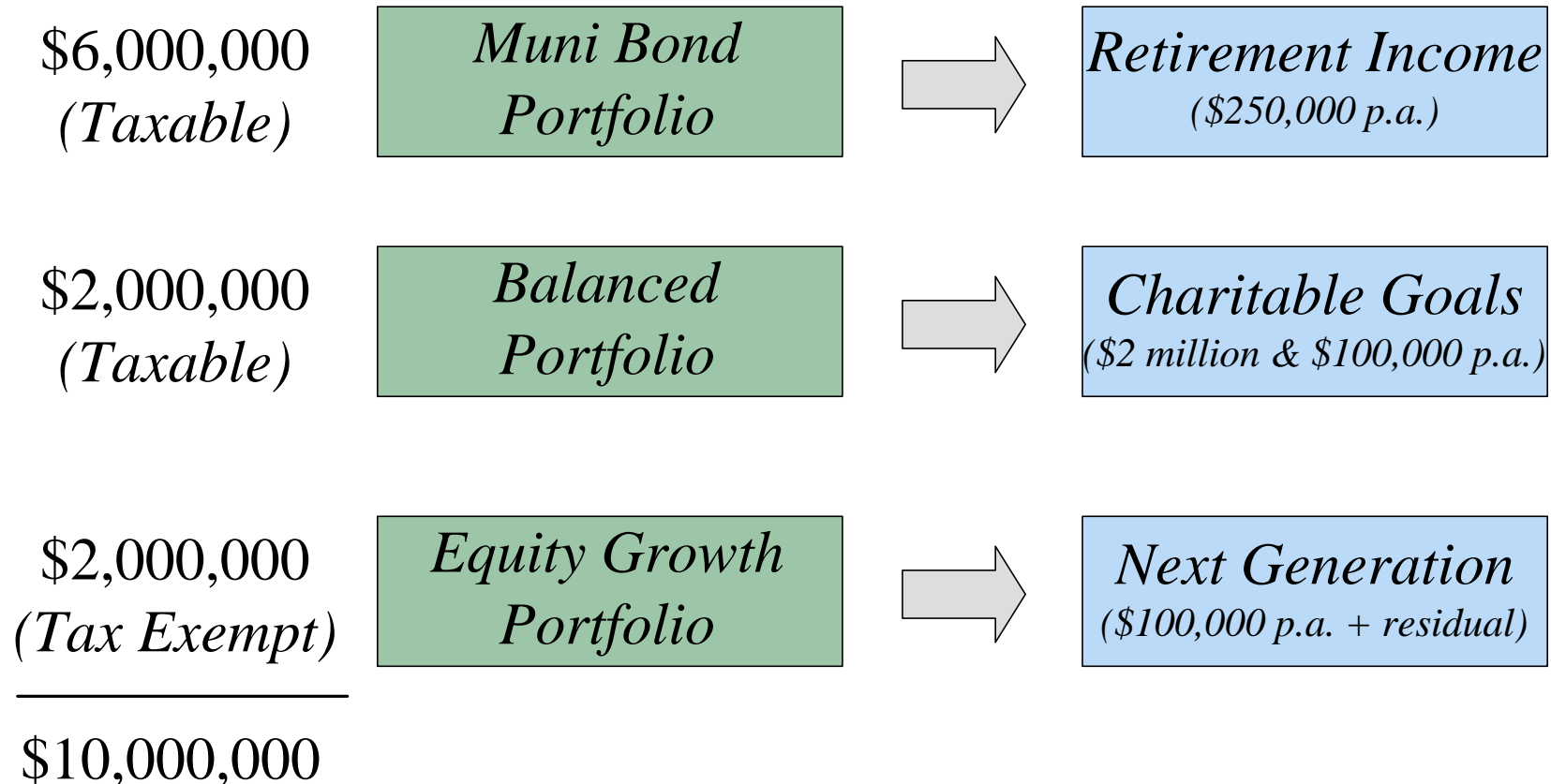
Retirement Income: \$250,000 per year starting in 5 years

Charitable Goals: \$100,000 in annual gifts for 15 years
\$2,000,000 to build Science Center in 2011

Next Generation: \$100,000 per year and whatever is left over

Bucketing Asset Allocation

Creating Discreet Pools



Asset Allocation for the Bucketing Approach

Asset Class	Bucketing Approach				
	Taxable Portfolios			Tax	Combined
	<u>Annuity</u>	<u>Charitable</u>	<u>Total</u>	<u>Deferred</u>	<u>Total</u>
Cash	-	1%	1%	-	1%
TIPS	-	-	-	-	-
Municipals	60%	7%	67%	-	67%
Global Bonds	-	-	-	-	-
Domestic Large Cap	-	8%	8%	11%	19%
Domestic Small Cap	-	2%	2%	2%	4%
International Equity	-	2%	2%	3%	5%
Emerging Markets	-	-	-	-	-
Hedge Funds	-	-	-	1%	1%
Private Equity	-	-	-	1%	1%
Real Estate	-	-	-	1%	1%
Commodities	-	-	-	1%	1%
Total	60%	20%	80%	20%	100%

Expected After-Tax Return

5.7%

Standard Deviation

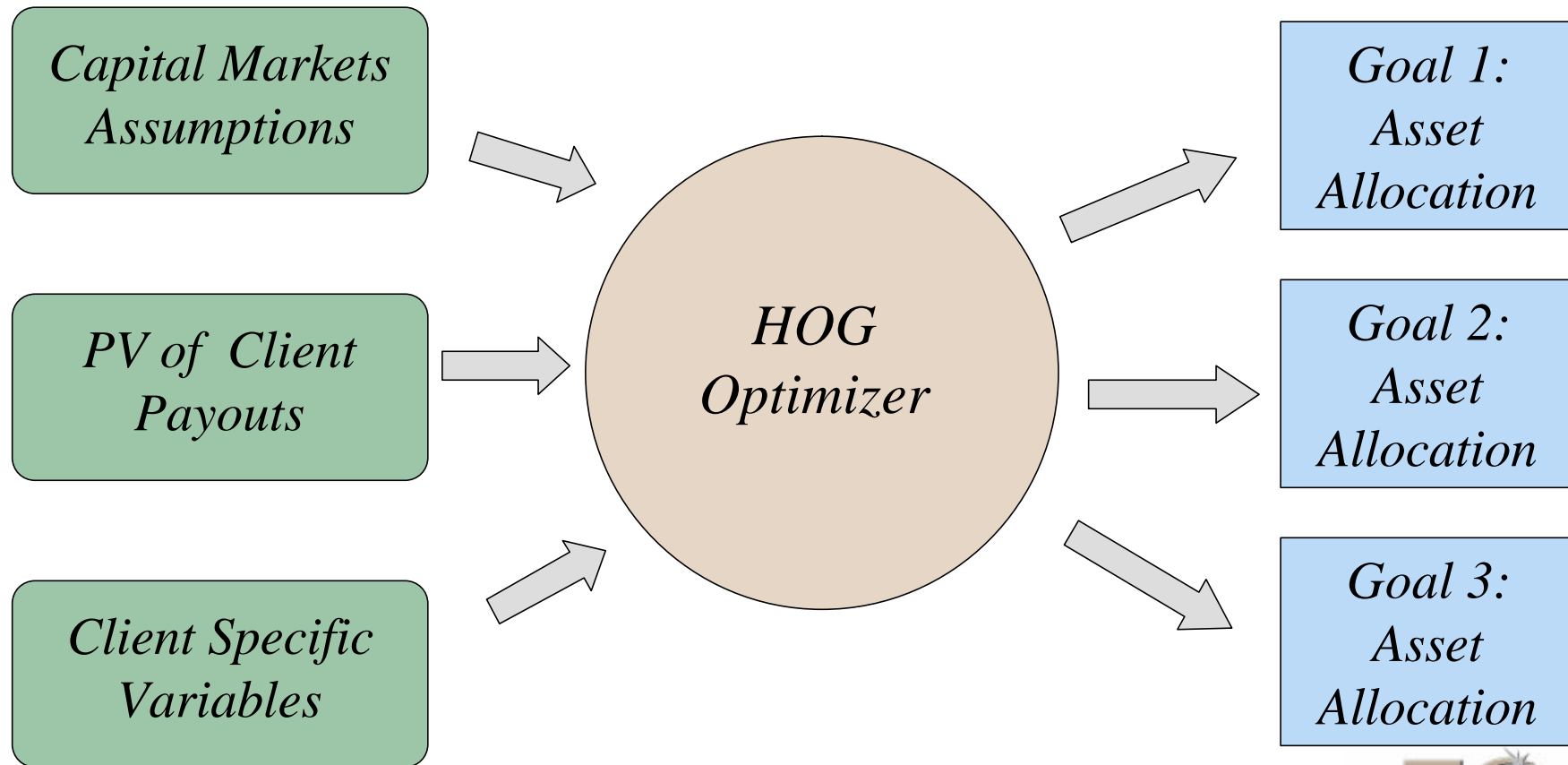
5.3%

Negative Probability (12-m)

14.2%

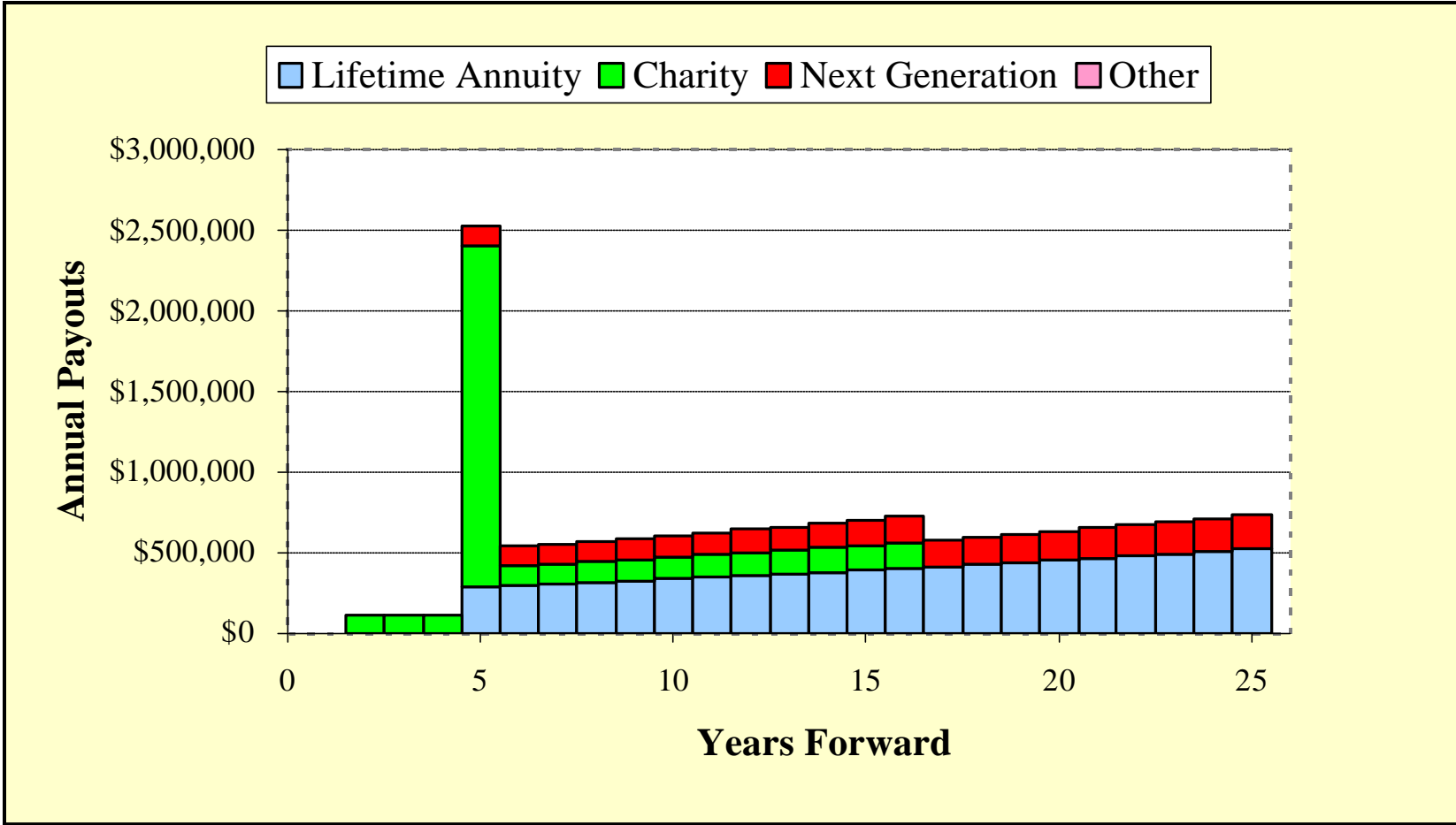
Holistic Optimization of Goals (HOG)

HOG finds the asset allocation that maximizes the probability of attaining goals



The HOG Approach Starts with a Projection of Payments

Projected Annual Payouts

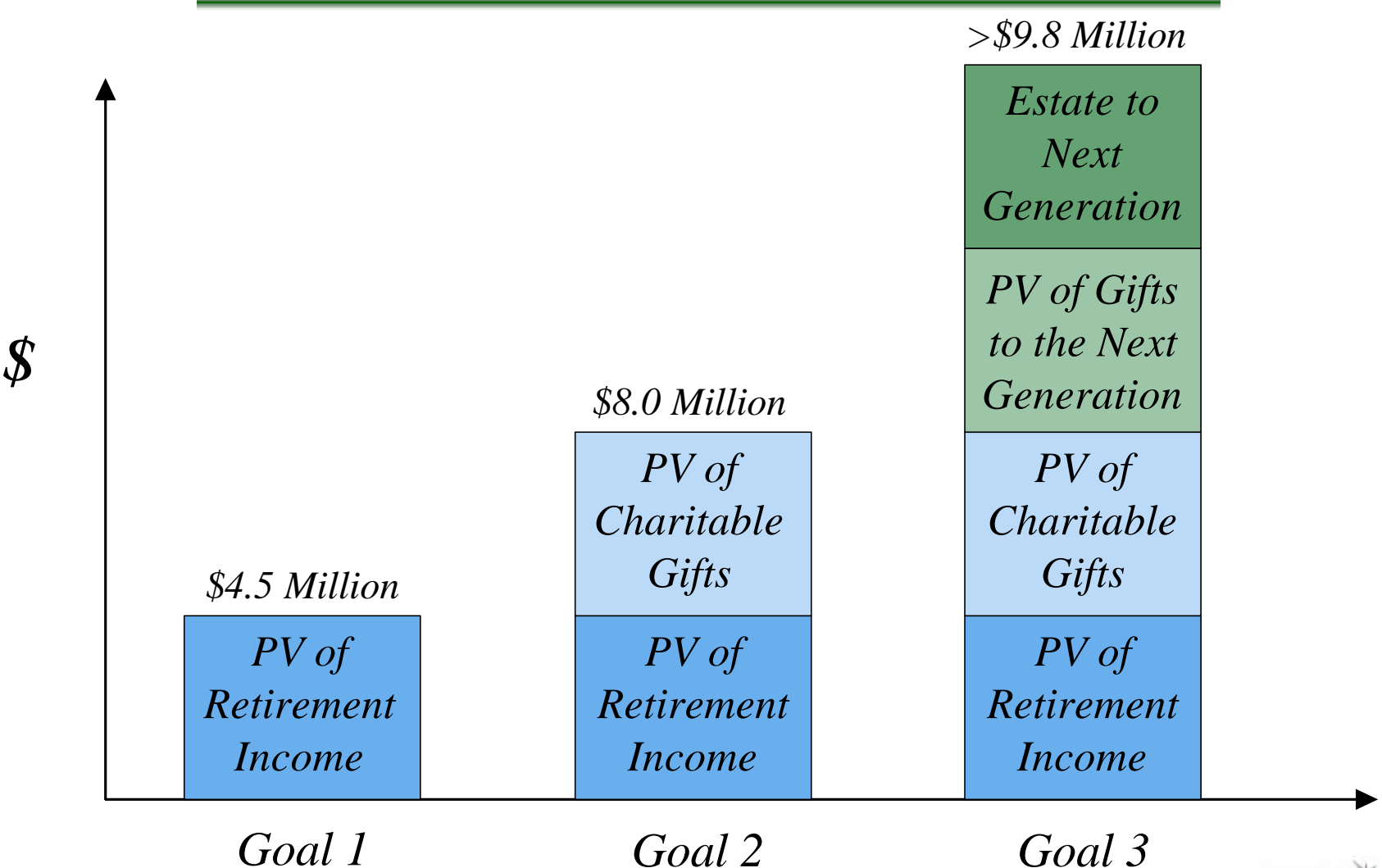


Projected Annuity Values for Each Goal (2011)

	Annual Payout	Inflation Adjustment	Initial Annual Payout	Duration in Years	Discount Rate	Projected Annuity Value (2011)
Lifetime Annuity	250,000	3%	285,113	21	3%	4,488,438
Charitable Annuity	100,000	3%	104,366	15	3%	1,476,780
Charitable Lump Sum	2,000,000	0%	2,000,000	1	3%	2,000,000
Next Generation Annuity	100,000	3%	114,045	21	3%	1,795,375
Total	2,450,000		2,503,524			9,760,593

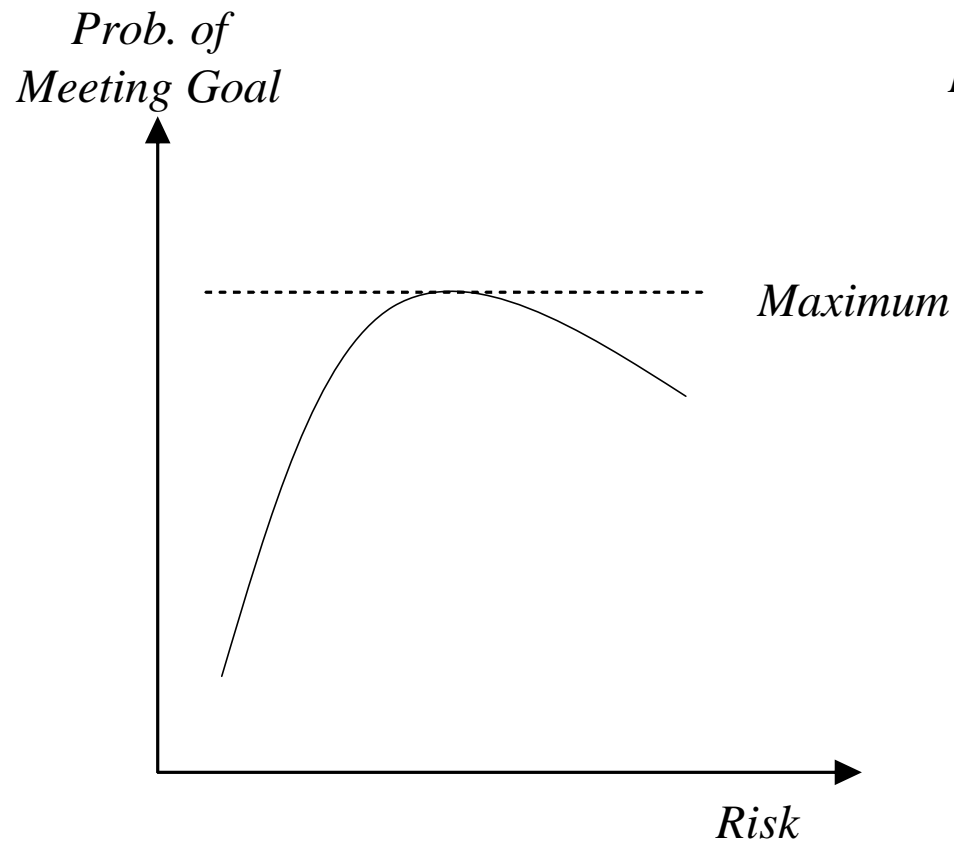
Source: Glenmede Investment Research

Goals are then Prioritized

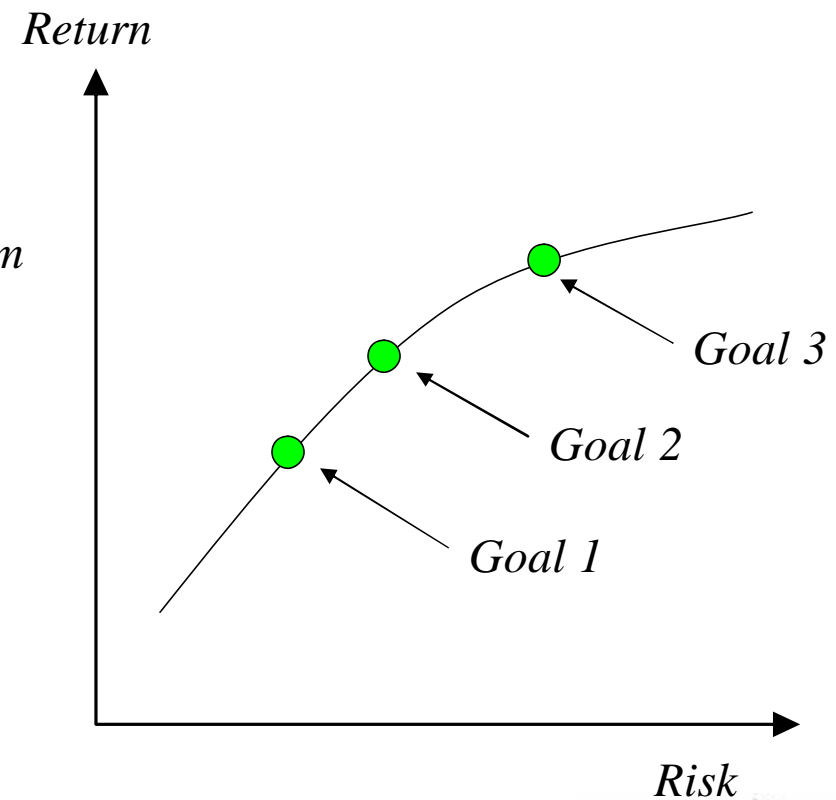


The “HOG” Optimization Seeks to Maximize the Probability of Hitting a Goal

“HOG” Optimization



“HOG” Frontier



Holistic Optimization of Goals - Input Assumptions

Asset Class Expected Returns and Weight Constraints

Asset Classes:	Expected Returns		Maximum % Weighting			Minimum % Weighting		
	Free & Clear	Tax Deferred	Free & Clear	Tax Deferred	Total	Free & Clear	Tax Deferred	Total
Cash	2.1%	3.3%	5%	5%	10%	5%	0%	5%
TIPS	3.3%	5.0%	0%	20%	20%	0%	0%	0%
Munis	4.5%	4.5%	80%	0%	80%	0%	0%	0%
US Govt/Credit	3.6%	5.5%	0%	20%	20%	0%	0%	0%
High Yield	3.9%	6.0%	5%	5%	10%	0%	0%	0%
Global Bonds	3.9%	6.0%	5%	5%	10%	0%	0%	0%
Large Cap	6.8%	8.0%	80%	20%	100%	0%	0%	0%
Small Cap	7.2%	8.5%	80%	20%	100%	0%	0%	0%
Intl Equity	6.9%	8.0%	80%	20%	100%	0%	0%	0%
Emerg Mkts	7.3%	8.5%	5%	5%	10%	0%	0%	0%
Hedge Funds	4.9%	7.5%	5%	5%	10%	0%	0%	0%
Private Eqty	7.2%	11.0%	5%	5%	10%	0%	0%	0%
Real Estate	6.3%	8.0%	5%	5%	10%	0%	0%	0%
Commodities	3.9%	6.0%	5%	5%	10%	0%	0%	0%
Other	2.0%	3.0%	5%	5%	10%	0%	0%	0%
Total			80%	20%	100%	80%	20%	100%

Total Equities	90%	Total Equities	20%
Total Fixed Income	90%	Total Fixed Income	20%
Total Alternatives	20%	Total Alternatives	0%
Small Cap/Total Equity	20%	Small Cap/Total Equity	0%
International/Total Equity	25%	International/Total Equity	0%

Holistic Optimization of Goals - Input Assumptions

Efficient Frontier Analysis (Partial View)

Asset Class	Expected	Historical (1970-2004)			Maximum	Minimum	Tax-Deferred					Fixed	High	Global	Large	Small	Int'l	Emerg	Hedge	Private	Real	Commo-
	Return	Return	StDev	Periods	Weight	Weight	Inflation	Cash	TIPS	Munis	Income	Yield	Bonds	Cap	Cap	Equity	Mkts	Funds	Equity	Estate	dities	
1. Inflation	3.0%	4.7%	3.2%	35	-	-	1.00	0.62	0.51	(0.17)	(0.20)	(0.38)	(0.00)	(0.23)	0.01	(0.20)	0.07	(0.13)	(0.04)	0.28	0.25	
Pre-Tax 2. Cash	3.3%	6.1%	2.9%	35	5%	0%		1.00	0.51	0.33	0.36	(0.06)	0.04	0.03	(0.01)	(0.12)	(0.14)	0.21	0.10	0.17	0.00	
3. TIPS	5.0%	9.5%	4.2%	32	20%	0%			1.00	0.59	0.58	0.04	0.46	(0.14)	0.06	(0.24)	(0.14)	0.17	(0.34)	0.33	0.18	
4. Munis	4.5%	7.0%	4.3%	35	0%	0%				1.00	0.99	0.51	0.59	0.21	0.15	(0.07)	(0.11)	0.42	(0.21)	0.08	(0.18)	
5. Fixed Income	5.5%	8.4%	5.6%	32	20%	0%					1.00	0.53	0.56	0.29	0.19	0.01	(0.16)	0.38	(0.20)	0.08	(0.22)	
6. High Yield	6.0%	9.5%	12.5%	35	5%	0%						1.00	0.41	0.58	0.68	0.38	0.35	0.56	0.16	0.36	(0.37)	
7. Global Bonds	6.0%	9.9%	8.8%	20	5%	0%							1.00	0.18	0.04	0.50	(0.05)	0.03	(0.34)	(0.02)	(0.11)	
8. Large Cap	8.0%	11.3%	17.2%	35	20%	0%								1.00	0.78	0.59	0.31	0.57	0.48	0.32	(0.19)	
9. Small Cap	8.5%	13.3%	20.1%	35	20%	0%									1.00	0.45	0.55	0.59	0.39	0.64	(0.17)	
10. Intl Equity	8.0%	11.1%	22.4%	35	20%	0%										1.00	0.57	0.20	0.34	0.23	(0.09)	
11. Emerg Mkts	8.5%	10.7%	31.1%	20	5%	0%											1.00	0.07	0.34	0.23	0.17	
12. Hedge Funds	7.5%	9.2%	5.7%	11	5%	0%												1.00	0.23	0.56	0.16	
13. Private Eqty	11.0%	17.4%	25.0%	31	5%	0%													1.00	0.07	0.20	
14. Real Estate	8.0%	12.4%	8.2%	27	5%	0%														1.00	0.14	
15. Commodities	6.0%	9.2%	22.4%	31	5%	0%																1.00
Taxable 16. Cash	2.1%	4.0%	1.9%	35	5%	5%																
17. TIPS	3.3%	6.2%	2.7%	32	0%	0%																
18. Munis	4.5%	7.0%	4.3%	35	80%	0%																

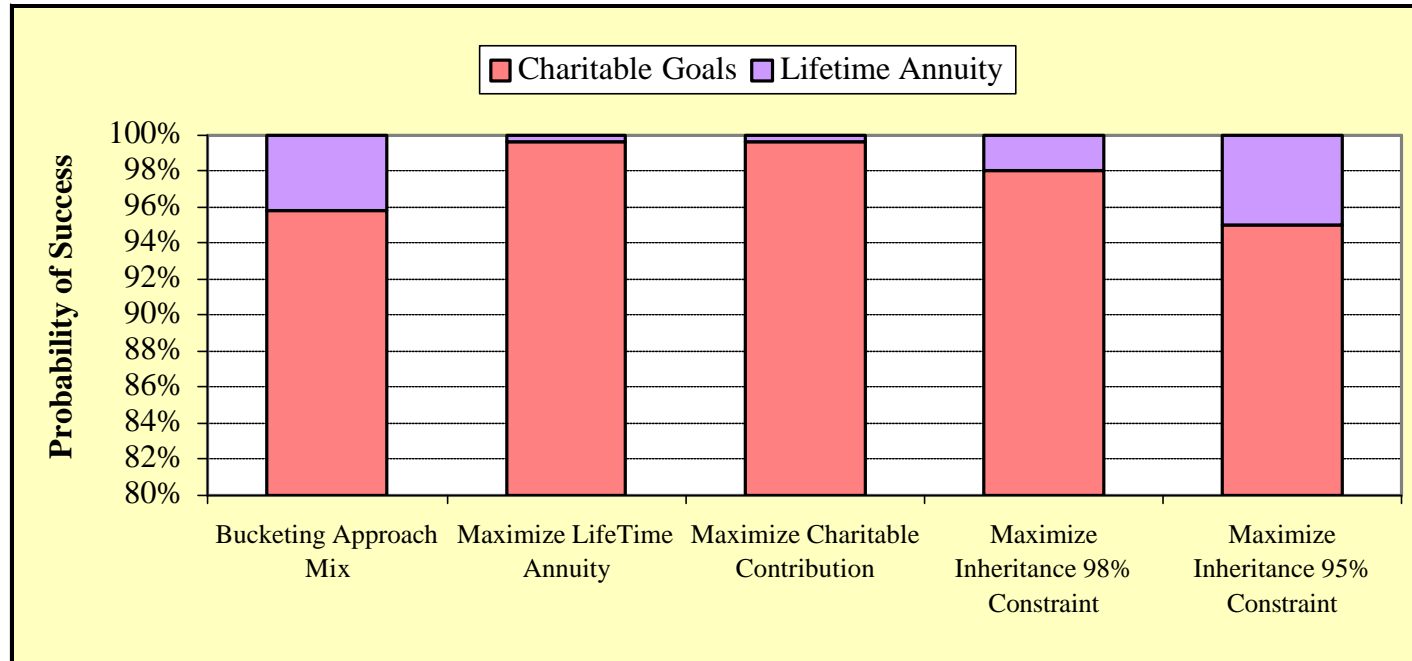
Correlation Matrix

Asset Allocations for “Bucketing Approach” and “HOG” Optimizations

Asset Class	● Bucketing Approach		■ HOG Goal 1		▲ HOG Goal 2		◆ HOG - Goal 3 98% Probability		● HOG - Goal 3 95% Probability	
	Tax		Tax		Tax		Tax		Tax	
	Deferred	Taxable	Deferred	Taxable	Deferred	Taxable	Deferred	Taxable	Deferred	Taxable
Cash	-	1%	5%	5%	5%	5%	-	5%	-	5%
TIPS	-	-	15%	-	15%	-	-	-	-	-
Municipals	-	67%	-	38%	-	36%	-	27%	-	10%
Fixed Income	-	-	-	-	-	-	-	-	-	-
High Yield	-	-	-	-	-	-	-	-	-	-
Global Bonds	-	-	-	2%	-	3%	5%	5%	5%	5%
Domestic Large Cap	11%	8%	-	11%	-	11%	-	22%	-	34%
Domestic Small Cap	2%	2%	-	4%	-	4%	-	8%	-	11%
International Equity	3%	2%	-	4%	-	4%	-	3%	-	5%
Emerging Markets	-	-	-	1%	-	1%	-	5%	-	5%
Hedge Funds	1%	-	-	5%	-	5%	5%	-	5%	-
Private Equity	1%	-	-	1%	-	1%	2%	-	4%	-
Real Estate	1%	-	-	5%	-	5%	4%	5%	3%	5%
Commodities	1%	-	-	5%	-	5%	4%	-	3%	-
Total	20%	80%	20%	80%	20%	80%	20%	80%	20%	80%

Expected After-Tax Return	5.7%	5.3%	5.4%	6.6%	7.3%
Standard Deviation	5.3%	3.2%	3.3%	4.9%	6.5%
Negative Probability (12-m)	14.2%	5.0%	5.0%	8.7%	12.9%

HOG Estimates Probability of Success for Different Goals

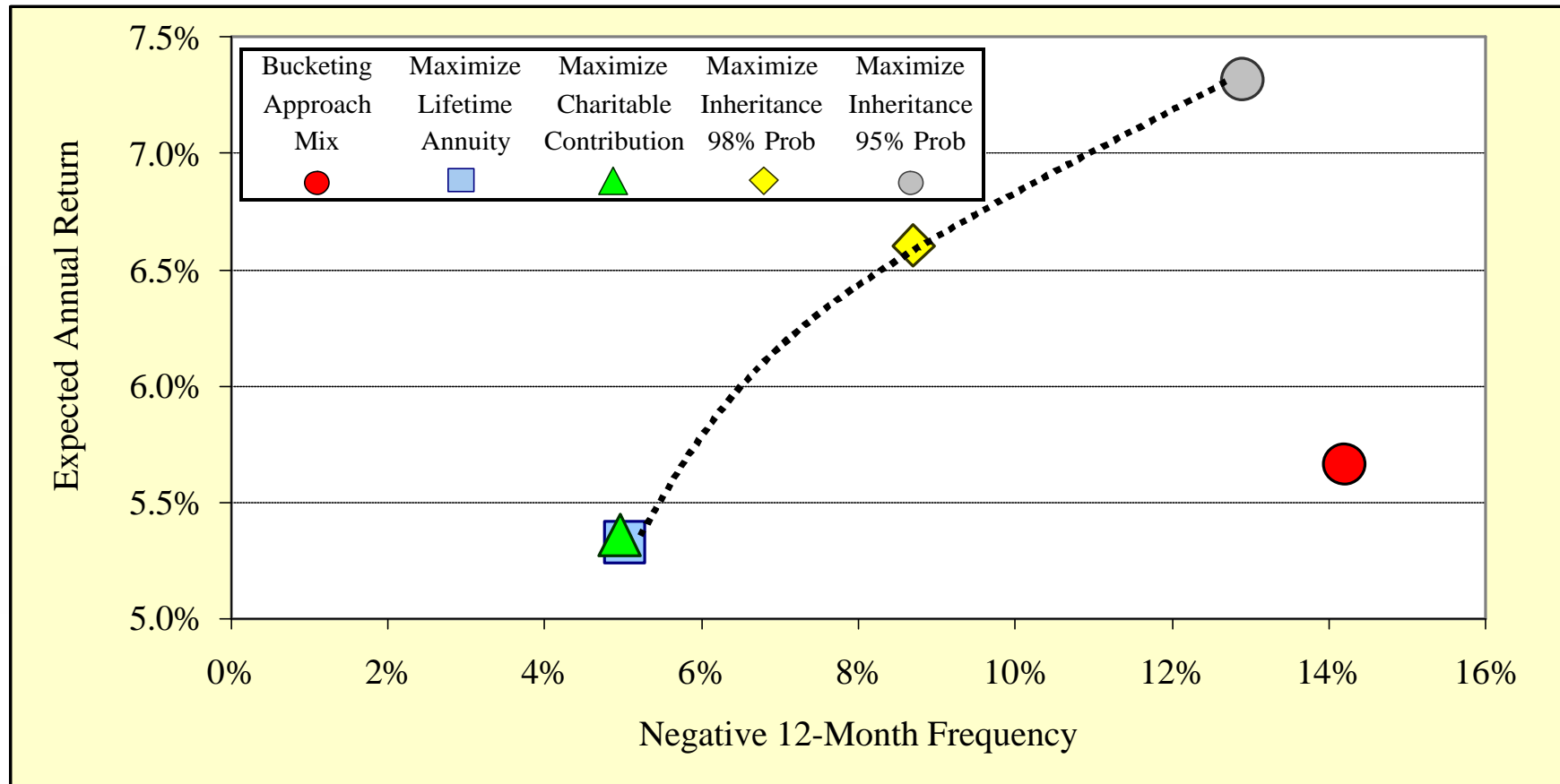


Estimated Probabilities of Success and Ending Portfolio Value (\$000)

Goals	Bucketing Approach	Maximize Lifetime Annuity	Maximize Charitable Goals	Maximize Inheritance	
	Mix			Probability 98%	Probability 95%
Lifetime Annuity	99.989%	100.000%	100.000%	99.999%	99.949%
Charitable Goals	95.828%	99.647%	99.650%	98.000%	95.000%
Childrens' Payout	83.721%	92.962%	93.040%	89.304%	85.030%
projected portfolio Value as of 2031	\$1,506	\$1,222	\$1,356	\$5,491	\$9,655

Risk & Returns for Bucketing Approach & “HOG” Optimizations

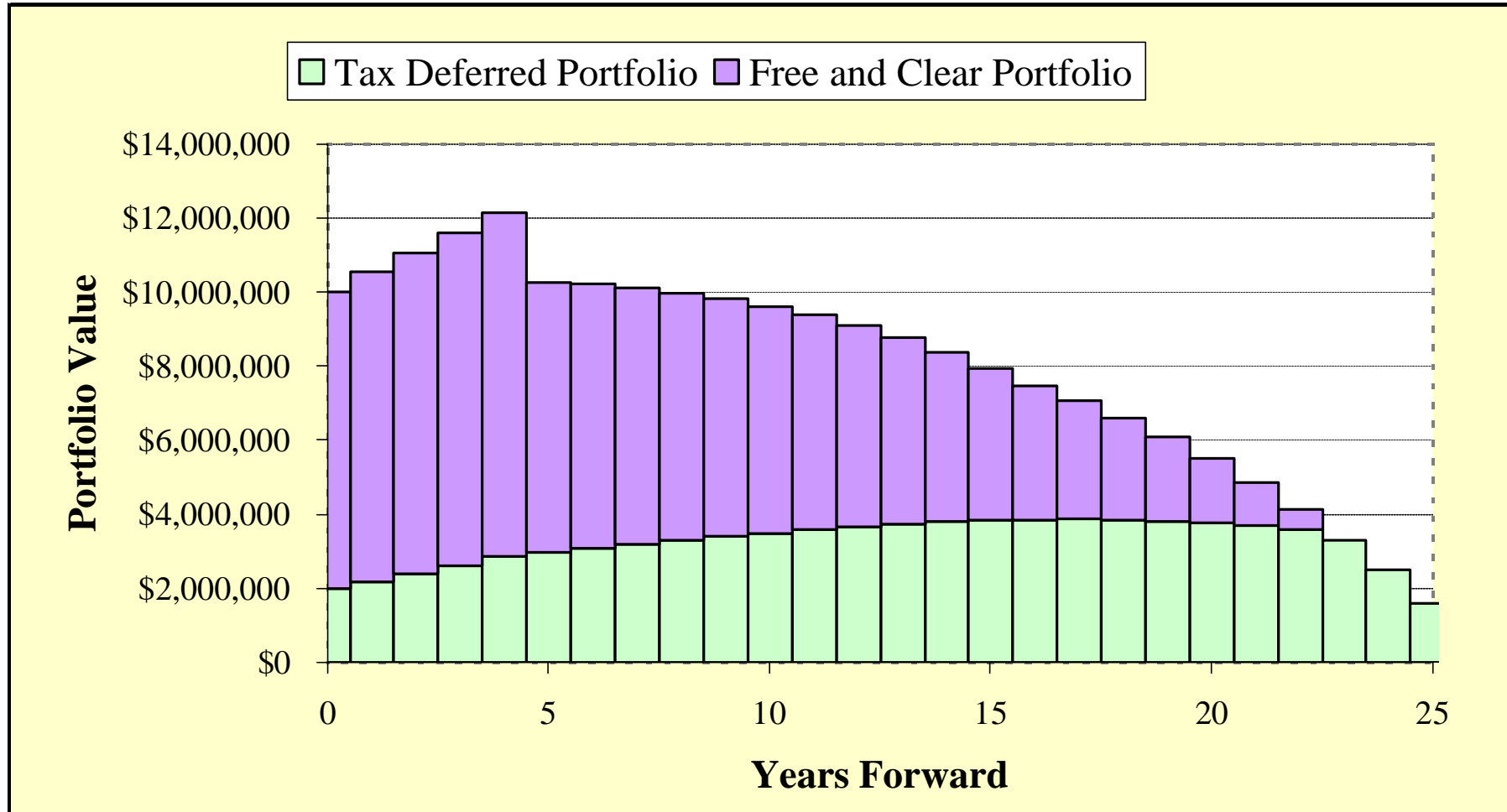
Expected Annualized Returns and Risk



Source: Glenmede Investment Research.

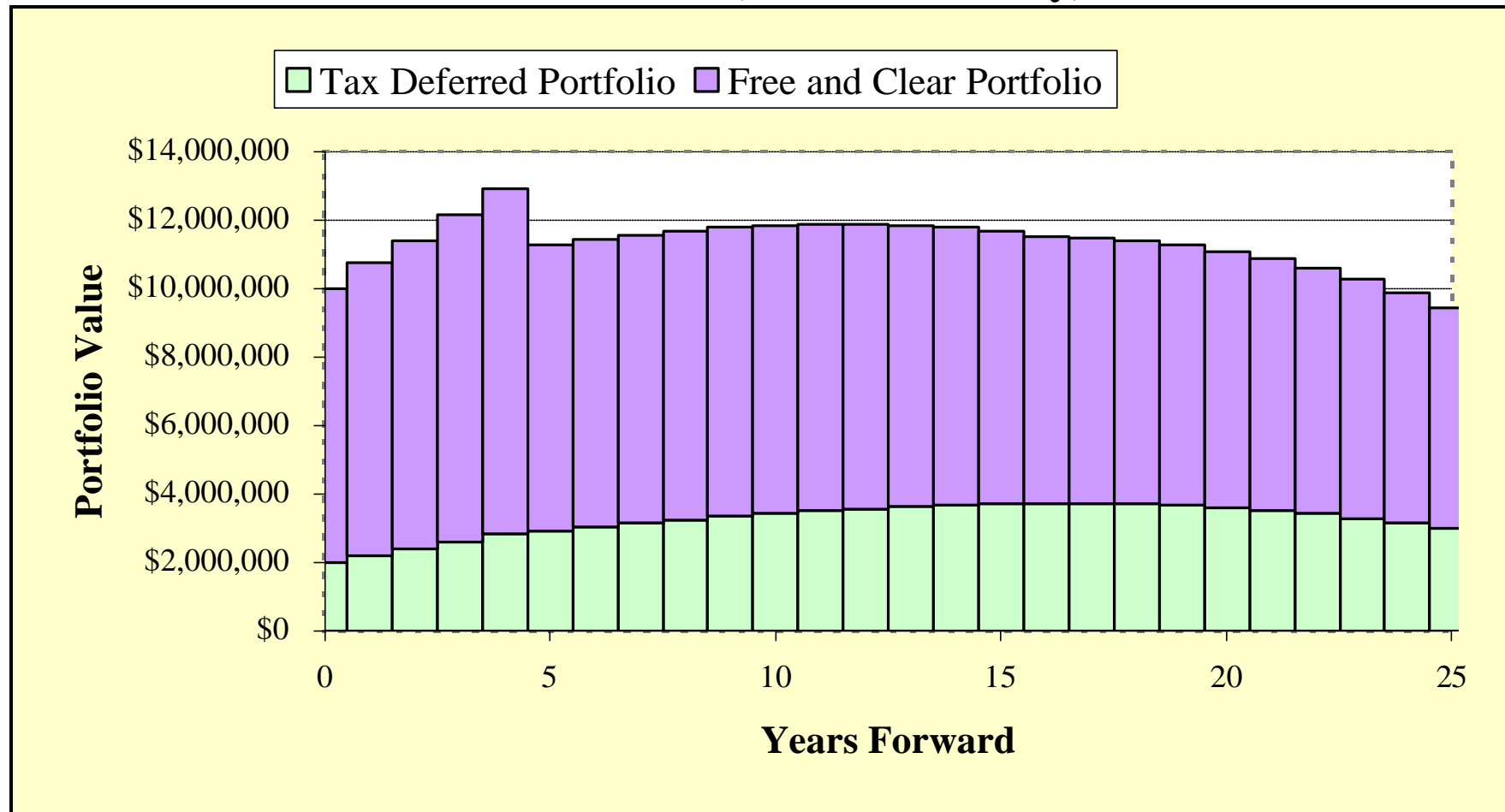
Projected Portfolio Value

Bucketing Approach



Projected Portfolio Value

HOG - Goal 3 (95% Probability)



Contrasting Bucketing and HOG

Bucketing

- Historical Appeal
- Conforms to a Behavioral Finance View of Risk
- Existing Technology

Holistic Optimization of Goals

- Jointly Optimizes both Asset Location and Investor Goals
- Optimal Risk/Reward Tradeoff from a Classical View of Risk
- Requires New Technology

Summary

- ◆ Bucketing has some historical appeal and may be appropriate for some investors.

However

- ◆ The HOG technology accounts for both
 - Asset Location Optimization and
 - Goal Optimization

Vladimir de Vassal, CFA

Glenmede Director of Quantitative Research

Vladimir de Vassal, CFA, is first vice president and director of quantitative research. Mr. de Vassal provides proprietary research and analytical support to various areas of the Company, including high net worth, domestic institutional funds, alternative assets, and the Pew Charitable Trusts. Mr. de Vassal and his team manage several quantitatively-based equity portfolios, including four mutual funds and longterm/shortterm strategies. His responsibilities include strategic and tactical asset allocation, market leading indicators and stock valuation tools. He is a member of the Company's Investment Policy Committee.

Mr. de Vassal joined Glenmede in 1998 after serving as vice president and director of quantitative analysis at CoreStates Investment Advisors and as vice president of interest rate risk reporting/analysis, at CoreStates Financial Corp.

Graduating with highest honors from Drexel University in 1982, Mr. de Vassal received a B.S. with dual majors in Finance and Accounting. At that time, he was given the Outstanding Student in Accounting and Finance Award. He received an M.B.A. from Drexel University in 1987, majoring in investment management. In 1992, he earned the Chartered Financial Analyst designation.

He is three-time winner of the Philadelphia Prize awarded by the Financial Analysts of Philadelphia for articles addressing investment insight. In addition, Mr. de Vassal's work has been published in periodicals such as *Barron's*, *The Journal of Wealth Management*, *The Journal of Portfolio Management*, *Worth* and *The Journal of Fixed Income*. He is a frequent speaker at investment conferences and universities, including the Wharton School at the University of Pennsylvania, Princeton, Penn State and Drexel.

Mr. de Vassal resides in Gwynedd Valley, Pennsylvania, with his wife and two children. He is a member of the CFA Institute (formerly AIMR, the Association for Investment Management and Research).