



**Asset
Management**

The Search for Alpha

Robert Litterman

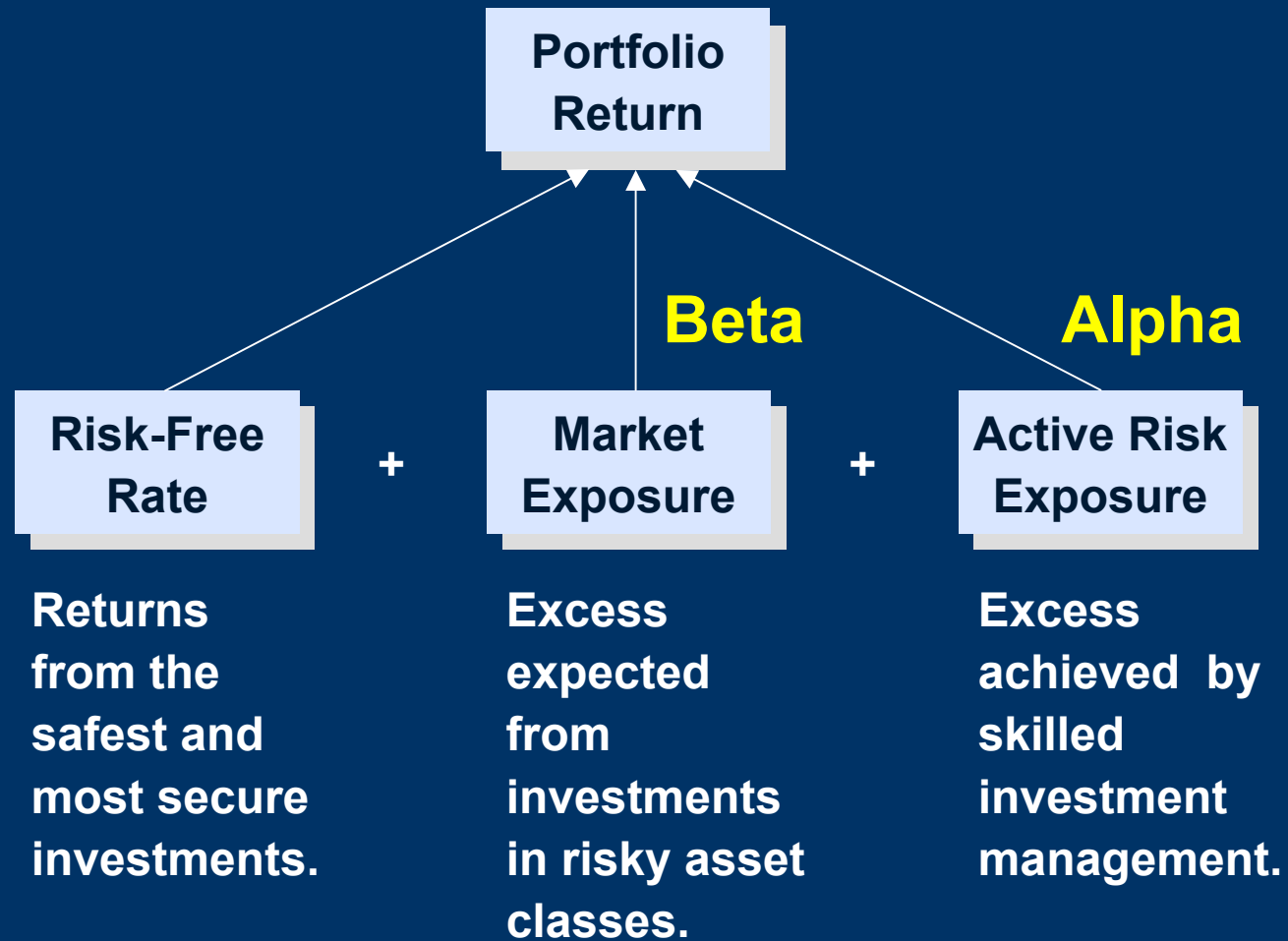
Managing Director, Head of Quantitative Resources

Active Alpha Investing: Key Ideas

- Additional market risk increases portfolio volatility considerably in contrast to active risk.
- The optimal level of active risk in a portfolio is much higher than most investors currently consider.
- Finding alpha is hard – To be successful, active strategies must address the 5 C's:
 - Correlation, Consistency, Capacity, Capital, and Cost
- Hedge funds, active currency management, global tactical asset allocation, and portable alpha strategies are good sources of alpha
- Relaxing no-shorting constraints in traditional mandates can also add alpha

Three Basic Sources of Return

Asset
Management



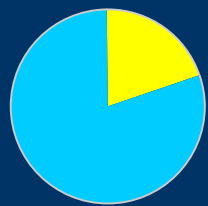
Relative Contribution to a \$ 5 Billion Portfolio

\$ 225 Million

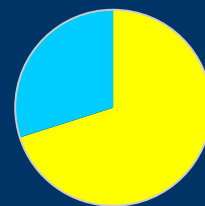
4.5% 10-year Govt. Bond Yield

Risk Free Returns

Beta: \$ 35 Million → to \$130 Million



20%
Equity
3.4% Risk



70%
Equity
12.0% Risk

Excess from
Investments in
Risky Things

Alpha: None → to \$ 90 Million

100% Passive
(No Active Risk)

3% Active Risk
(at 0.6 Information Ratio)

Excess from
Investments with
Skilled People

Note: Information ratio is a measure of the efficiency by which active managers convert active risk into excess returns.

Simulated performance results do not reflect actual trading and have certain inherent limitations.

For illustrative purposes only.

Three Basic Sources of Risk

Interest rate risk from liabilities:

- Uncompensated
- Can be hedged

Market risk:

- Low cost, plentiful
- Low efficiency (low Sharpe ratio)

Active risk:

- Uncorrelated
- Skill-based
- Requires deviations from equilibrium

Equilibrium: Market-Capitalization-Weighted Portfolio

Asset Class	Weight	Gross Excess Return	Volatility	Sharpe Ratio ¹
U.S. Equity	28.5%	3.3%	16.2%	0.21
U.K. Equity	5.7%	2.9%	16.2%	0.18
Europe Equity, ex-U.K.	9.8%	3.6%	19.0%	0.19
Asia Pacific Equity	6.8%	2.3%	16.4%	0.14
Canada Equity	1.5%	2.9%	16.8%	0.17
Emerging Markets Equity	2.7%	3.8%	23.6%	0.16
Fixed Income	42.3%	0.05%	3.2%	0.01
High Yield	2.8%	1.0%	7.7%	0.12
Total Portfolio	100.0%	1.8%	8.4%	0.22

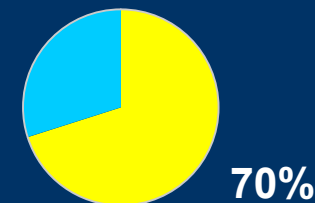
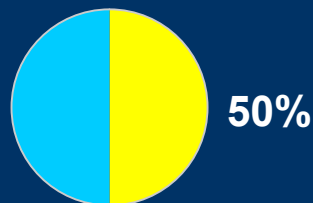
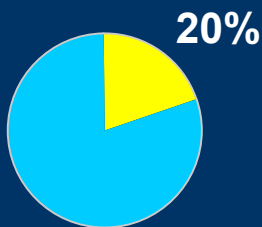
Equilibrium Stock / Bond Split: 55% / 45%

Note: (1) The Sharpe Ratio is the ratio of excess return to volatility and is a measure of the efficiency of return generation in a portfolio.

Simulated performance results do not reflect actual trading and have certain inherent limitations. Estimates reflect regional MSCI Indices for developed market equity portfolios, MSCI EMF for emerging markets equity, and regional JPM Global Government Bond Indices and the Lehman High Yield Index for fixed income portfolios. Long-term expected volatilities and correlations based on daily and monthly excess returns over cash for each asset class over the longest period of time for which data are available, from 31 Dec 1979 through 30 Sep 2004. Indices are unmanaged, the figures for the index reflect the reinvestment of dividends but do not reflect the deduction of any fees or expenses which would reduce returns. Investors cannot invest directly in indices. Please see additional disclosures.

Equilibrium: Passive Efficient Frontier

The low ratio of expected return per unit of risk does not change as you move along the optimal frontier.



20% Equity Allocation

0.7% Excess Return
3.4% Risk
0.21 Sharpe Ratio¹



50% Equity Allocation

1.8% Excess Return
8.6% Risk
0.21 Sharpe Ratio¹



70% Equity Allocation

2.6% Excess Return
12.0% Risk
0.21 Sharpe Ratio¹

Note: (1) The Sharpe Ratio is the ratio of excess return to volatility and is a measure of the efficiency of return generation in a portfolio.

Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see additional disclosures.

Adding Active Risk Can Dramatically Improve Portfolio Performance

Add Beta

	Excess Return	Volatility	Sharpe Ratio ¹
Original Portfolio (50% equity)	1.8%	8.6%	
Additional Market Risk (25% equity)	0.9%	4.4%	
Benefit from Diversification	–	(0.1%)	
New Portfolio	2.7%	12.9%	0.21

Add Alpha

	Excess Return	Volatility	Sharpe Ratio ¹
Original Portfolio (50% equity)	1.8%	8.6%	
3% Active Risk ² (assumed IR = 0.6)	1.8%	3.0%	
Benefit from Diversification	–	(2.5%)	
New Portfolio	3.6%	9.1%	0.40

Sharpe Ratio¹ improves with the addition of market independent return

Note: (1) The Sharpe Ratio is the ratio of excess return to volatility and is a measure of the efficiency of return generation in a portfolio. (2) Information Ratio (IR) is a measure of the efficiency by which active managers convert active risk into excess returns.

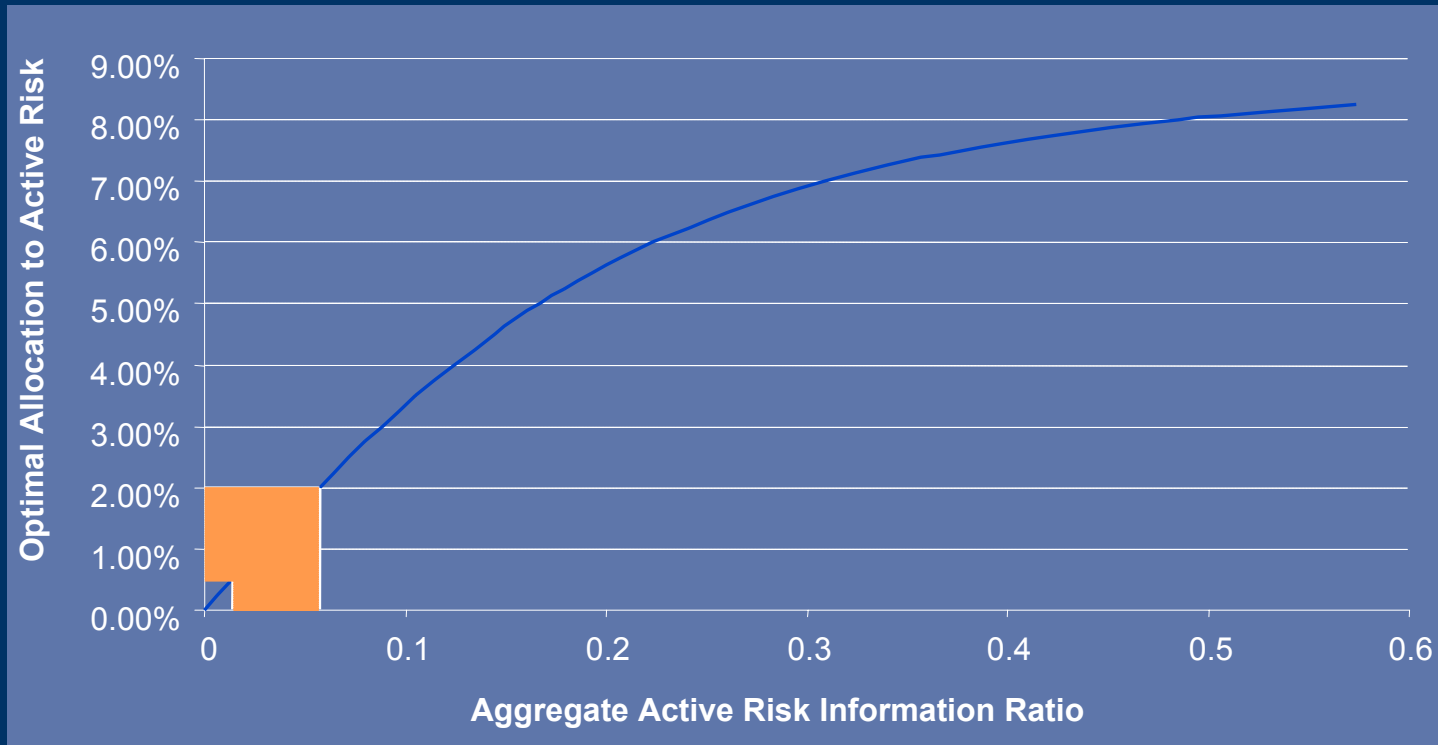
Simulated performance results do not reflect actual trading and have certain inherent limitations. Please see additional disclosures.

The Active Risk Puzzle:

Why do funds have such modest expectations?

Optimal Risk Allocations Reveal Modest IR Expectations

Allocations to active risk of typical pension funds range between 50 and 200 basis points



Possible Explanations:

- Funds may be unsure of their ability to select skilled managers
- Career risk
- Governance restrictions
- Active risk and strategic asset allocation have historically been linked
- It's hard to generate active risk – it takes a lot of capital

The 5 C's: Finding More Alpha for Your Portfolio

- **Correlation:** uncorrelated across sources
- **Consistency:**
 - High alpha per unit of active risk
 - Sustainability
- **Capacity**
- **Capital:**
 - Alpha constrained by capital allocation
 - Active risk overlays require low capital
- **Cost**

Potential Solutions

- **The most attractive alpha generation strategies:**
 - Target high return with minimal capital requirements
 - Have no beta and low correlations to other alpha sources
 - Have reasonable fees

- **Good examples are:**
 - Market-neutral absolute return strategies
 - Active risk overlay strategies (currency or GTAA)
 - Traditional mandates with the no-shorting constraint removed

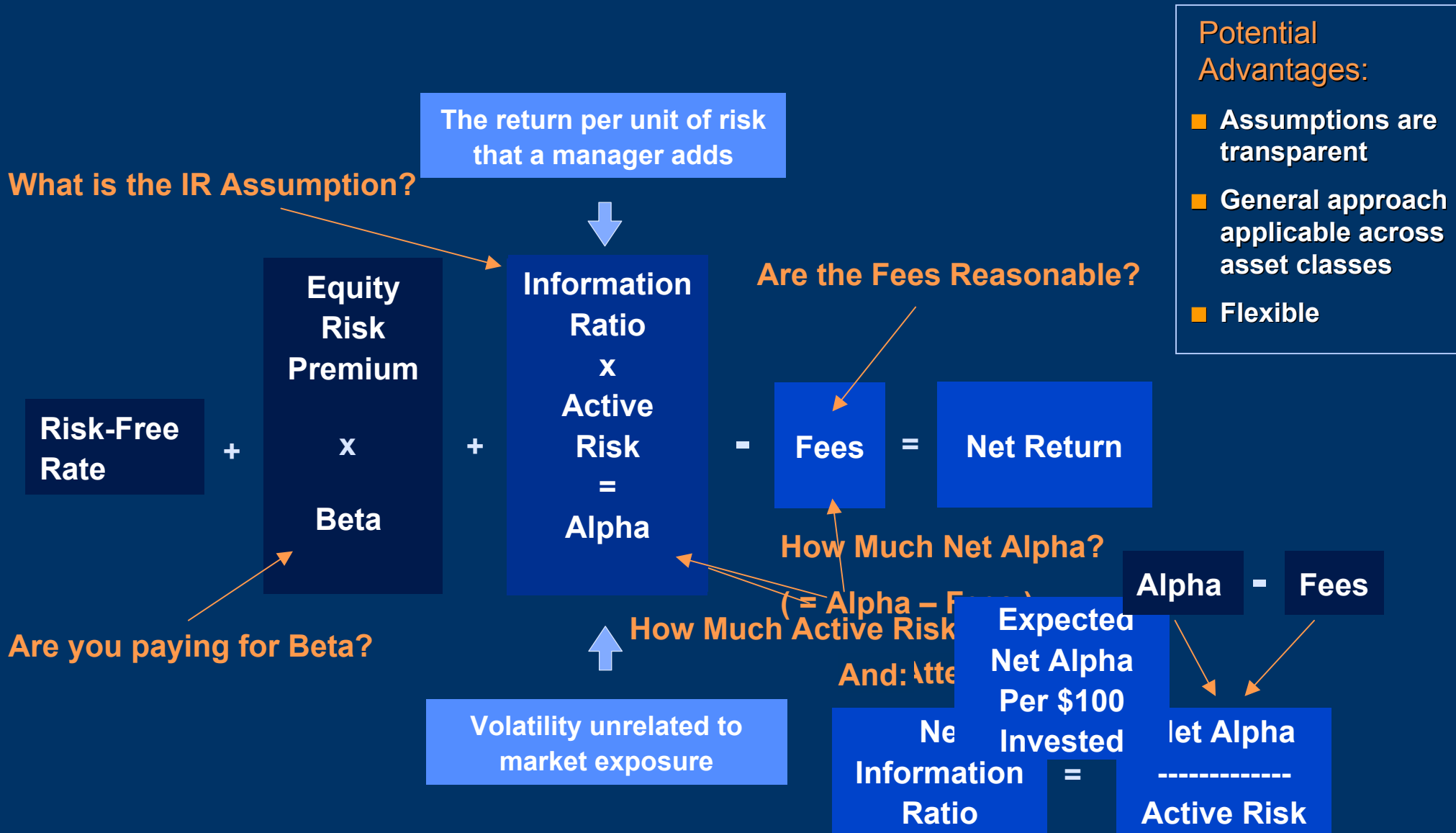
Some Leading U.S. Endowments Already Pursue Active Alpha Investing

	Leading Endowments Target Allocation			NACUBO ¹ Survey
	Harvard	Yale	Stanford	Average >US\$ 1B
Traditional Asset Classes	52%	38%	52%	65%
Public-Market Equity	30% ²	30%	40%	47%
Fixed Income and Cash	22% ³	8%	12%	18%
Alternative Assets	48%	63%	48%	35%
Absolute Return Strategies	12%	25%	15%	20%
Private Equity	13%	18%	10%	8%
Real Estate, Commodities	23%	20%	23%	7%
Total	100%	100%	100%	100%

Notes: (1) NACUBO is the National Association of College and University Business Officers. (2) Harvard's public-market equity classification includes internally-run long-short equity arbitrage strategies. Also allocates a 5% allocation to Emerging Markets. (3) Harvard's fixed income classification includes internally-run long-short bond arbitrage strategies. Also includes High-Yield and Inflation-Linked bonds.

Sources: 2004 Annual Reports of The Yale Endowment, Harvard Management Company, Stanford Management Company; NACUBO 2004 study of endowments.

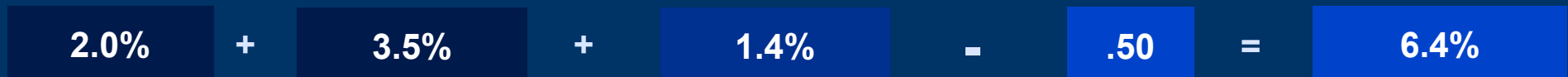
We have a framework for decomposing Risk and Return



Assessing Risk and Return: Hypothetical Traditional Actively-Managed US Equity Portfolio



Expected Return



Alpha
↙

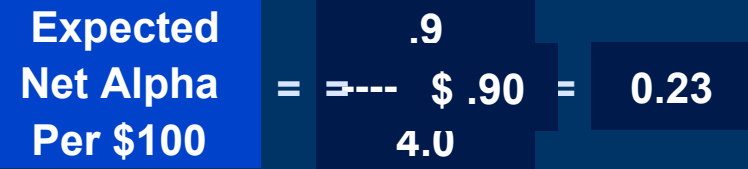
Volatility



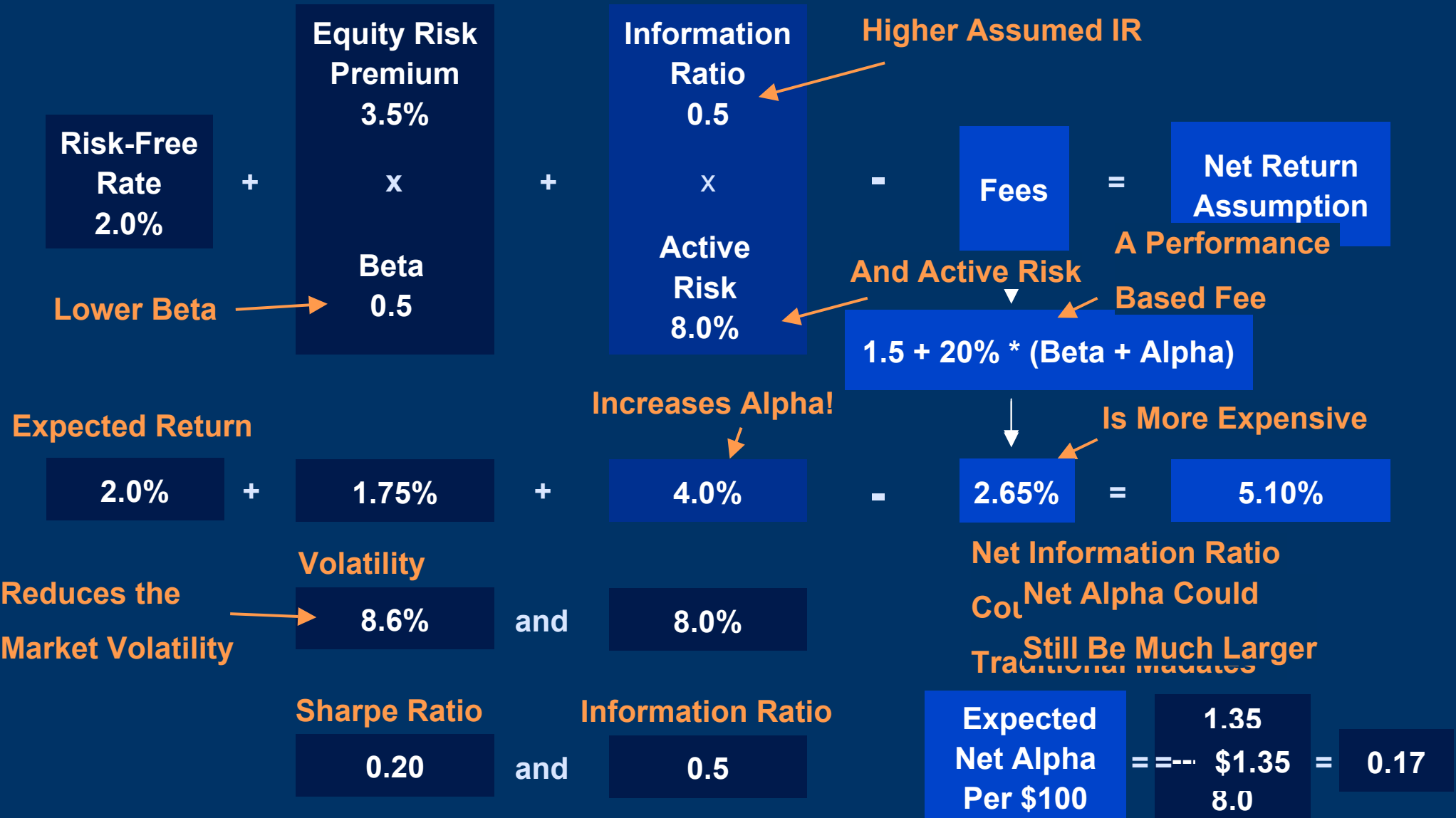
Sharpe Ratio



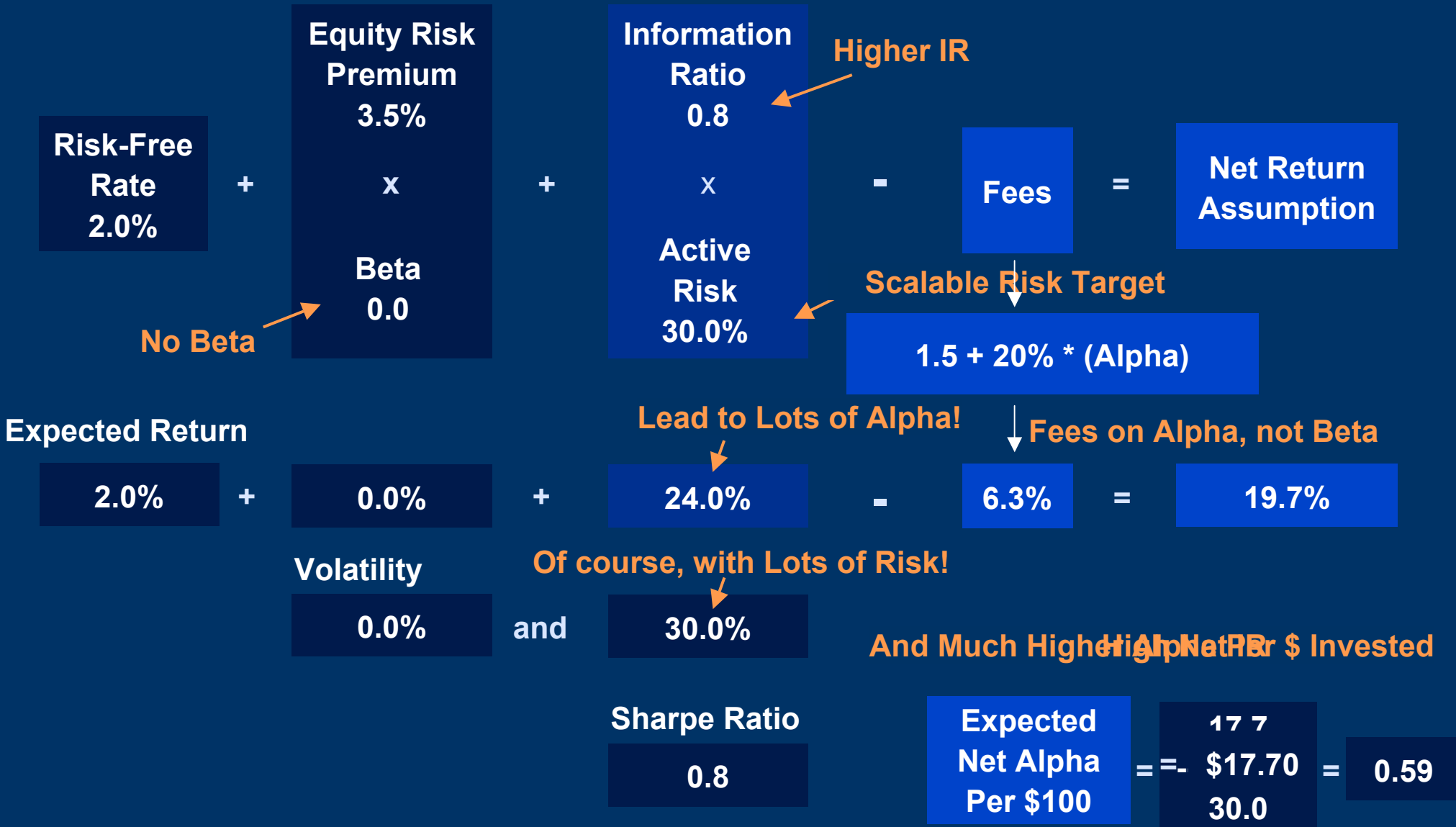
Information Ratio



Assessing Risk and Return: Hypothetical Hedge Fund With More Alpha, Less Beta



Assessing Risk and Return: Hypothetical GTAA Mandate Scalable Risk and Return



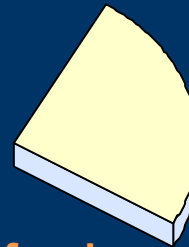
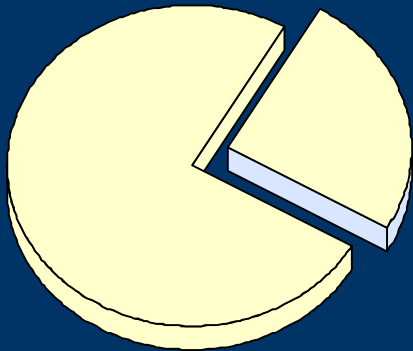
Leverage your ACTIVE RISK: Portable Alpha Strategies Can Significantly Increase Total Alpha

Asset Allocation Weights

Example: Terminate Manager

Remove \$100 MM of Fixed Income exposure
With 50 basis points of tracking error

Expected loss of alpha:
\$.25 MM assuming
Core Bond net IR = 0.5



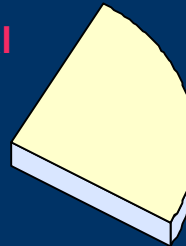
Result:
Original Asset Allocation
Plus \$13.25 MM additional alpha

Use \$10 MM to fund:

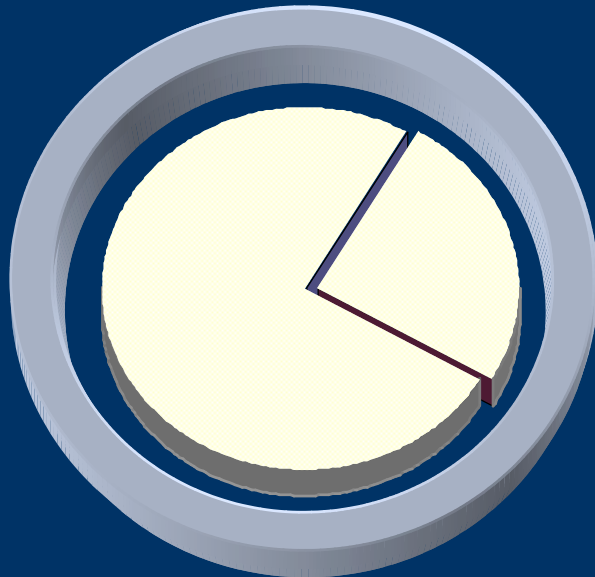
The
Original
Beta

**More Alpha
From GTAA**
And \$90 MM to fund:

A \$90 MM Investment in a
30% Volatility GTAA vehicle



\$10 MM margin to create
\$100 MM Synthetic Bond
Exposure Using Futures



Another Approach: More alpha from traditional allocations

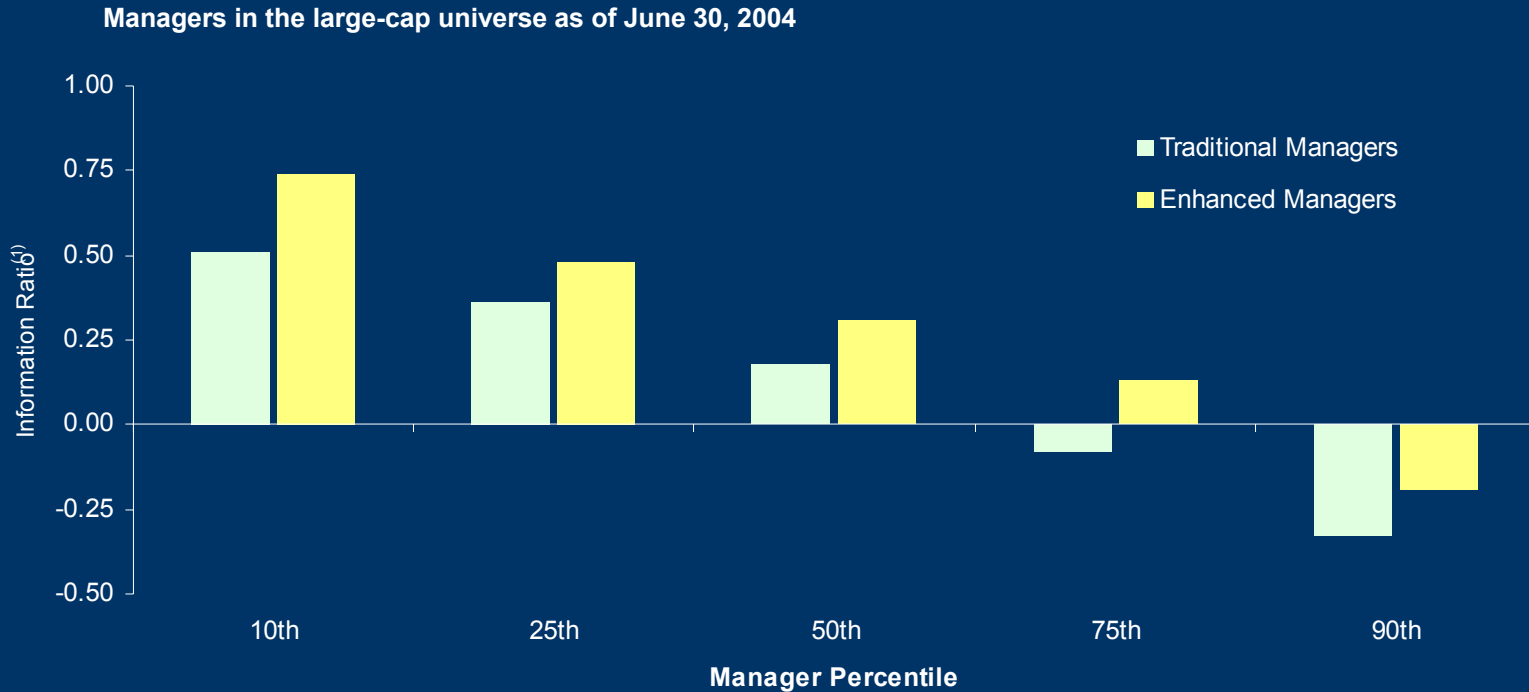
- Enhanced managers have historically achieved higher information ratios than traditional managers.
- Enhanced indexers construct diversified portfolios of over- and underweight positions relative to the stated benchmark.
- Constraints—in particular, the long-only constraint—prevent enhanced managers from hitting higher risk targets.

Relaxing constraints allows managers to create more efficient portfolios at higher levels of risk.

Enhanced managers achieve higher information ratios

July 1, 1994 – June 30, 2004

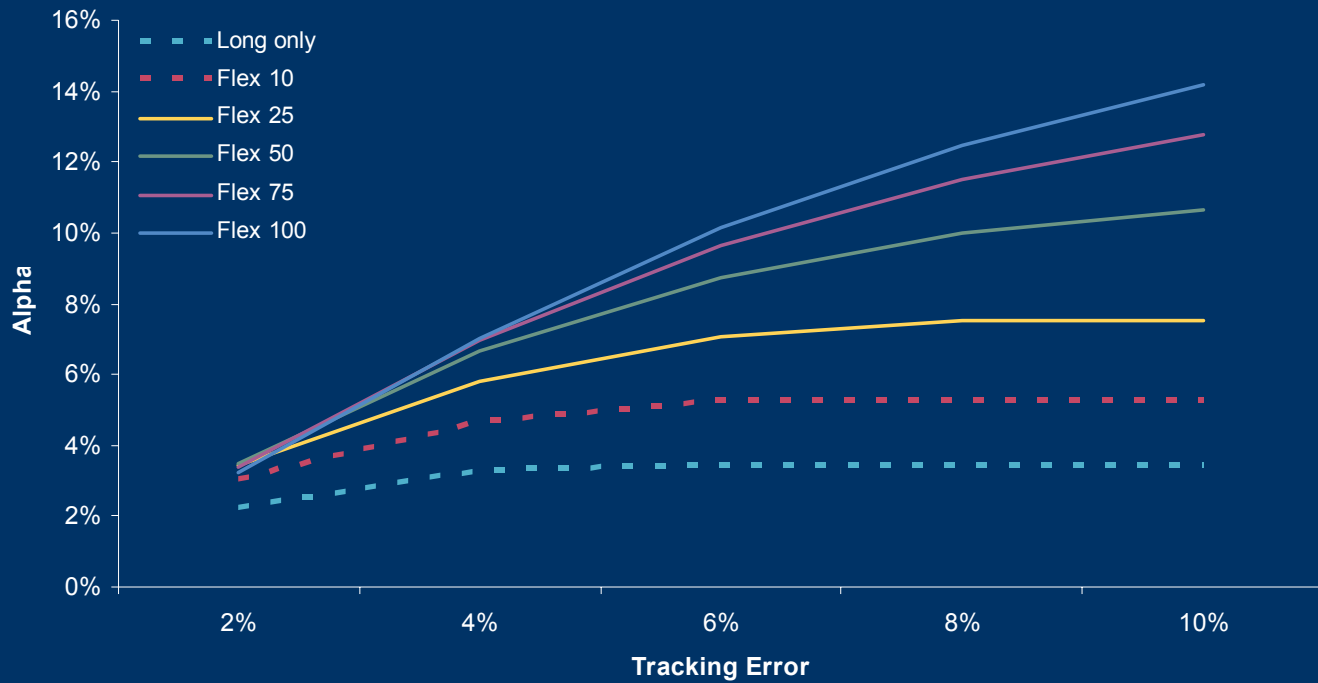
Over the last 10 years, structured managers have produced higher risk-adjusted returns at all skill levels.



(1) The information ratio is excess return divided by tracking error; a higher information ratio means a better risk/return trade-off. In the above, enhanced managers are defined as those with 10-year annualized tracking errors between 1.0% and 3.5%; Traditional managers are defined as those with a 10-year tracking error above 3.5%. This analysis was based on returns of 161 traditional and 48 enhanced managers. Past performance is not indicative of future results, which may vary. Source: PSN (Plan Sponsor Network). PSN is an independent provider of performance data to pension funds and asset managers. The data presented is monthly and gross of fees. Please see the appendix for additional information and disclosures.

Portfolios can target higher risk levels with less loss in efficiency (information ratio)

US Large Cap Expected Alpha

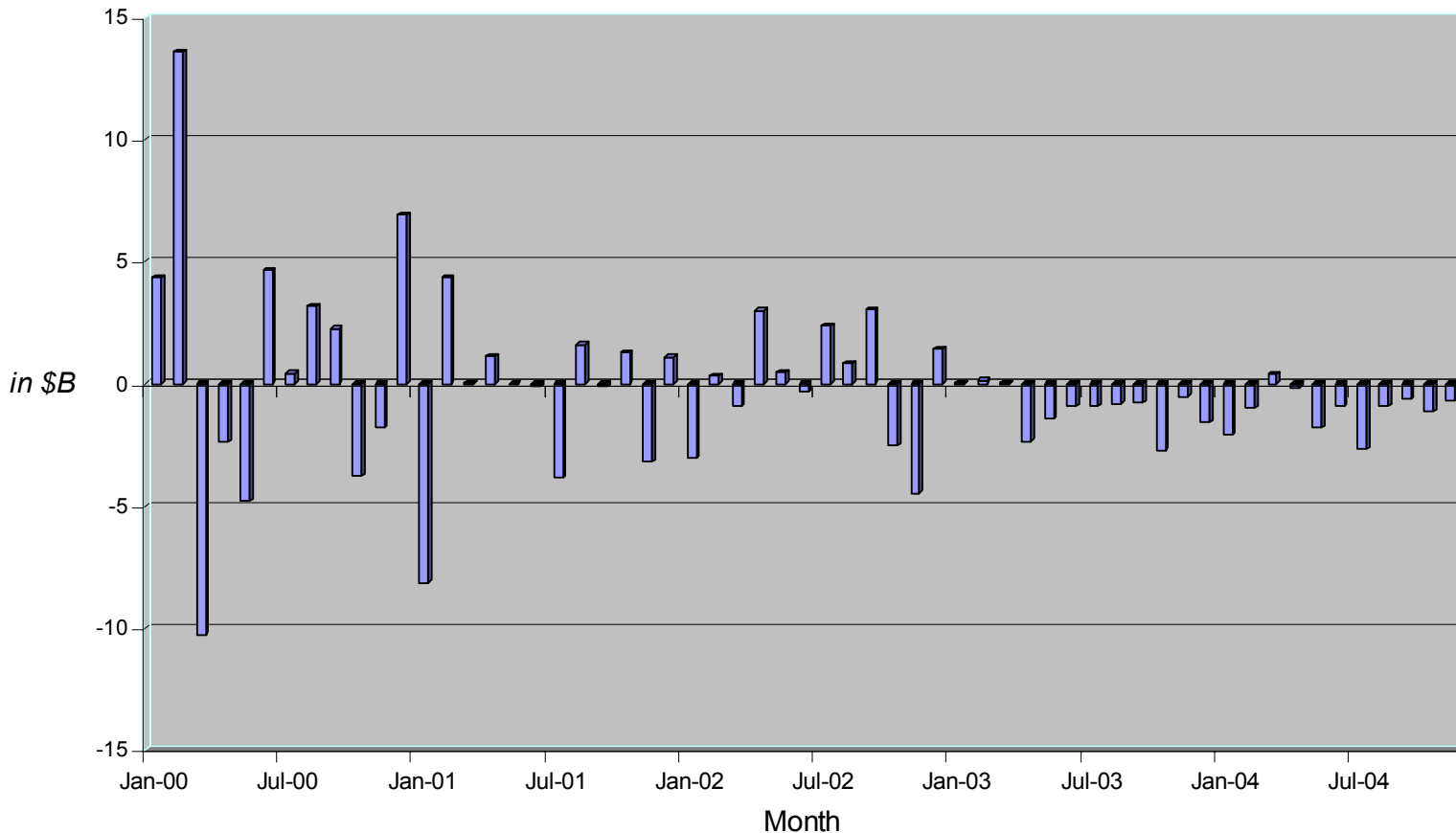




Traditional Managers Have Been Taking Less Risk in Recent Years

Sector	AUM	Average Tracking Error		Average Decline
	\$ Billions	2000	2004	
Large Cap Core	457.6	784	252	68%
Large Cap Growth	241.1	1168	365	69%
Large Cap Value	323.0	716	261	64%
Mid Cap Core	113.9	1414	389	72%
Mid Cap Growth	102.1	1760	442	75%
Mid Cap Value	96.7	1019	446	56%
Small Cap Core	146.4	1703	459	73%
Small Cap Growth	67.4	1662	529	68%
Small Cap Value	46.6	1174	453	61%
International Large Cap Core	53.3	652	233	64%

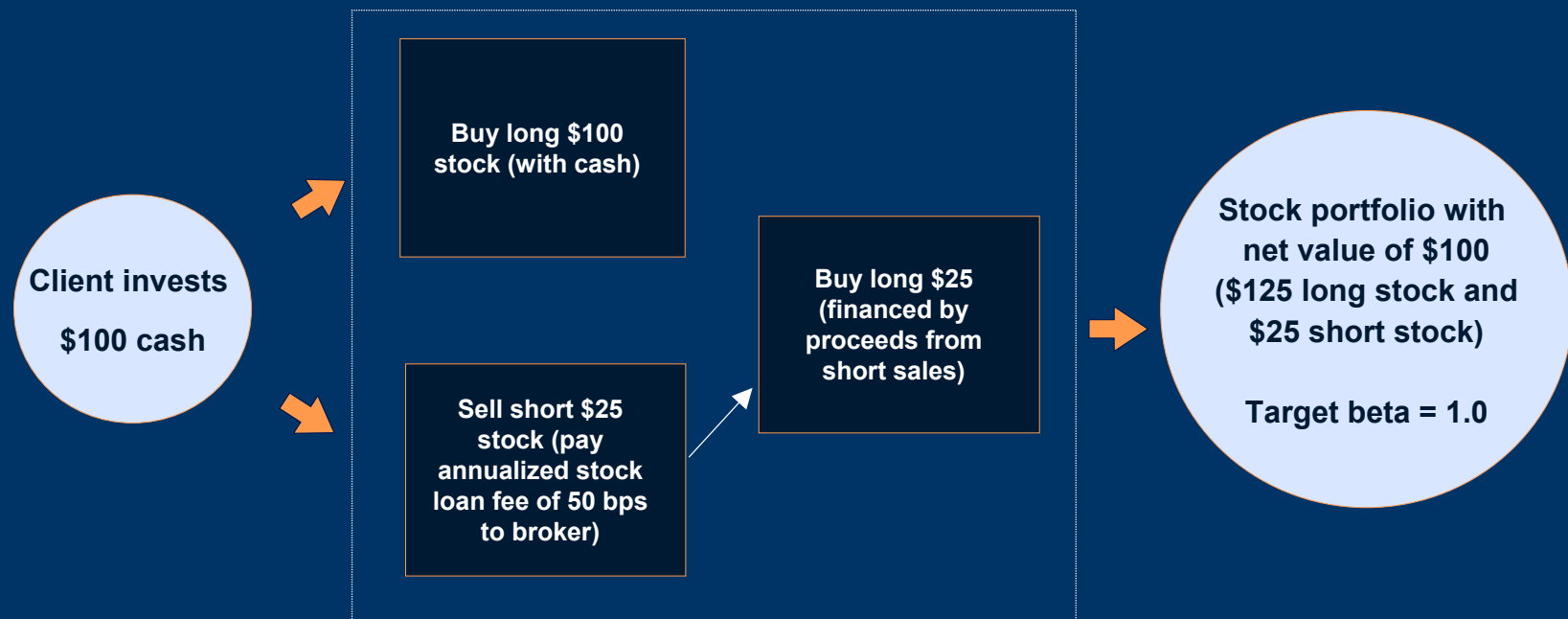
Traditional Managers Have Been Creating Less Alpha in Recent Years



Monthly Dollar Alpha Created in the US Mutual Funds In the Large Cap Core Sector (Versus the S&P 500)

Allow quantitative managers the flexibility to short

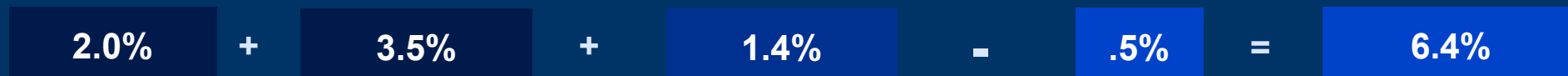
- Managers can better express their negative views
- Short sales finance additional buys, allowing larger overweight positions



Start With the Hypothetical Traditional Actively-Managed US Equity Portfolio



Expected Return



Volatility



Sharpe Ratio

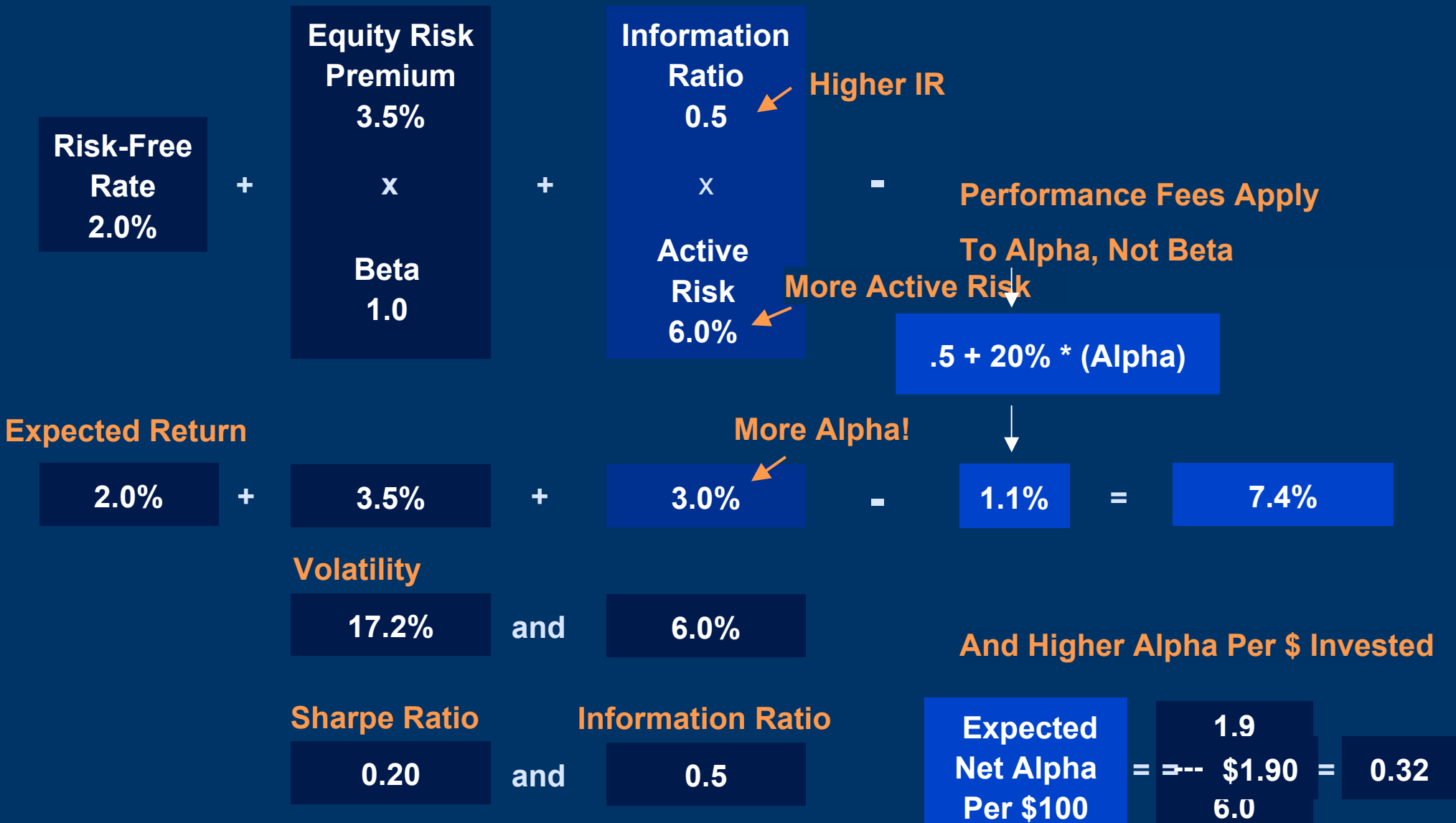


and

Information Ratio



Flex! Add the Flexibility to Go Short Allow More Active Risk And a Higher Information Ratio



Active Alpha Investing

- Active Alpha investing Separates Alpha from Beta
- Relies on skill-based active management to diversify risk and add return.
- Active strategies must address the 5 C's.
- Active Alpha portfolios differ from traditional portfolios:
 - Substantial absolute return investments, hedge funds, currency and GTAA overlay strategies
 - Increased use of financial engineering: portable alpha
 - Lower allocations to traditional public assets
 - Allow less constrained “Flex” mandates,

This material is provided for educational purposes only and should not be construed as investment advice or an offer to sell or the solicitation of offers to buy any security. Opinions expressed herein are current opinions as of the date appearing in this material only. No part of this material may be i) copied, photocopied or duplicated in any form, by any means, or ii) redistributed without Goldman Sachs Asset Management's prior written consent.

Simulated performance results have certain inherent limitations. Such results are hypothetical and do not represent actual trading, and thus may not reflect material economic and market factors, such as liquidity constraints, that may have had an impact on the Adviser's actual decision-making. Simulated results are also achieved through the retroactive application of a model designed with the benefit of hindsight. The results shown reflect the reinvestment of dividends and other earnings, but do not reflect advisory fees, transaction costs and other expenses a client would have paid, which would reduce return. No representation is made that a client will achieve results similar to those shown.

In the event any of the assumptions used in this presentation do not prove to be true, results are likely to vary substantially from the examples shown herein. These examples are for illustrative purposes only and do not purport to show actual results.

References to market or composite indices, benchmarks or other measures of relative market performance over a specified period of time (each, an “index”) are provided for your information only. Reference to an index does not imply that the portfolio will achieve returns, volatility or other results similar to the index. The composition of the index may not reflect the manner in which a portfolio is constructed in relation to expected or achieved returns, portfolio guidelines, restrictions, sectors, correlations, concentrations, volatility or tracking error targets, all of which are subject to change over time.

While the Adviser seeks to design a portfolio which will reflect appropriate risk and return features such as sector weights, credit quality and duration, the Client understands that such characteristics of the portfolio, as well as its volatility, may deviate to varying degrees from those of the benchmark.

This presentation has been communicated in the United Kingdom by Goldman Sachs Asset Management International which is authorized and regulated by the Financial Services Authority (FSA).