Strategic Frontier Management

GLOBAL MARKET STRATEGY

OVERVIEW

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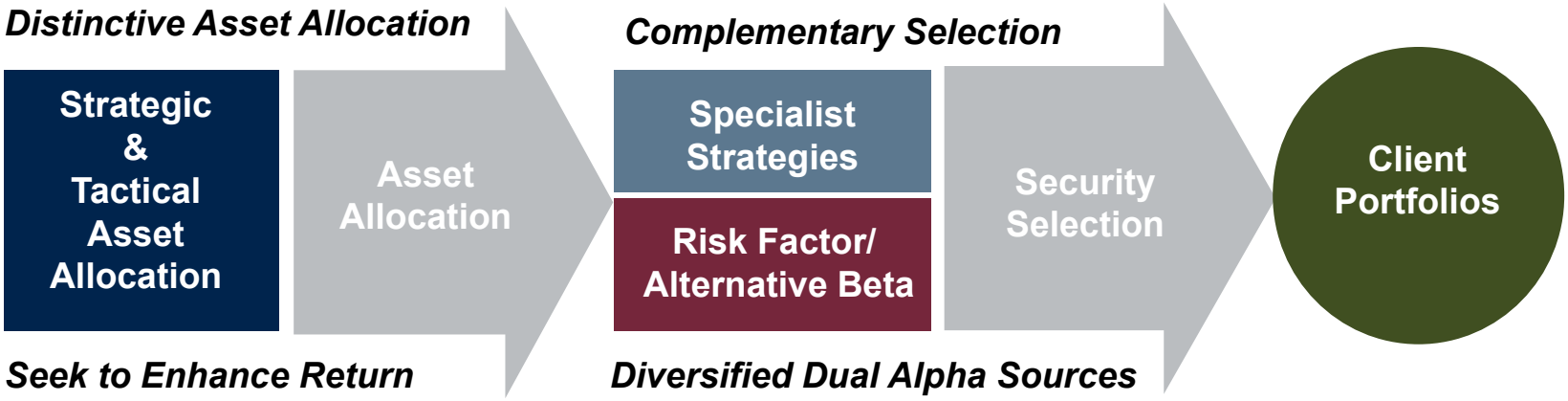
www.StrategicCAPM.com

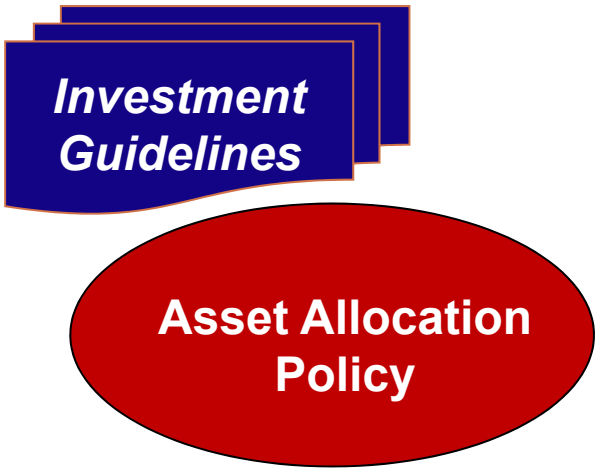
INVESTMENT PROCESS STRATEGY

- Disciplined approach to Asset Allocation and Security Selection
- Seek sustainable advantage, catalysts, and indicators of change
- Rationalizing complex world of uncomfortable choices, varying investor preferences, and evolving risk measures

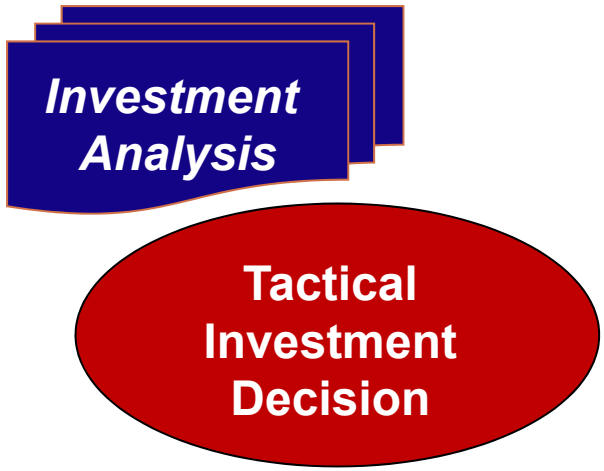


ASSET ALLOCATION: THE MOST IMPORTANT DECISION FOR INVESTORS

Determining an appropriate asset allocation for a particular time horizon and risk tolerance must be managed, and accounts for over 90% of performance variations[1]



Strategic Asset Allocation



Tactical Asset Allocation

Leveraging Differentiated Strategic and Tactical Asset Allocation Processes

1. Source: Asset allocation explained 93.6% of return variations between pension plans in a study by Brinson et al, FAJ, 1986. Numerous successive studies and papers confirm this conclusion still continues to persist today, despite globalization.

ASSET ALLOCATION KEY TO PERFORMANCE

FINANCIAL ANALYSTS JOURNAL / JULY-AUGUST 1986

by Gary P. Brinson, L. Randolph Hood and Gilbert L. Beebower

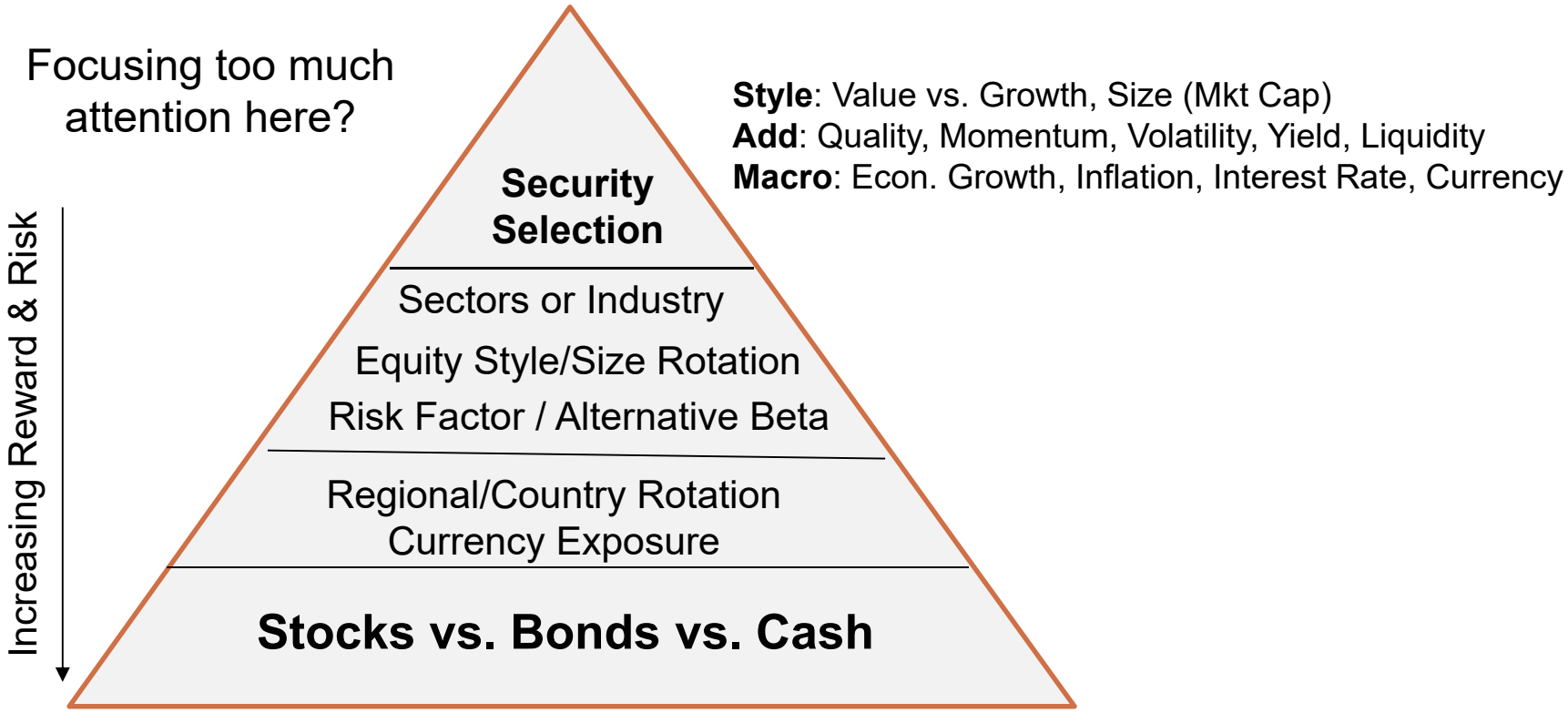
Determinants of Portfolio Performance

In order to delineate investment responsibility and measure performance contribution, pension plan sponsors and investment managers need a clear and relevant method of attributing returns to those activities that compose the investment management process—investment policy, market timing and security selection. The authors provide a simple framework based on a passive, benchmark portfolio representing the plan's long-term asset classes, weighted by their long-term allocations. Returns on this "investment policy" portfolio are compared with the actual returns resulting from the combination of investment policy plus market timing (over or underweighting asset classes relative to the plan benchmark) and security selection (active selection within an asset class).

Data from 91 large U.S. pension plans over the 1974–83 period indicate that investment policy dominates investment strategy (market timing and security selection), explaining on average 93.6 per cent of the variation in total plan return. The actual mean average total return on the portfolio over the period was 9.01 per cent, versus 10.11 per cent for the benchmark portfolio. Active management cost the average plan 1.10 per cent per year, although its effects on individual plans varied greatly, adding as much as 3.69 per cent per year. Although investment strategy can result in significant returns, these are dwarfed by the return contribution from investment policy—the selection of asset classes and their normal weights.

GALAXY OF INVESTMENT OPPORTUNITIES

Most Products Narrowly Focused, Rarely Exploit Multiple Disciplines



Risk Factor Investing (*Alternative Beta)* expose new dimensions.
Risk management versus Value Added tilts or Attribution Insight

STRATEGIC ASSET ALLOCATION DISCIPLINE

Asset Allocation is the investment discipline of determining an optimal mix of portfolio exposures across public and private (*) market asset classes for a given investor's risk tolerance and time horizon.

- Asset Allocation must begin with an investment philosophy and discipline
- Integrate what drives return expectations of asset classes and currencies
- Variety of Investment Objectives to determine Strategic Policy:

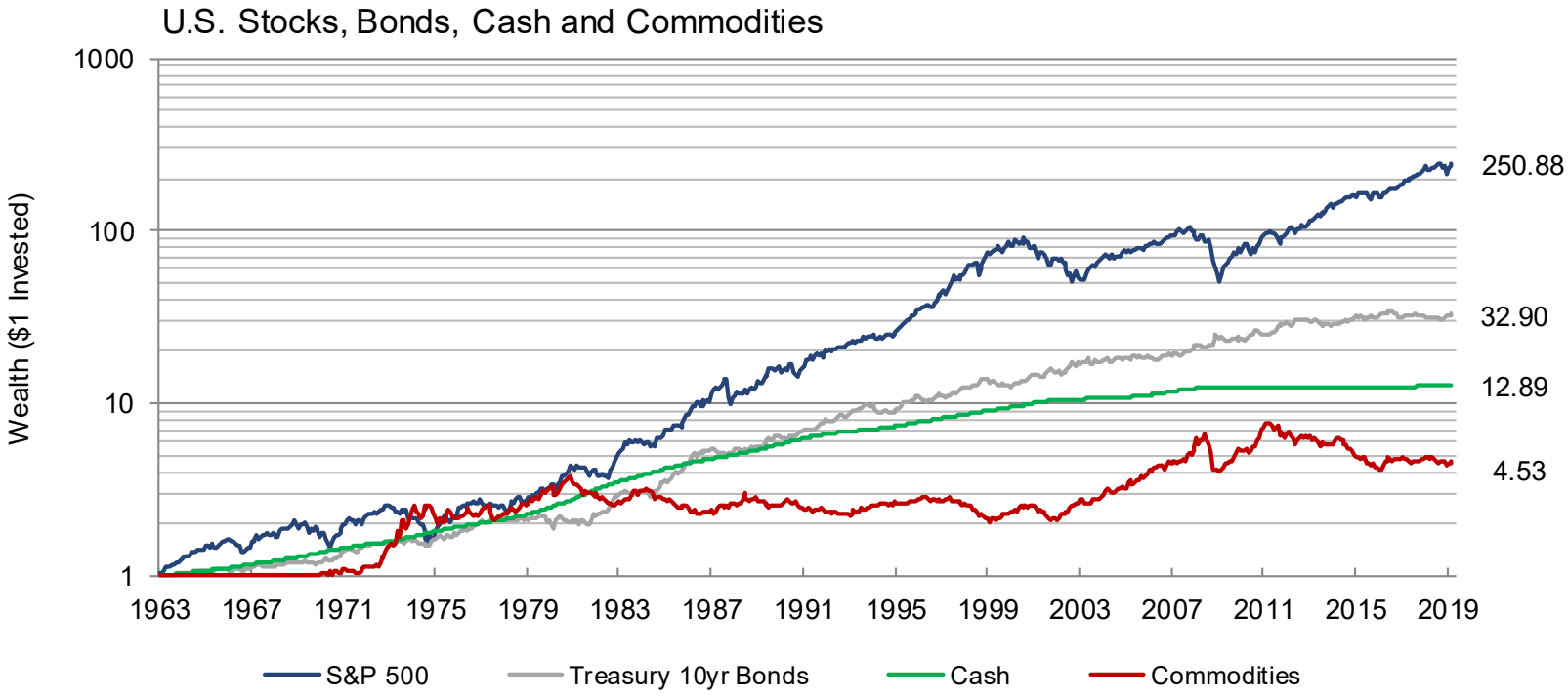
1. **Risk-Adjusted Return (M-V)**
2. Liability-Driven Investing
3. Risk Parity
6. Maximum Diversification
7. Minimum Variance
8. Committee or Simple/Equal Weights

What is an Asset Class?

Equity	Fixed Income	Alternatives
Domestic Stocks International Stocks Emerging Market Stock Long/Short & 130/30 *Private Equity *Venture Capital	Cash Equivalents Domestic Bonds International Bonds Emerging Market Bonds TIPs, Leveraged Loan *Private Debt	Currency Management Commodities *Absolute return *Hedge Funds *Real Estate *Infrastructure, Timber
Multi-Asset Strategies	Global TAA, Risk Parity, Derivative Strategies, Hedging	

LONG-TERM ASSET CLASS RETURNS

- US Equities is the best way to stay ahead of inflation, particularly as overvalued bonds struggle with normalization (raising rates, reducing bond holdings)
- Cash has been a better store of value than more volatile commodities or gold

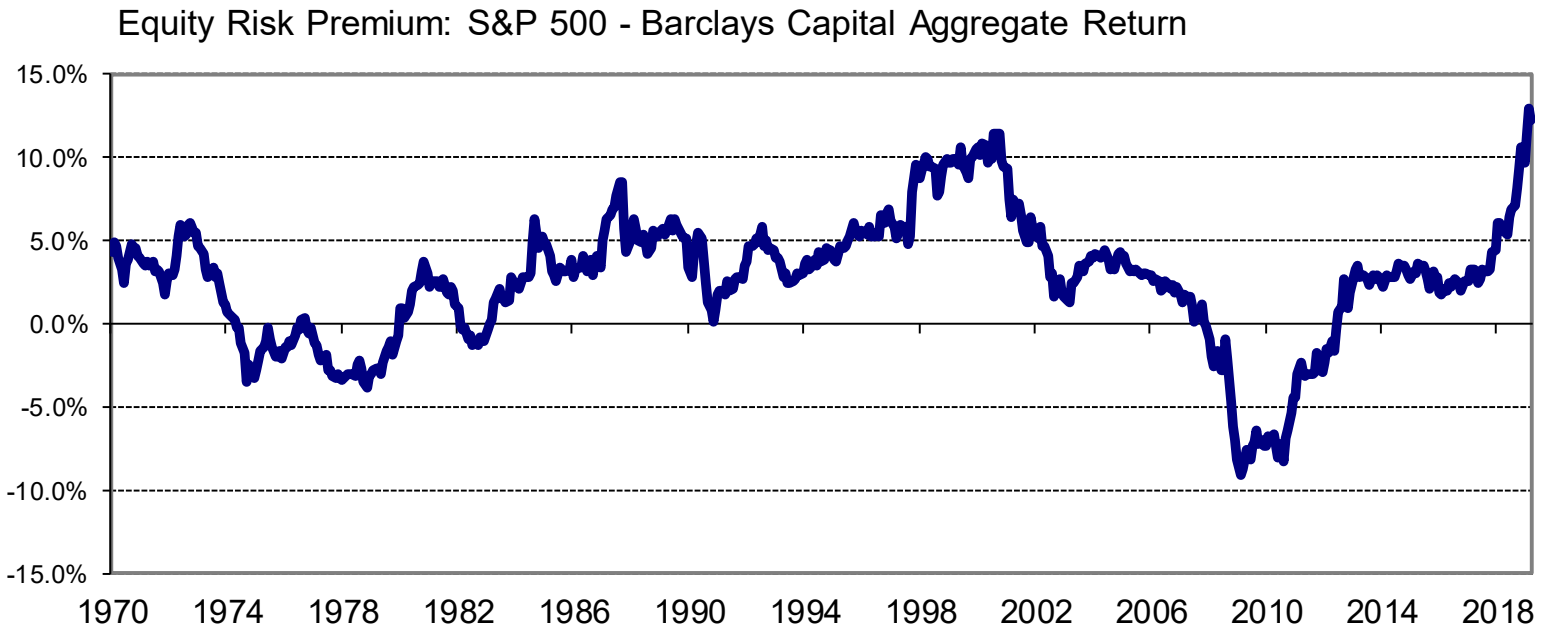


Source: Refinitiv DataStream and Strategic Frontier Management

ROLLING 10-YR STOCK VS. BOND RETURN

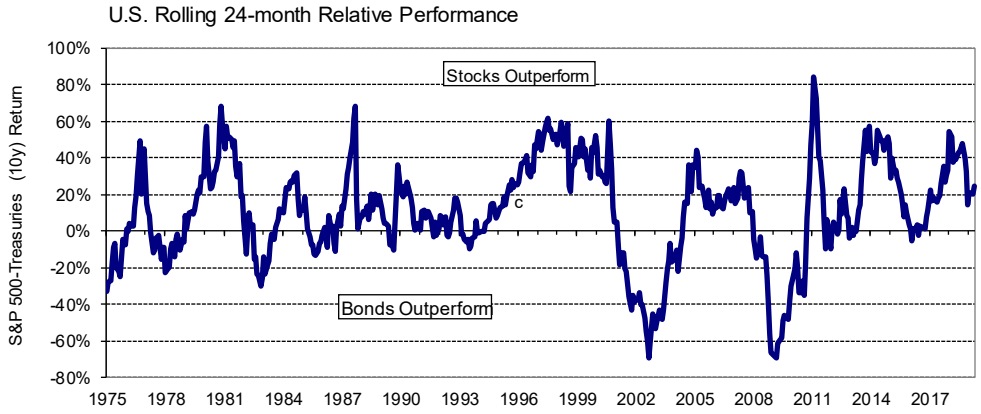
Reversal in relative performance can change investors' risk averse behavior toward global equities and shorter horizon reflected in high bond allocations.

How will this change investor behavior? Valuation critical—better than thought?



Source: Strategic Frontier Management, Standard & Poor's Indices, Barclays Capital

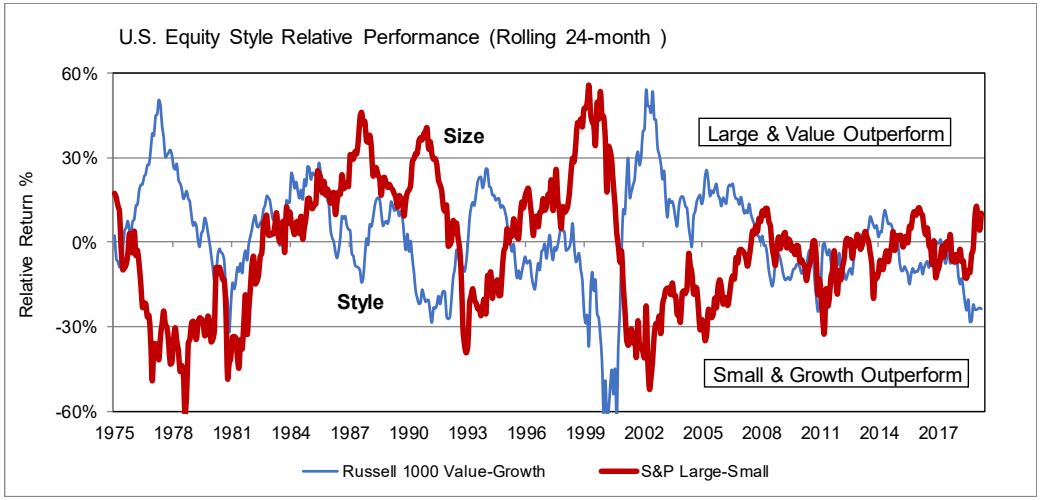
RELATIVE PERFORMANCE SWINGS



U.S. Stocks vs. Bonds

Returns diverge and risk varies, but Stocks outperform Bonds over long term horizons.

S&P 500 Index has returned over 200% since March 2009. *New Normal hypothesis* and *subordination of the equity risk premium* was very misguided.



U.S. Equity Styles

Equity style investing can benefit from differential market returns, and often cycles are not synchronized.

Yet, Value and Small-cap tilts have outperformed over the long-run.

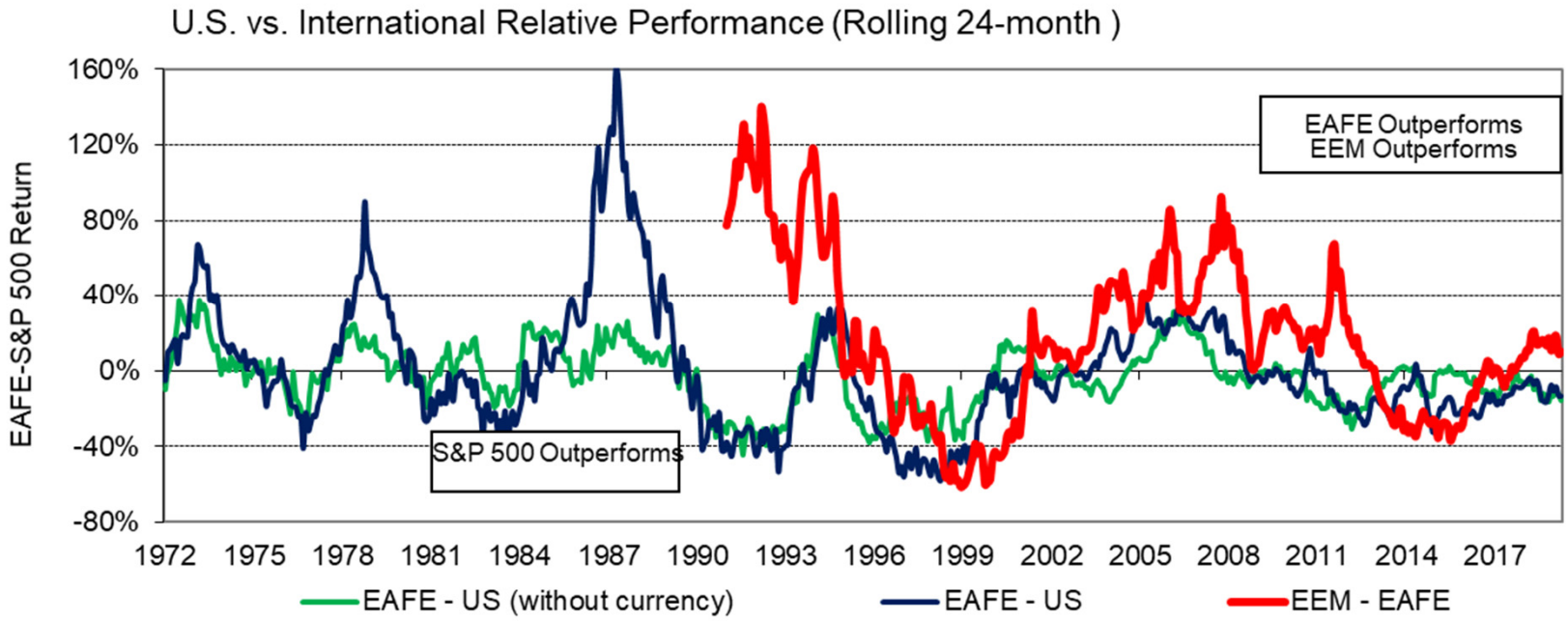
BENEFIT OF VALUE INVESTING MIA

- Advantage tilting toward *Value*, yet absent since Quant Quake/Financial Crisis
- Long-term risk premiums such as Value-Growth and Small Size (large vs. small) are cyclical, but also can be exploited tactically. Other risk factors similarly cyclical.
- Over 35 years through 2010, value outperformed growth by 2.4% annualized, which has compounded to nearly 3X greater wealth (see chart below)
- Smart-Beta (factor premiums) suffered as Size and Value premiums failed recently
- Observe: Lagging Active Equity return coincided with lagging Value and Small-cap, but forecasting when Active outperforms is a fools errand, assumes Active is cyclical

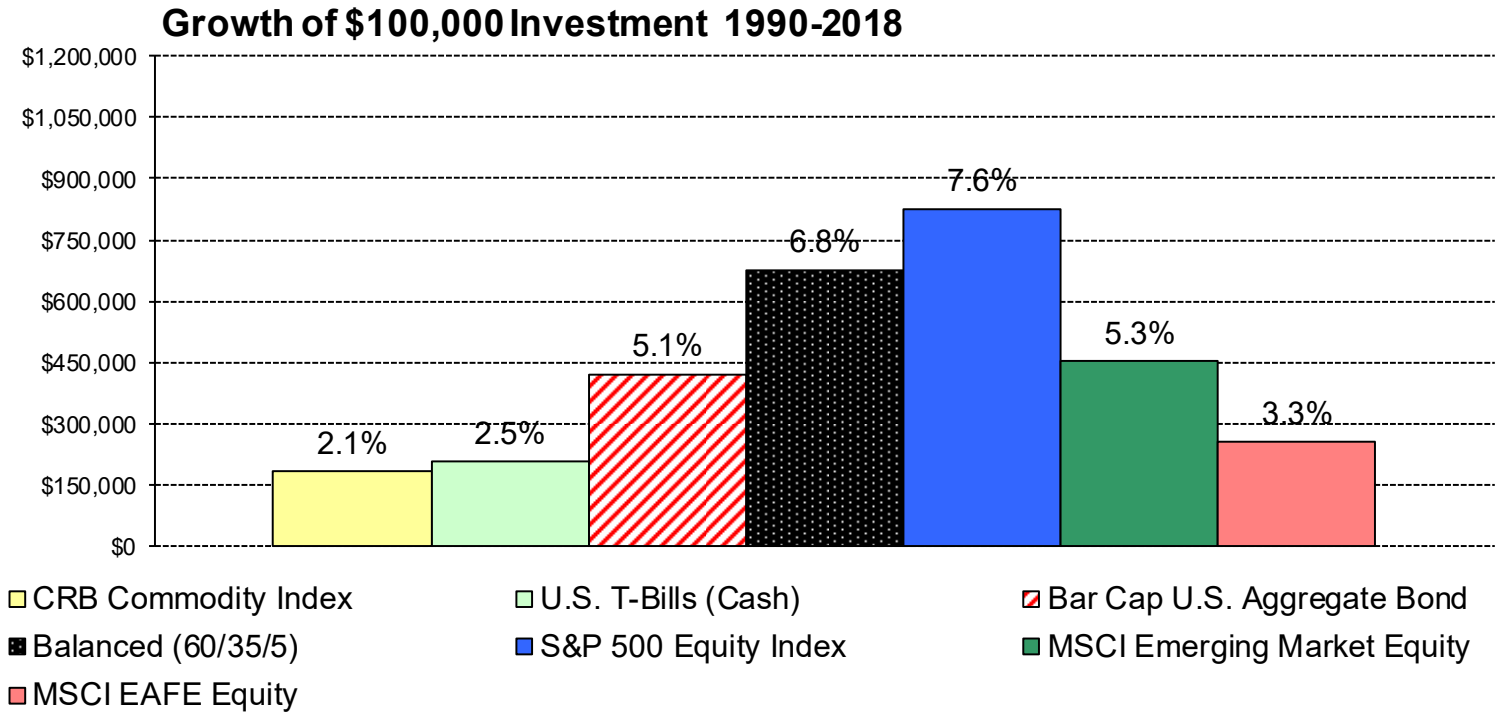
Source: Strategic Frontier Management & DataStream

CURRENCY IMPACT CAN BE DRAMATIC

- Currency can play a more pivotal role than many investors realize
- Emerging markets have lagged global developed markets, even BRICs
- Expect greater dispersion among global regions, countries, and currencies
- Country dispersion driven by growth, margins, competitive advantages gap



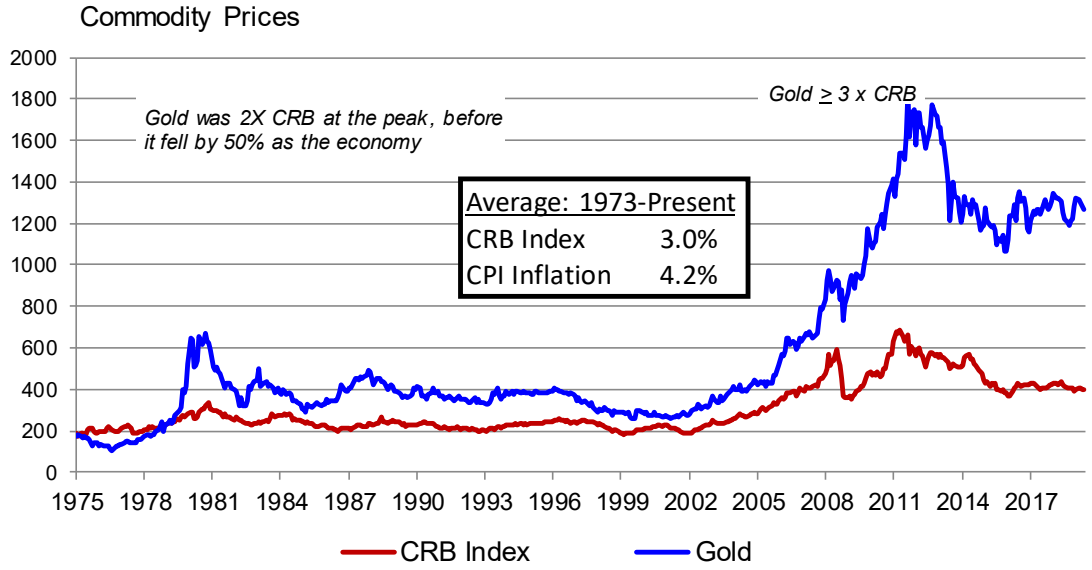
INTERNATIONAL EQUITIES LAGGED SINCE 1990



Source: Strategic Frontier Management

COMMODITIES STILL LANGUISHING

- Gold has languished since 2009, but we believe it is an inefficient strategic holding with extremely high volatility and negative real return. Similarly for commodities.
- Cash is actually a better store of value and better market hedge than commodities.



Correlation	Commodity	Gold
S&P 500	18%	1%
UST 10yr	-24%	3%
Cash	-9%	-3%
Inflation	25%	21%

Note: Monthly returns for 1973-2017 CRB Index

Commodity Returns:
1871 – 2007: Goldman/The Economist/IMF: Real return = -0.4%
1900 – 2008: Credit Suisse 2.5% vs. 3.0% inflation Real return = -0.5%
1973 – 2009: 4.75% vs. 4.5% (inflation) Real return = 0.25%

Source: Refinitiv DataStream

CALLAN PERIODIC TABLE OF RETURNS

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Real Estate 37.96%	Emerging Market Equity 34.00%	Real Estate 42.12%	Emerging Market Equity 39.38%	U.S. Fixed Income 5.24%	Emerging Market Equity 78.51%	Small Cap Equity 26.85%	U.S. Fixed Income 7.84%	Real Estate 27.73%	Small Cap Equity 38.82%	Real Estate 15.02%	Large Cap Equity 1.38%	Small Cap Equity 21.31%	Emerging Market Equity 37.28%	Cash Equivalent 1.87%
Emerging Market Equity 25.55%	Real Estate 15.35%	Emerging Market Equity 32.17%	Non-U.S. Equity 12.44%	Non-U.S. Fixed Income 4.39%	High Yield 58.21%	Real Estate 19.63%	High Yield 4.98%	Emerging Market Equity 18.23%	Large Cap Equity 32.39%	Large Cap Equity 13.69%	U.S. Fixed Income 0.55%	High Yield 17.13%	Non-U.S. Equity 24.21%	U.S. Fixed Income 0.01%
Non-U.S. Equity 20.38%	Non-U.S. Equity 14.47%	Non-U.S. Equity 25.71%	Non-U.S. Fixed Income 11.03%	Cash Equivalent 2.06%	Real Estate 37.13%	Emerging Market Equity 18.88%	Non-U.S. Fixed Income 4.36%	Non-U.S. Equity 16.41%	Non-U.S. Equity 21.02%	U.S. Fixed Income 5.97%	Cash Equivalent 0.05%	Large Cap Equity 11.96%	Large Cap Equity 21.83%	High Yield -2.08%
Small Cap Equity 18.33%	Large Cap Equity 4.91%	Small Cap Equity 18.37%	U.S. Fixed Income 6.97%	High Yield -26.16%	Non-U.S. Equity 33.67%	High Yield 15.12%	Large Cap Equity 2.11%	Small Cap Equity 16.35%	High Yield 7.44%	Small Cap Equity 4.89%	Real Estate -0.79%	Emerging Market Equity 11.19%	Small Cap Equity 14.65%	Non-U.S. Fixed Income -2.15%
Non-U.S. Fixed Income 12.54%	Small Cap Equity 4.55%	Large Cap Equity 15.79%	Large Cap Equity 5.49%	Small Cap Equity -33.79%	Small Cap Equity 27.17%	Large Cap Equity 15.06%	Cash Equivalent 0.10%	Large Cap Equity 16.00%	Real Estate 3.67%	High Yield 2.45%	Non-U.S. Equity -3.04%	Real Estate 4.06%	Non-U.S. Fixed Income 10.51%	Large Cap Equity -4.38%
High Yield 11.13%	Cash Equivalent 3.07%	High Yield 11.85%	Cash Equivalent 5.00%	Large Cap Equity -37.00%	Large Cap Equity 26.47%	Non-U.S. Equity 8.95%	Small Cap Equity -4.18%	High Yield 15.81%	Cash Equivalent 0.07%	Cash Equivalent 0.03%	Small Cap Equity -4.41%	Non-U.S. Equity 2.75%	Real Estate 10.36%	Real Estate -5.63%
Large Cap Equity 10.88%	High Yield 2.74%	Non-U.S. Fixed Income 8.16%	High Yield 1.87%	Non-U.S. Equity -43.56%	Non-U.S. Fixed Income 7.53%	U.S. Fixed Income 6.54%	Real Estate -6.46%	U.S. Fixed Income 4.21%	U.S. Fixed Income -2.02%	Emerging Market Equity -2.19%	High Yield -4.47%	U.S. Fixed Income 2.65%	High Yield 7.50%	Small Cap Equity -11.01%
U.S. Fixed Income 4.34%	U.S. Fixed Income 2.43%	Cash Equivalent 4.85%	Small Cap Equity -1.57%	Real Estate -48.21%	U.S. Fixed Income 5.93%	Non-U.S. Fixed Income 4.95%	Non-U.S. Equity -12.21%	Non-U.S. Fixed Income 4.09%	Emerging Market Equity -2.60%	Non-U.S. Fixed Income -3.09%	Non-U.S. Fixed Income -6.02%	Non-U.S. Fixed Income 1.49%	U.S. Fixed Income 3.54%	Non-U.S. Equity -14.09%
Cash Equivalent 1.33%	Non-U.S. Fixed Income -8.65%	U.S. Fixed Income 4.33%	Real Estate -7.39%	Emerging Market Equity -53.33%	Cash Equivalent 0.21%	Cash Equivalent 0.13%	Emerging Market Equity -18.42%	Cash Equivalent 0.11%	Non-U.S. Fixed Income -3.08%	Non-U.S. Equity -4.32%	Emerging Market Equity -14.92%	Cash Equivalent 0.33%	Cash Equivalent 0.86%	Emerging Market Equity -14.58%

CAPITAL MARKET REVIEW

Total Return	Q4 2018	3-Mon	6-Mon	1-Yr	3-Yr	5-Yr	10-Yr	20.Yr	30.Yr
S&P 500 Index	-13.3	13.6	-1.7	9.5	13.5	10.9	15.9	6.0	10.2
NASDAQ Composite	-17.2	16.4	-3.6	9.6	17.4	14.1	18.9	7.5	11.3
S&P 500-Russell 2000	-20.2	14.6	-8.6	2.0	12.9	7.1	15.4	8.4	9.4
Russell Value-Growth	4.2	-4.2	1.2	-7.1	-6.1	-5.8	-3.0	1.2	-0.4
Non-US (World xUS)	-12.7	10.6	-3.5	-2.6	7.8	2.7	9.4	4.6	5.1
Emerging Markets	-7.4	10.0	1.89	-7.1	11.1	4.1	9.3	8.7	9.3
Equity REITs	-6.1	17.2	10.1	20.5	7.8	10.0	18.8	11.1	10.7
U.S. 10-Year Treasury	4.6	3.0	7.7	5.5	0.4	2.8	3.1	4.7	6.1
BarCap Agg Bonds	1.6	2.9	4.6	4.5	2.0	2.7	3.8	4.7	6.2
High Yield Bonds	-4.5	7.4	2.4	5.9	8.7	4.7	11.2	6.7	8.2
Short-term Bonds	1.5	1.6	3.1	3.5	1.3	1.2	1.6	3.2	4.5
US Dollar (TWI)	2.3	-0.7	1.5	6.0	0.0	3.6	0.8	-0.4	0.0
CRB Commodity Index	-3.4	3.7	0.2	-4.5	1.5	-6.3	0.9	3.8	1.7
WTI Oil (US$)	-38.3	33.3	-17.7	-7.7	16.2	-9.9	1.9	6.6	3.7
Gold (US$)	7.5	1.1	8.7	-2.1	1.6	0.1	3.5	8.0	4.1

Source: Market returns as of March 31, 2019 in U.S. Dollars. Performance longer than 1-year is annualized.

ASSET CLASSES: LONG-TERM RETURNS

	10-year Returns		1900-2017[2]	30-Years							
Asset Class	**Return**	**Risk**	**LT Return**	**1989-2018**	**Risk**	**E[Return][1]**	**Risk**	**2018**	**2017**	**2008**	**Sharpe**
U.S. Stocks	13.1%	13.5%	9.4%	10.0%	14.0%	7.5%	14.0%	-4.4%	21.8%	-37.0%	0.51
U.S. Small-cap	12.0%	18.4%	-.-	9.2%	18.5%	8.5%	18.5%	-11.0%	14.6%	-33.8%	0.34
World (ex-US)	6.8%	16.1%	-.-	4.7%	16.7%	6.5%	16.7%	-13.6%	25.6%	-43.1%	0.11
Emerg. Mkt Equity	8.4%	19.3%	-.-	9.5%	22.7%	8.0%	22.7%	-14.2%	37.8%	-53.2%	0.29
U.S. 10Y Tres	2.5%	7.1%	5.8%	6.0%	7.0%	1.7%	7.0%	-0.1%	2.1%	21.2%	0.44
US BC Agg Bond	3.5%	3.0%	-.-	6.1%	3.7%	2.0%	3.7%	0.0%	3.5%	5.2%	0.86
Cash	0.4%	0.2%	3.7%	2.9%	0.7%	3.0%	0.7%	1.9%	0.9%	1.5%	0.00
Inflation	1.8%	1.1%	2.9%	2.5%	0.9%	2.5%	0.9%	1.9%	2.0%	-0.1%	-0.44
Commodities	0.7%	15.8%	2.6%	1.5%	11.7%	2.4%	11.7%	-7.1%	1.6%	-23.7%	-0.12
Risk Premium											
Small-cap Equity	-1.1%		-.-	-0.8%		1.0%		-6.6%	-7.2%	3.2%	
Stock-Bond	10.6%		3.6%	4.0%		5.8%		-4.3%	19.7%	-58.2%	
Stock-Cash	12.7%		5.7%	7.1%		4.5%		-6.3%	21.0%	-38.5%	
Bond-Cash	2.1%		2.1%	3.1%		-1.3%		-2.0%	1.2%	19.7%	

(1) Expected return as of November 2018 refers to long-term return over an investment cycle

(2) 1900-2017 data from Credit Suisse Global Investment Returns Yearbook

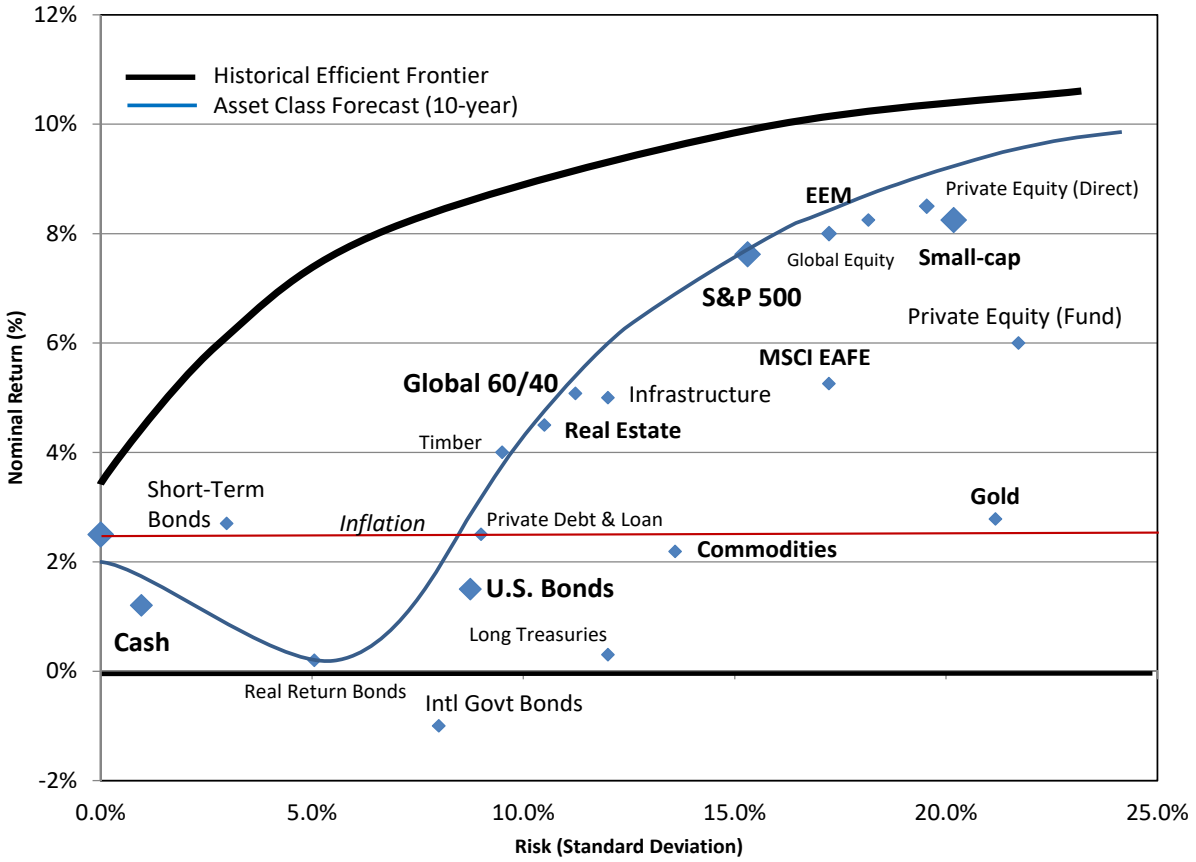
(3) Data as of December 31, 2017. Periods greater than 1-year are annualized.

(4) **Stocks:** S&P 500, **Bonds:** Barclay's Aggregate Bond, **Cash:** 3m T-Bill, **Commodity:** CRB

Source: Strategic Frontier Management (January 2019) – www.StrategicCAPM.com)

STRATEGIC 10-YEAR EXPECTED RETURNS

Unusual Strategic Frontier, Difficult Starting Point for Bonds and Alternatives
Private Markets Playing in a Crowded Sandbox---Diminished Risk Premiums



Challenging Beliefs

Input prices can't exceed output prices, commodity returns can't exceed inflation (1900-2012: -0.5% vs. CPI).

Normalizing interest rates after the inflation risk premium extinguished by manipulation, could drive a 0.5% excess risk.

Return and Risk assumptions are misleading and evolving for both private and public. Lower private illiquidity risk premium.

Forward looking information and forecasts contained herein are the opinion of Strategic Frontier Management. Future market returns may differ significantly from our expectations.

STRATEGIC ALLOCATION INNOVATION

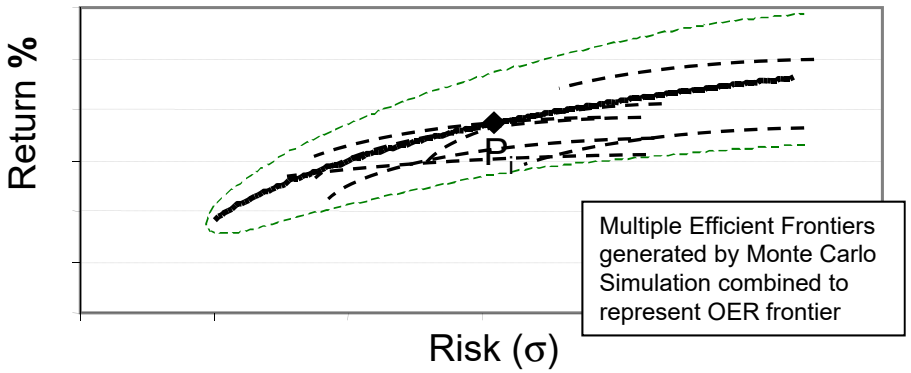
Portfolio Allocation Problems

- Practical and intuitive portfolio decision making under uncertainty, but vulnerable to poor inputs, incomplete understanding, or misguided judgement
- Simplistic compromised suboptimal allocations (i.e., ending in x0 or x5% increments) exaggerates inefficiencies and requires imposing aggressive constraints
- Risk uncertainty increasing as historically-derived correlation, volatility evolving quickly
- If you don't start off in the right direction, how can you achieve your objectives?

Solution: Intuitive Proprietary Strategic Asset Allocation Methodology

- Alternative to parametric M-V optimization – Simple MPT not so modern anymore
- Intuitive strategic policy allocation that more accurately reflects market behavior
- Recognizes actual uncertainty in capital market return expectations
- *Optimal Empirical Resampling (OER)* utilizes actual empirical asset return distribution

*Proprietary Efficient Frontier**



Note: Optimal Empirical Resampling is a SFM proprietary methodology

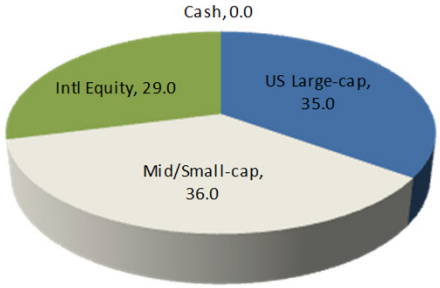
"When solving for efficient portfolios, differences in precision of the [input] estimates should be explicitly incorporated…"
---Harry Markowitz

STRATEGIC ASSET ALLOCATIONS

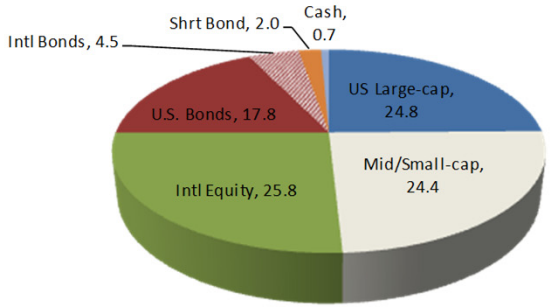
Focused Diversification: Determining efficient Asset Allocations that count

- Typical Allocations Often Too Simplistic or Unnecessarily Complex and Costly
- Committees tend to yield sub-optimal “comfortable” allocations, ending x0% or x5%

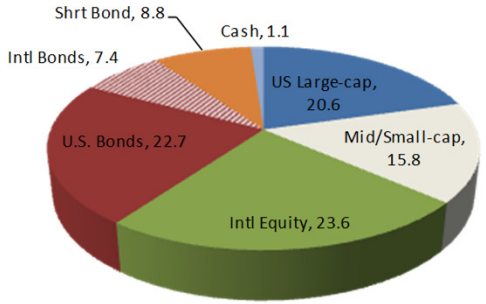
Diversified Equity



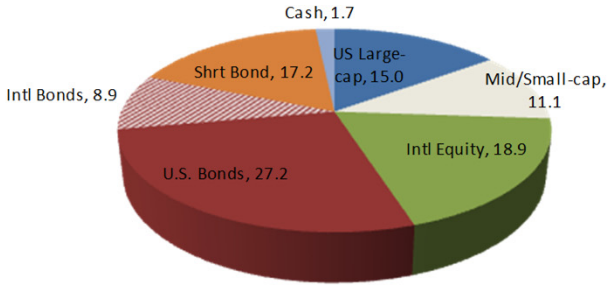
Capital Growth



Growth & Income



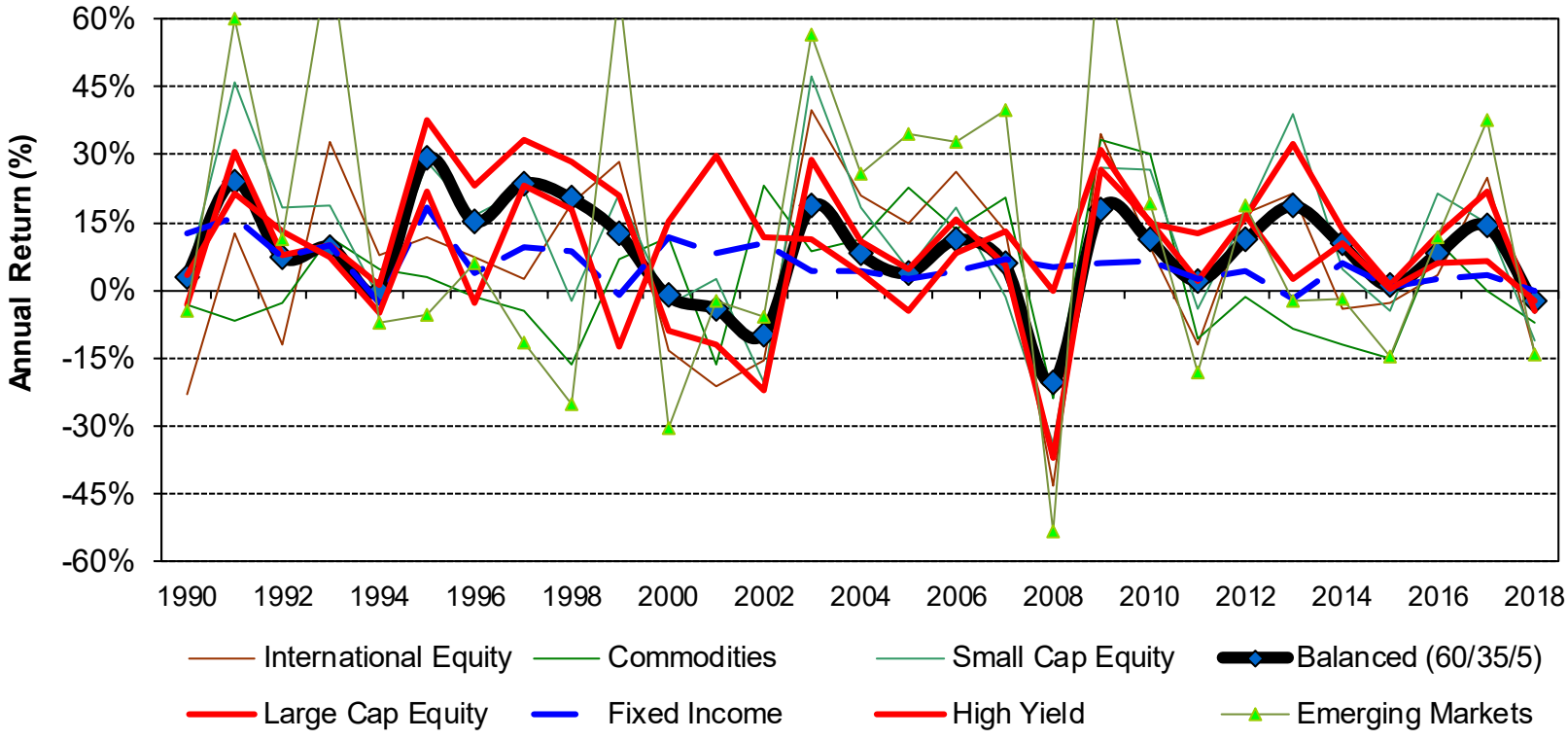
Balanced Appreciation



Source: Strategic Frontier OER Proprietary Methodology

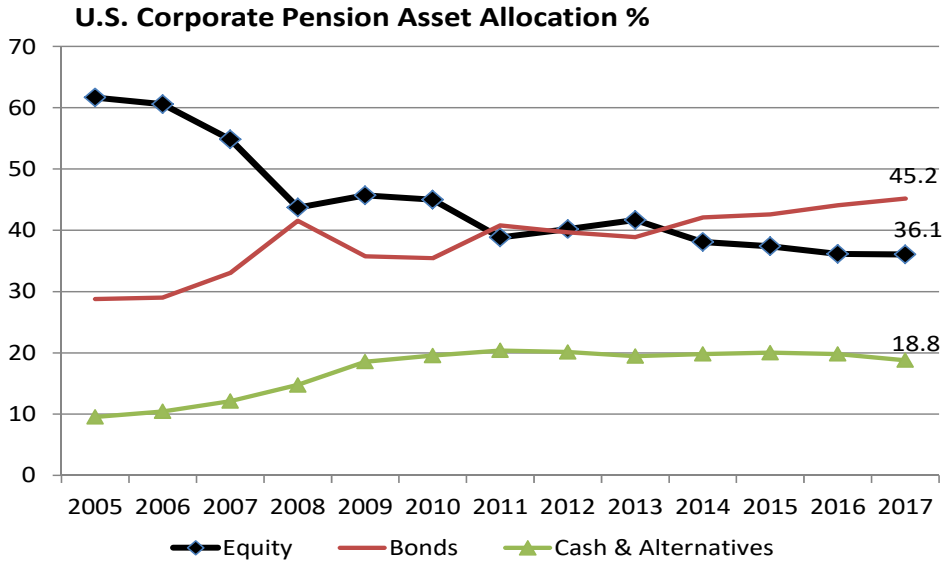
SMOOTHER RIDE + TACTICAL POTENTIAL OF GLOBAL MULTI-ASSET OBJECTIVES

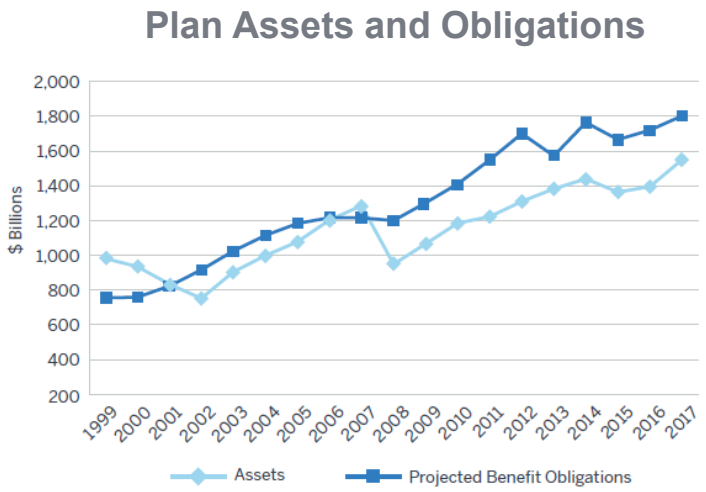
Global diversification serves as a critical buffer against volatile periods, yet underutilized Global TAA may also add exceptional value too.



PENSION FUNDS AT LOWEST EQUITY AND HIGHEST BOND EXPOSURE EVER

- Return expectations averaging 7% are still too high, particularly given Lower Equity + Higher Bond allocations despite continuing need for interest rate normalization
- Pension gap worsening with compounding of underfunded liabilities
- Funded ratio increased to 86% on strong investment returns for those with higher equity allocations and from significant plan contributions of $62B from employers.





Source: Milliman Pension Study, April 2018

Lower Equity Allocations Can't Close Funding Gap as Bonds Decline
Regret & Envy May Fuel An Asset Allocation Rotation from LDI

PORTFOLIO DIVERSIFICATION MATHEMATICS

Calculating portfolio (*p*) return is the weighted (w_i) average of individual security (*i*) holding returns:

$$R_p = \sum_i wi\ R_i$$

Calculating an investment's contribution to portfolio risk is more complicated as a function of investment volatility (σ^2) and pairwise correlation (ρ).

$$\sigma_p = \left(\sum_i wi\sigma_i^2 \ + \ \sum_i \sum_j (w_i\ \sigma_i)\ \rho_{ij}\ (w_j\ \sigma_j) \right)^{1/2}$$

So, correlation with a range of [−1, 1] can reduce portfolio risk if $\rho_{ij} < 0$.

RISK PARITY AND LIABILITY-DRIVEN INVESTING LAG LIABILITY GROWTH—GETS WORSE NOW

- Plan liabilities increase in excess of inflation, but increase faster with stronger growth.
- *Future liabilities* increase as inflation and growth increase, so liability growth is negatively correlated with bond returns that are unlikely to exceed inflation.
- Yet, *Liability Driven Investing* and *De-risking Strategies* emphasize increased, even leveraged, bond allocations, but significantly lag simple 60/40 global balanced
- Retirement liabilities correlated with nominal economic growth, so high bond allocations are inconsistent with long time horizons
- Dr. Fisher Black: *Should You Use Stocks to Hedge Your Pension Liability* – FAJ 1989. Concluded the broader your definition of pension liability, greater the equity allocation.

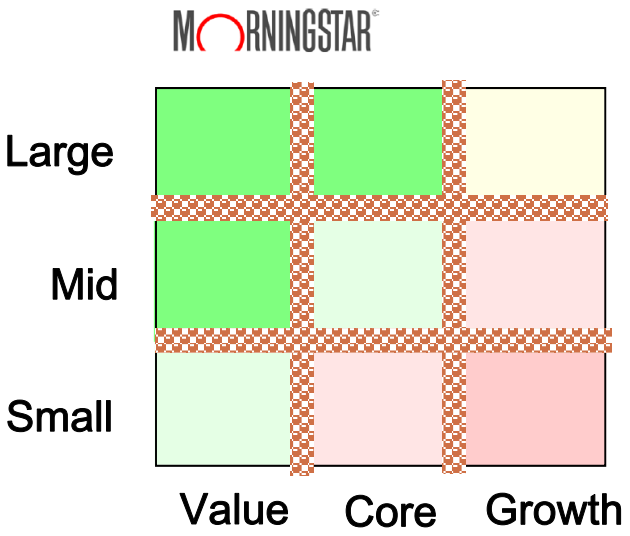
1973-2018	**S&P 500**	R 2000	EAFE+C	REIT	**T-Notes**	G/C 1-3yr	CRB	Gold	Cash	R.Sales	Wages	CPI
S&P 500	1	0.86	0.72	0.65	-0.01	0.09	0.18	0.01	0.05	0.29	0.03	0.05
R 2000	0.86	1	0.65	0.70	-0.11	0.02	0.21	0.06	0.02	0.29	0.07	0.07
REIT	0.65	0.70	0.54	1	0.04	0.10	0.27	0.08	0.01	0.33	0.06	0.09
EAFE+C	0.65	0.65	1	0.54	-0.06	0.05	0.35	0.20	0.03	0.34	0.00	0.06
T-Notes	**-0.01**	**-0.11**	**-0.06**	**0.04**	**1**	**0.77**	**-0.24**	**0.04**	**0.16**	**-0.28**	**-0.16**	**-0.18**
G/C 1-3yr	0.09	0.02	0.05	0.10	0.77	1	-0.14	0.02	0.55	-0.12	-0.03	0.13
CRB	**0.18**	**0.21**	**0.35**	**0.27**	**-0.24**	**-0.14**	**1**	**0.44**	**-0.09**	**0.35**	**0.14**	**0.25**
Gold	0.01	0.06	0.20	0.08	0.04	0.02	0.44	1	-0.03	0.13	0.04	0.21
Cash	**0.05**	**0.02**	**0.03**	**0.01**	**0.16**	**0.55**	**-0.09**	**-0.03**	**1**	**0.15**	**0.42**	**0.59**
R.Sales	0.29	0.29	0.34	0.33	-0.28	-0.12	0.35	0.13	0.15	1	0.31	0.35
Wages	0.03	0.07	0.00	0.06	-0.16	-0.03	0.14	0.04	0.42	0.31	1	0.51
CPI	0.05	0.07	0.06	0.09	-0.18	0.13	0.25	0.21	0.59	0.35	0.51	1
Risk	**15.1%**	**20.0%**	**16.9%**	**16.8%**	**7.8%**	**2.7%**	**13.4%**	**20.8%**	**1.0%**	4.2%	1.5%	1.2%
Total Return	**10.5%**	**10.6%**	**8.9%**	**2.5%**	**6.7%**	**2.5%**	**2.1%**	**2.0%**	**3.0%**	-0.3%	0.9%	0.1%
E[Return]	**7.5%**	**9.0%**	**6.0%**	**5.0%**	**1.5%**	**2.8%**	**3.0%**	**2.5%**	**3.0%**	5.2%	2.5%	2.5%
Real Return	**5.0%**	**6.5%**	**3.5%**	**2.5%**	**-1.0%**	**0.3%**	**0.5%**	**0.0%**	**0.5%**	2.7%	0.0%	0.0%
Sharpe	**0.30**	**0.32**	**0.18**	**0.12**	**-0.19**	**-0.07**	**0.00**	**-0.02**	**0.00**			

GLOBAL TACTICAL ASSET ALLOCATION

- Asset Allocation recognized as the significant factor driving capital appreciation
- Return differentials of global asset allocation exposures are persistently large, thus *Global Tactical Asset Allocation* has significant active return potential
- *Countries Still Matter*: International diversification increasing with greater uncertainty and policy divergences
- Fundamental factors can identify tactical investment opportunities, while disciplined portfolio investment strategies can exploit these opportunities
- Market risk should be controlled, adhering to client-specific investment objectives, guidelines and constraints---TAA is a logical extension of strategic asset allocation
- Active return potential more meaningful in low return regimes, while tactical management serves as a logical extension of strategic asset allocation

Global Tactical Asset Allocation is a Frequently Untapped and Uncorrelated Source of Excess Return Opportunity

WHAT LIES BEYOND 9 SIMPLE BOXES?

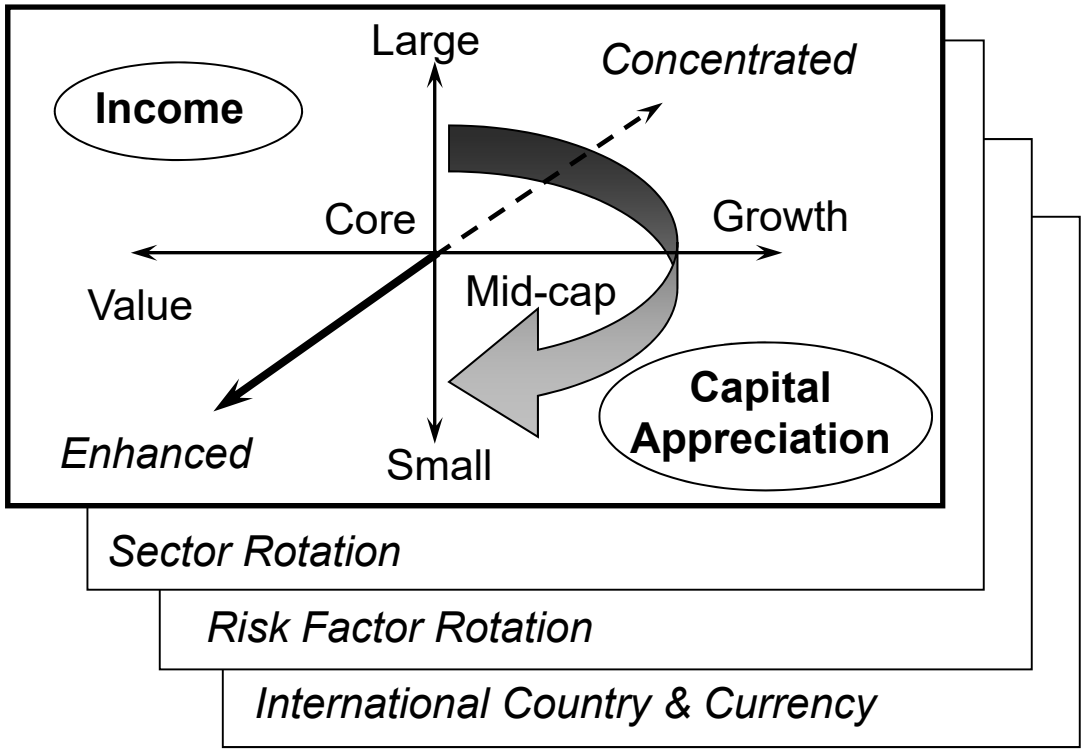


VS.

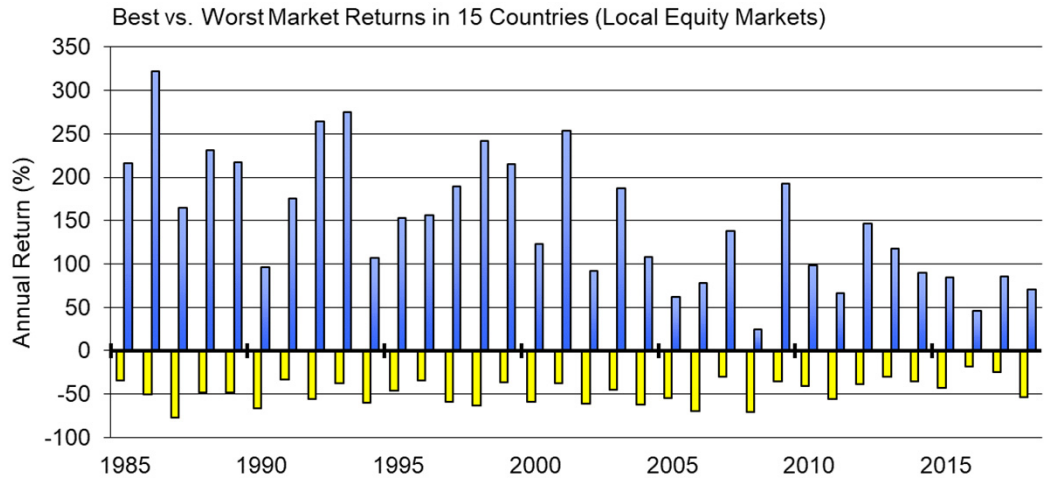
Answer: Many Compelling Sources of *Excess* Risk-adjusted Return in Multi-asset Solutions

Opportunities Investing "Between-the-Cracks"
Exploitable persistent tactical opportunities for investors relaxing confining "style box" constraints. Managers tend to avoid the edges or crossing style box boundaries.

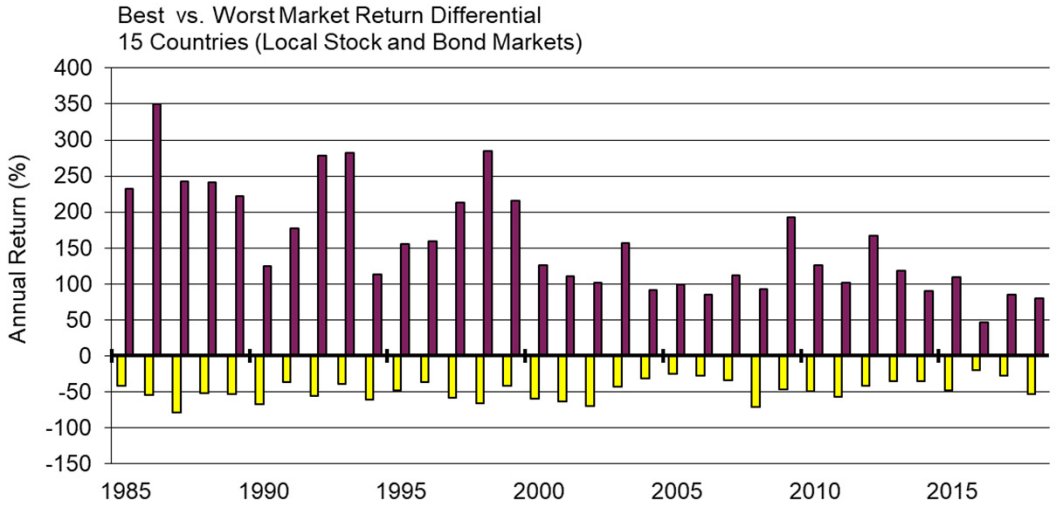
Thinking "Inside" the Box



SUBSTANTIAL TACTICAL OPPORTUNITY



Spread between best and worst clairvoyant market performance is dramatic and persistent over time, albeit cyclical.



Global Balanced Provides More <u>Persistent Opportunity:</u>

Asset management success is a function of *forecasting skill* and *strategy breadth*

– Richard Grinold, "The Fundamental Law of Active Management (JPM, 1989)

DIMENSIONS OF GLOBAL TAA

Countries: Stock, Bond, Currency, plus Cash

GICS Sectors: Industry, Technology, Financials, Discretionary, Staples, Health Care, Energy, Basic Materials, Comm. Services, Utilities, Real Estate

Risk Factors: Small vs. Large-cap, Value - Growth, Quality, Momentum, Profitability, Risk (low volatility)

S&P 500 SECTOR TOTAL RETURNS

Significant differences observed over intermediate and long-term offer tactical opportunities

S&P 500 Sector Return	3 mo	YTD	12mon	3-year	5-year	10-year	20-year	30-year
Health Care	-8.7%	**6.5%**	6.5%	8.1%	11.1%	14.6%	6.9%	12.0%
Utilities	1.4%	**4.1%**	4.1%	10.7%	10.7%	10.5%	6.5%	7.5%
Consumer Discretionary	-16.4%	**0.8%**	0.8%	9.6%	9.7%	18.3%	7.5%	10.1%
Technology	-17.3%	**-0.3%**	-0.3%	16.4%	14.9%	18.4%	5.5%	10.3%
S&P 500	**-13.5%**	**-4.4%**	**-4.4%**	**9.3%**	**8.5%**	**13.1%**	**5.6%**	**10.0%**
Consumer Staples	-5.2%	**-8.4%**	-8.4%	3.1%	6.3%	11.0%	6.4%	10.9%
Communication Services	-13.2%	**-12.5%**	-12.5%	2.2%	2.6%	7.5%	0.6%	5.8%
Financials	-13.1%	**-13.0%**	-13.0%	9.3%	8.2%	10.9%	3.3%	8.4%
Industrials	-17.3%	**-13.3%**	-13.3%	7.6%	6.0%	12.7%	6.6%	9.3%
Real Estate	-19.4%	**-13.6%**	-13.6%	6.9%	4.4%	10.0%	5.5%	7.8%
Materials	-12.3%	**-14.7%**	-14.7%	7.2%	3.8%	11.1%	6.9%	7.3%
Energy	-23.8%	**-18.1%**	-18.1%	1.1%	-5.6%	3.5%	6.7%	8.3%
MSCI US Min Volatility	-7.5%	**1.6%**	1.6%	10.2%	10.5%	13.4%	7.2%	10.6%

Source: Refinitiv DataStream and Strategic Frontier Management
Note: Market returns as of March 31, 2019. Performance longer than 1-year is annualized.

S&P 500 FACTOR RETURNS

Significant differences observed over intermediate and long-term

	S&P500	SP5-Val	SP5-Grwth	SP600	DivYld	Quality	E.Quality	Momentum	MinVol
Q4-2018	**-13.5%**	1.5%	-1.2%	-6.6%	5.6%	-0.2%	0.9%	-2.1%	6.0%
3.mo	**13.6%**	**-1.5%**	**1.3%**	**-2.0%**	-1.8%	3.2%	-1.1%	-0.8%	-0.9%
6.mo	**-1.7%**	0.4%	-0.2%	**-9.1%**	4.7%	2.5%	0.0%	-3.0%	6.0%
1-Year	**9.5%**	**-3.6%**	**3.3%**	**-7.9%**	2.8%	2.9%	-3.9%	-1.5%	6.2%
3-year	**13.5%**	**-2.9%**	**2.4%**	**-1.0%**	-1.6%	1.7%	-5.4%	3.7%	-0.9%
5-year	**10.9%**	**-2.9%**	**2.5%**	**-2.5%**	0.4%	2.2%	-5.3%	4.0%	1.8%
10-year	**15.9%**	**-1.4%**	**1.3%**	1.1%	0.4%	1.0%	0.2%	2.2%	0.4%
20-year	**6.0%**	**-0.1%**	-0.2%	4.4%	4.3%	1.2%	4.7%	2.7%	1.7%
30-year	**10.2%**	**-0.9%**	**0.6%**			1.8%		3.9%	0.6%

	WrldxUS	DivYld	Quality	Momentum	MinVol
Q4-2018	**-12.7%**	-10.5%	-12.2%	-15.0%	-7.5%
3.mo	**10.6%**	10.7%	11.2%	11.4%	8.7%
6.mo	**-3.5%**	-0.9%	-2.4%	-5.3%	0.5%
1-Year	**-2.6%**	0.0%	-0.8%	-3.3%	2.8%
3-year	**7.8%**	7.5%	8.0%	7.6%	6.9%
5-year	**2.7%**	2.6%	3.4%	3.9%	6.7%
10-year	**9.4%**	9.7%	9.9%	9.6%	11.1%
20-year	**4.6%**	6.0%	5.3%	5.6%	
30-year	**5.1%**				

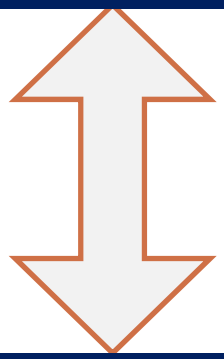
Source: Refinitiv DataStream and Strategic Frontier Management
Note: Market returns as of March 31, 2019. Performance longer than 1-year is annualized.

CHALLENGES MANAGING COMPLEX RISKS

Global Multi-Asset Management

Risk Compliance, VaR → Unified Risk Management
Style Box , Sectors, Countries → Multi-Factor/Multi-Asset Perspective
Various Misleading Theories and Myths

More Dynamic & Complex, Exogenous, and Event-driven Portfolio Risks



Regulatory & Legislative Implementation Problematic

Policymakers, Consultants, Public Focused on Last Crisis

Evolving Risk Measures at Great Inflection Point

Financial, Economic, Geopolitical Uncertainty

Multi-Asset Resurgence Coincides with Complexity in Products & Derivatives

Regulatory Confusion Reducing Liquidity and Increasing Investor Costs:

Misunderstanding *Agency* vs. *Principal Trading* undermining liquidity, differentiating *Balance Sheet* vs. *Discretionary Management Risks*, and targeting *Too Big to Fail* or *Systemically Important (SIFI)*,

GLOBAL TACTICAL OPPORTUNITIES INTRIGUING

Market opportunities can arise due to *Misguided Behavioral Tendencies*

- Global market return differentials remain persistently large
- Constrained by preferred habitats and strict investment guidelines
- Cognitive and emotional biases can drive markets to valuation extremes
- Investment committees may lack conviction, consistency, or timeliness
- *Rational Beliefs*[1] varying over time challenge notion of *Rational Expectations*

Currencies Subject to Additional Inefficiencies

- Capital flow restrictions due to regulation and preferred habitats
- May lack profit motive or objectives conflict (central banks, hedging)

Distinguishable Investment Opportunities

- Fundamental indicators can identify opportunities to add value
- Discipline management supports conviction to be uncomfortable, contrarian
- Larger number of global asset classes improves consistency

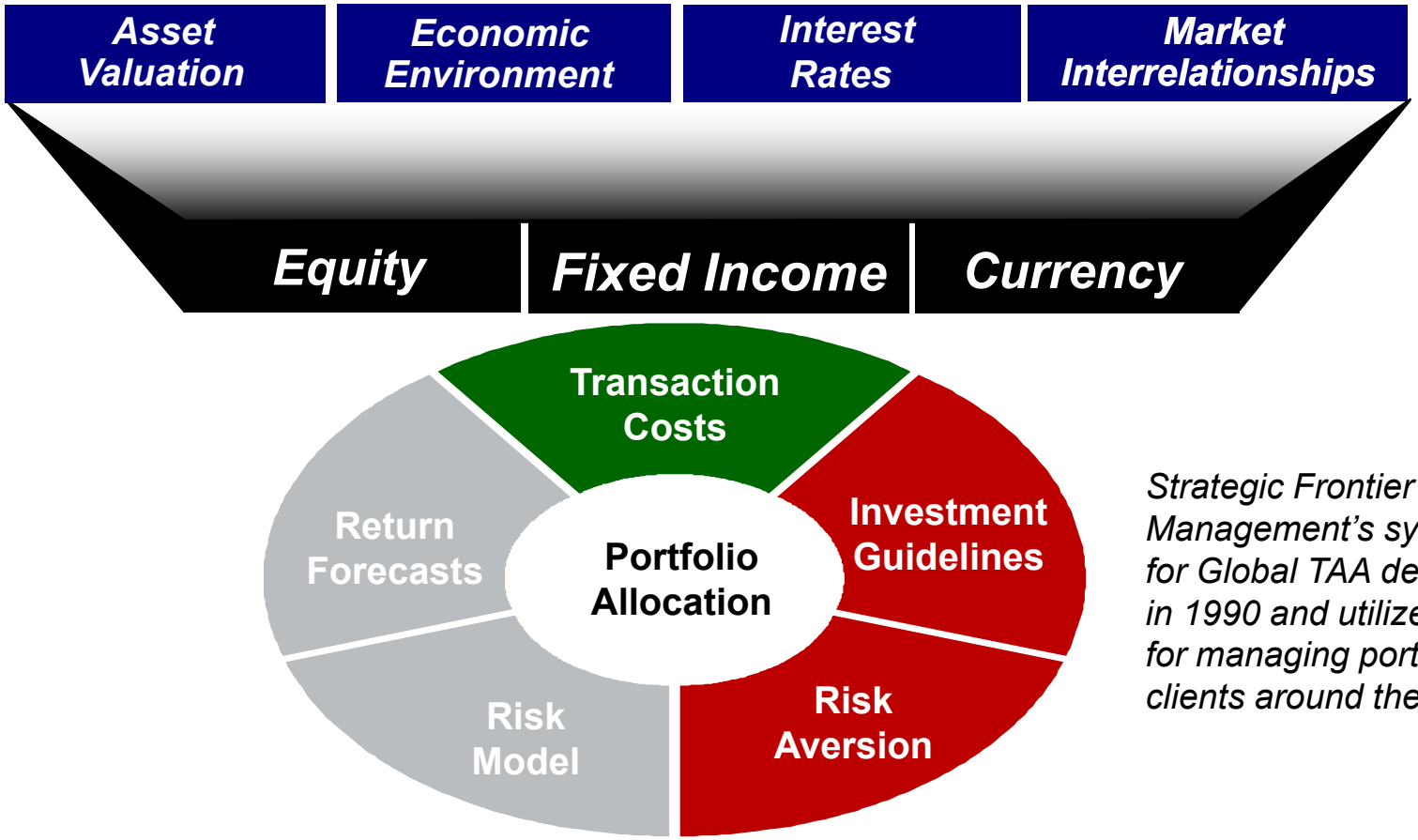
What is the risk? Investors Lose Confidence Too Quickly

- Contrarian strategies are inherently uncomfortable
- Value added can be episodic or inefficiencies diminish

1. Rational Belief Equilibrium is an alternative theory to Rational Expectations developed by Dr. Mordecai Kurz, and predicated on differentiated rational varying beliefs of investors making decisions based on imperfect information.

GLOBAL TACTICAL ASSET ALLOCATION

Evaluating allocations to Global Equity, Fixed Income and Currency Markets

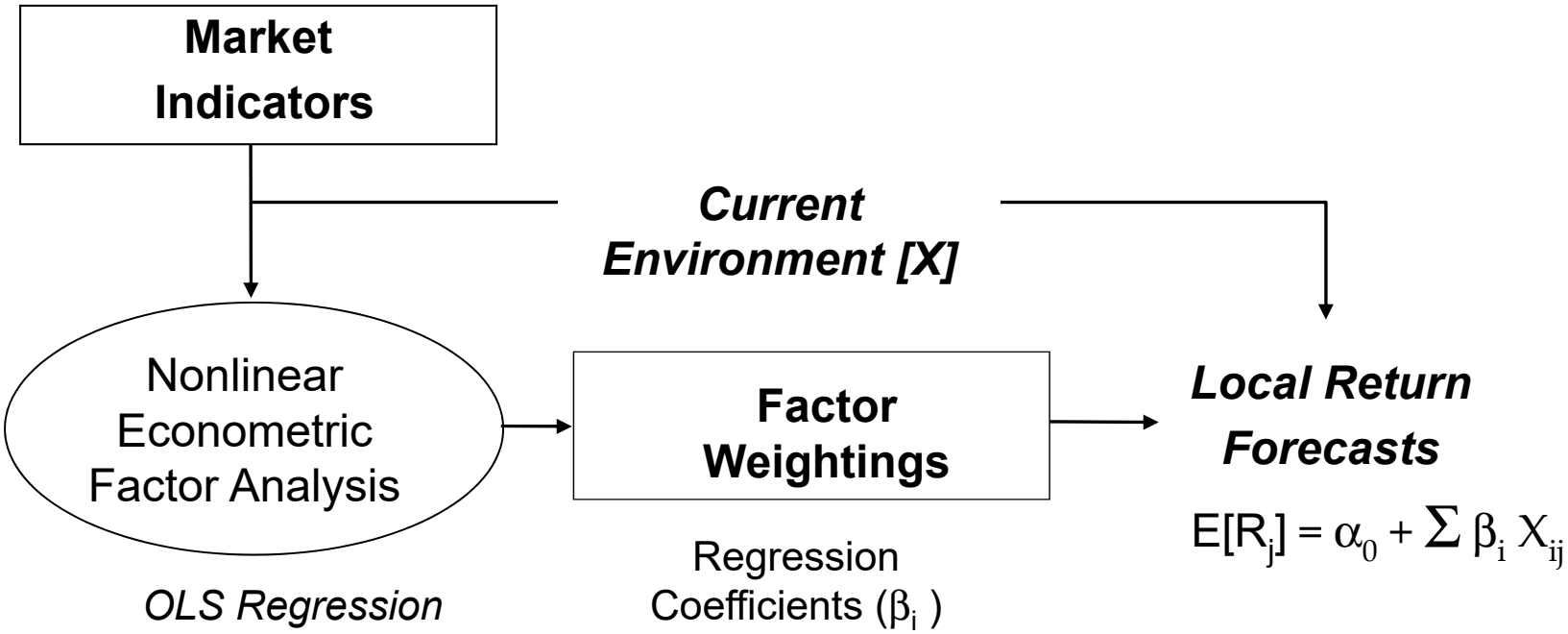


Strategic Frontier Management's system for Global TAA developed in 1990 and utilized since for managing portfolios of clients around the world.

1. 97% of MSCI World and 87% of MSCI All-Country Equity Indices (including Emerging Markets)

DEVELOPING RETURN FORECASTS: ASSET CLASSES AND CURRENCY

Quantitative models built upon a consistent investment philosophy

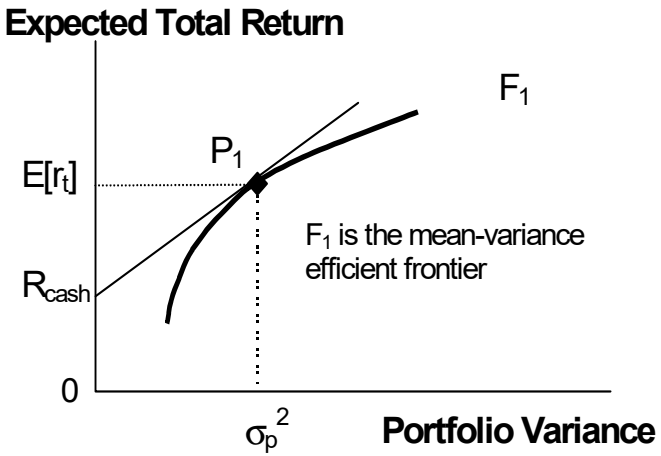


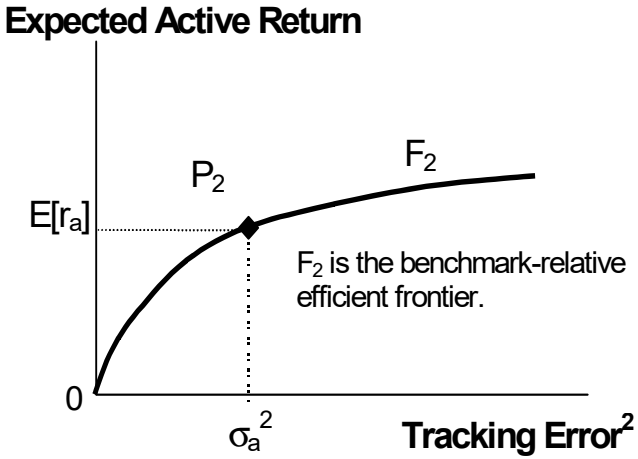
Fundamental Law of Active Management[1]

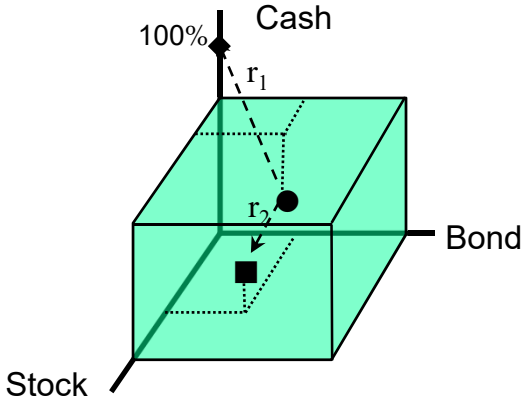
$$E = M c^2$$

1. Value added is a function of "skill" and "breadth". Source: Richard Grinold, JPM, Spring 1989

MEAN-VARIANCE VS. BENCHMARK-RELATIVE







Example: 60% stock, 30% bond, 10% cash

- ◆ Minimum variance solution
- ■ Minimum tracking error solution
- ● Optimal solution
- Feasible region

PORTFOLIO OPTIMIZATION (RETURN-RISK)

Objective: Maximize risk-adjusted expected active return

Max Utility **=** Expected Return – λ * Portfolio Risk
- Specific Risk - Transaction Costs - Penalties

Max $\Sigma \alpha_i X_i - \lambda(\Sigma \Sigma X_i C_{ij} X_j)$

where,

α_i = Active return forecast of factor or security i
C_{ij} = Factor covariance (k,m)
X_i = Portfolio exposure of factor or security I
λ = risk aversion

Subject to:

Investment guidelines, security or factor exposure ranges (long-only or long-short), leverage, etc.

Allocation ***Factors*** may be asset classes, styles, countries, currencies or risk factors. Portfolio solution determined by nonlinear/quadratic portfolio optimization

GLOBAL ASSET ALLOCATION STRATEGIES

Across 15 Developed Countries (Stock, Bond, Currency)

Investment Strategy

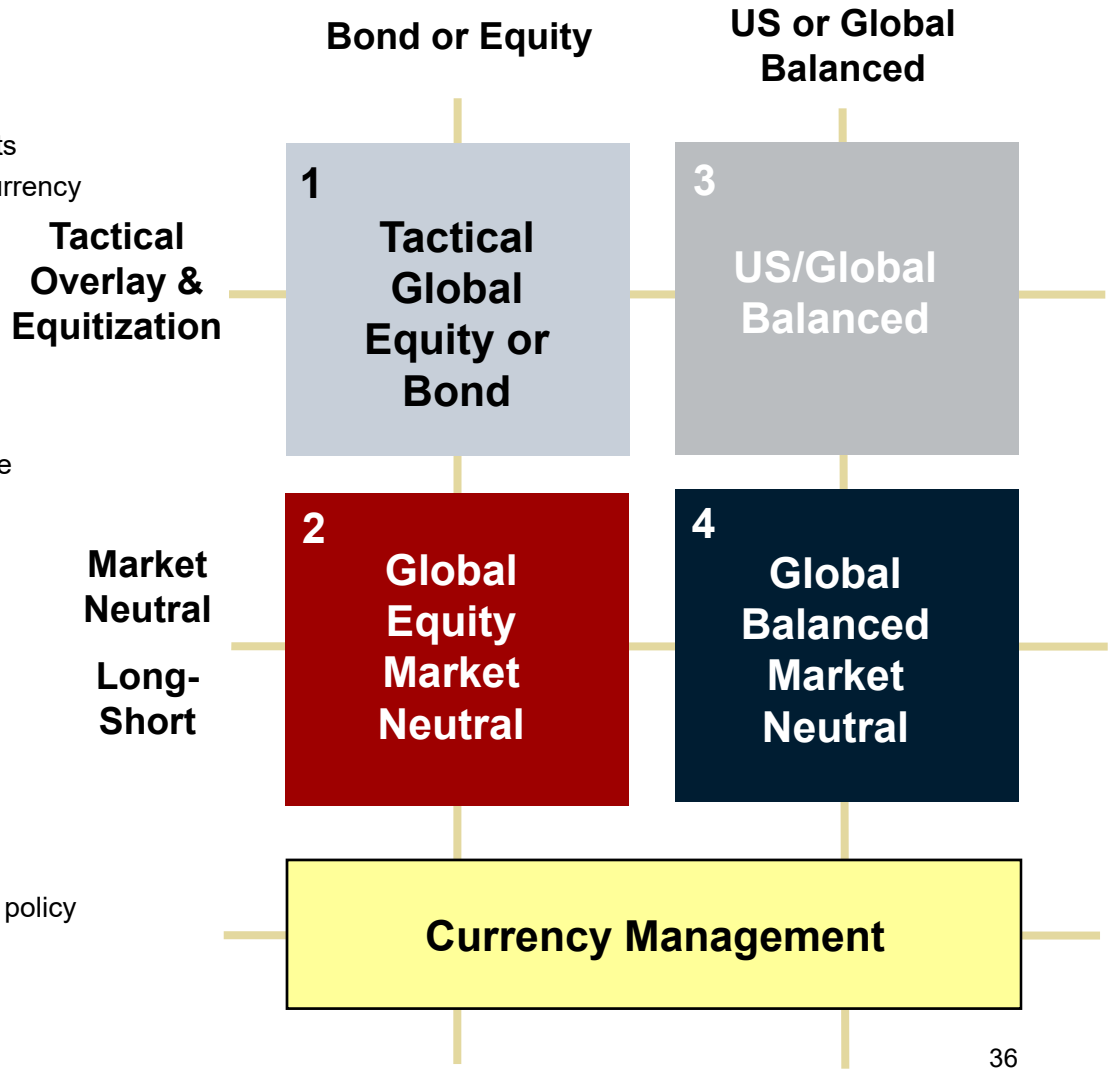
- Multi-Asset/Balanced Portfolio Management
- Invests in global equity, bond, and currency markets
- Country/regional rotation, asset class allocation, currency management tilts
- Alternative Strategies
  - Global Balanced Overlay
  - Hedge and Long/Short products
  - Active Currency Management
  - Global Equity or Bond Equitization
- Strategy developed in 1990, managing assets since 1991

Risk Management

- Innovative twist on measuring portfolio risk
- Custom benchmarking
- Completion portfolio

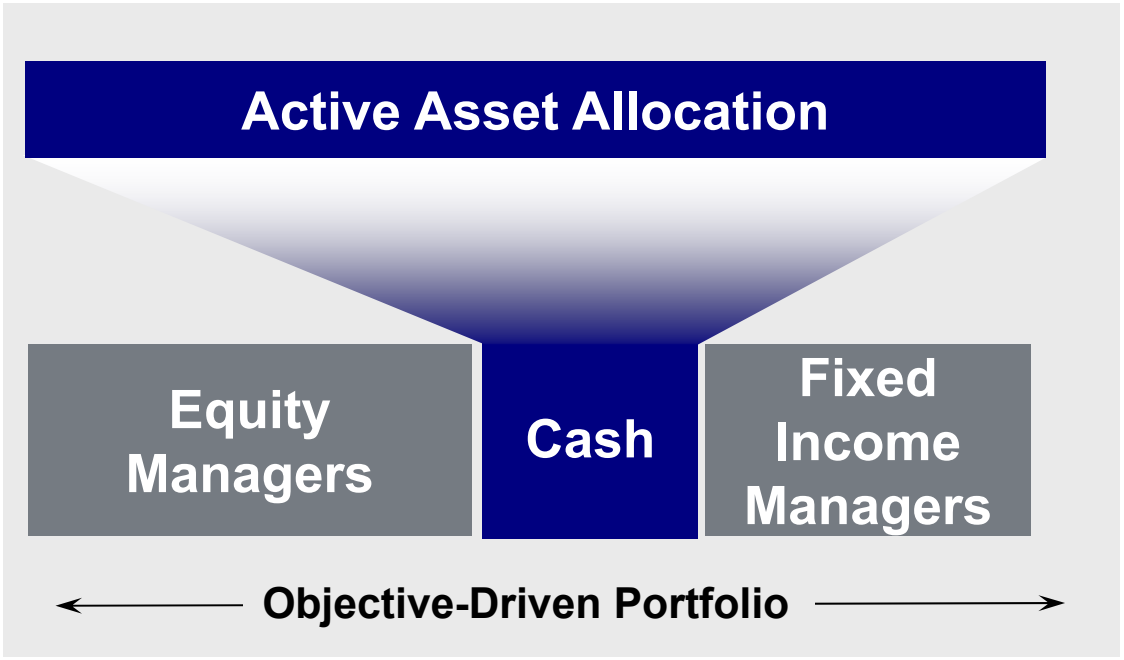
Flexible Investment Objectives

- Multi-asset investment guidelines and constraints
- Market neutral and long/short experience
- May be combined with HCM's proprietary strategic policy
- Utilized by HighMark's Asset Allocation Committee



DUAL "ALPHA" ARITHMETIC

Derivative Overlays of GTAA Can Boost Excess Return Applied in Parallel without Leveraging Total Risk, as Active Risk Is Generally Not Additive

Portfolio Structure	Value Added[1]
	1.0% Asset Allocation 1.0% Security Selection 8.0% Benchmark Return 10.0% Portfolio Return 2.0% Active Return

Diversification of Active Risk Sources Can Lower Total Volatility, and Be Combined with Strategic, Rebalancing, Hedging Objectives

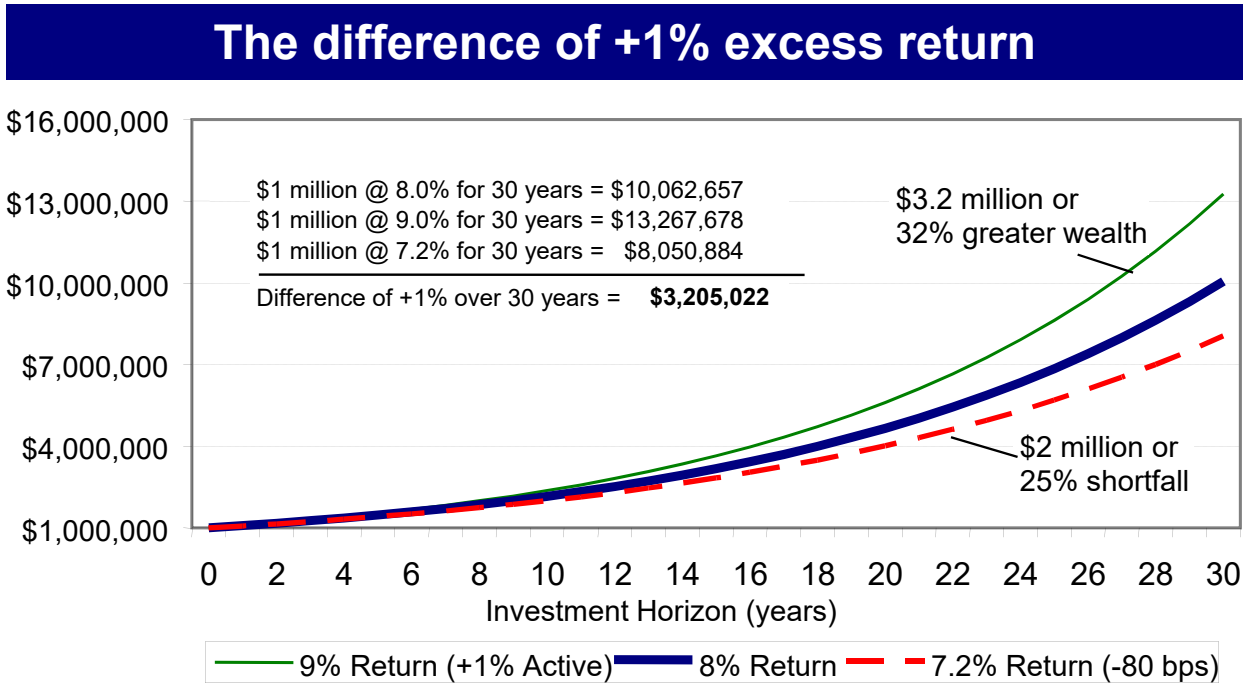
1. Performance conceptualization is for relative illustration only. Management fees will subtract from gross return. Past performance is not a guarantee of future results. Investment return and principal value will fluctuate, so holdings may be worth more or less than their original cost.

DIMENSIONS OF ASSET ALLOCATION

	Diversified Equity			Balanced			Income Plus		
	Strategic	Tactical	*Active*	Strategic	Tactical	*Active*	Strategic	Tactical	*Active*
Total Equity:	**100.0**	**100.0**	*0.0*	**60.0**	**63.0**	*3.0*	**30.0**	**33.0**	*3.0*
US Equity	**71.0**	**71.0**	*0.0*	**36.4**	**39.4**	*3.0*	**17.5**	**20.5**	*3.0*
Large Cap Equity	**35.0**	**33.5**	*-1.5*	**20.6**	**22.7**	*2.1*	**9.7**	**12.2**	*2.6*
Large Core	22.5	21.0	***-1.5***	13.8	15.9	***2.1***	4.5	7.0	***2.6***
Large Value	5.9	6.9	***1.0***	2.7	3.3	***0.6***	1.9	2.2	***0.3***
Large Growth	6.6	5.6	***-1.0***	4.0	3.4	***-0.6***	3.3	3.0	***-0.3***
Mid-Cap Equity	**13.5**	**13.5**	***0.0***	**2.8**	**2.8**	***0.0***	**0.5**	**0.5**	***0.0***
Small Core Equity	**15.1**	**16.6**	***1.5***	**7.7**	**8.6**	***0.9***	**1.4**	**1.8**	***0.4***
Non-US Equity	**29.0**	**29.0**	*0.0*	**23.6**	**23.6**	*0.0*	**12.5**	**12.5**	*0.0*
International	13.5	11.5	***-2.0***	15.8	14.6	***-1.2***	8.0	7.4	***-0.6***
Emerging Markets	15.6	17.6	***2.0***	7.8	9.0	***1.2***	4.5	5.1	***0.6***
REIT	7.5	7.5	***0.0***	5.3	5.3	***0.0***	6.0	6.0	***0.0***
Fixed Income	**0.0**	**0.0**	*0.0*	**38.9**	**34.3**	*-4.6*	**68.1**	**62.4**	*-5.7*
Long-term T-Bonds	0.0	0.0	***0.0***	3.4	1.9	***-1.6***	3.5	0.7	***-2.7***
Aggregate Bonds	0.0	0.0	***0.0***	12.9	9.9	***-3.0***	17.0	14.0	***-3.0***
Short-term Bonds	0.0	0.0	***0.0***	8.8	8.8	***0.0***	27.8	27.8	***0.0***
High-yield	0.0	0.0	***0.0***	6.4	6.4	***0.0***	9.9	9.9	***0.0***
Non-US Fixed Income	0.0	0.0	***0.0***	7.4	7.4	***0.0***	10.0	10.0	***0.0***
Cash/Alternatives:	**0.0**	**0.0**	*0.0*	**1.1**	**2.7**	*1.6*	**1.9**	**4.6**	*2.7*
MMF	0.0	0.0	***0.0***	1.1	2.7	***1.6***	1.9	4.6	***2.7***
Commodities	0.0	0.0	***0.0***	0.0	0.0	***0.0***	0.0	0.0	***0.0***
TIP's	0.0	0.0	***0.0***	0.0	0.0	***0.0***	0.0	0.0	***0.0***

IMPACT OF ACTIVE MANAGEMENT

Is Guaranteed Underperformance of Index Funds/ETFs Good Enough?



Is passive management worth the cost?

This chart is for illustrative purposes only and not indicative of any investment. The chart is based on a hypothetical initial investment of $1,000,000 growing for 30 years at a rate of 8% and 9%,compounded annually. Investing involves risk, including possible loss of principal. Investment return and principal will fluctuate, and may be worth more or less than their original cost. Past performance is no guarantee of future results.

DISCLOSURES

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