



# The Case for Informed Rebalancing

# Agenda

---

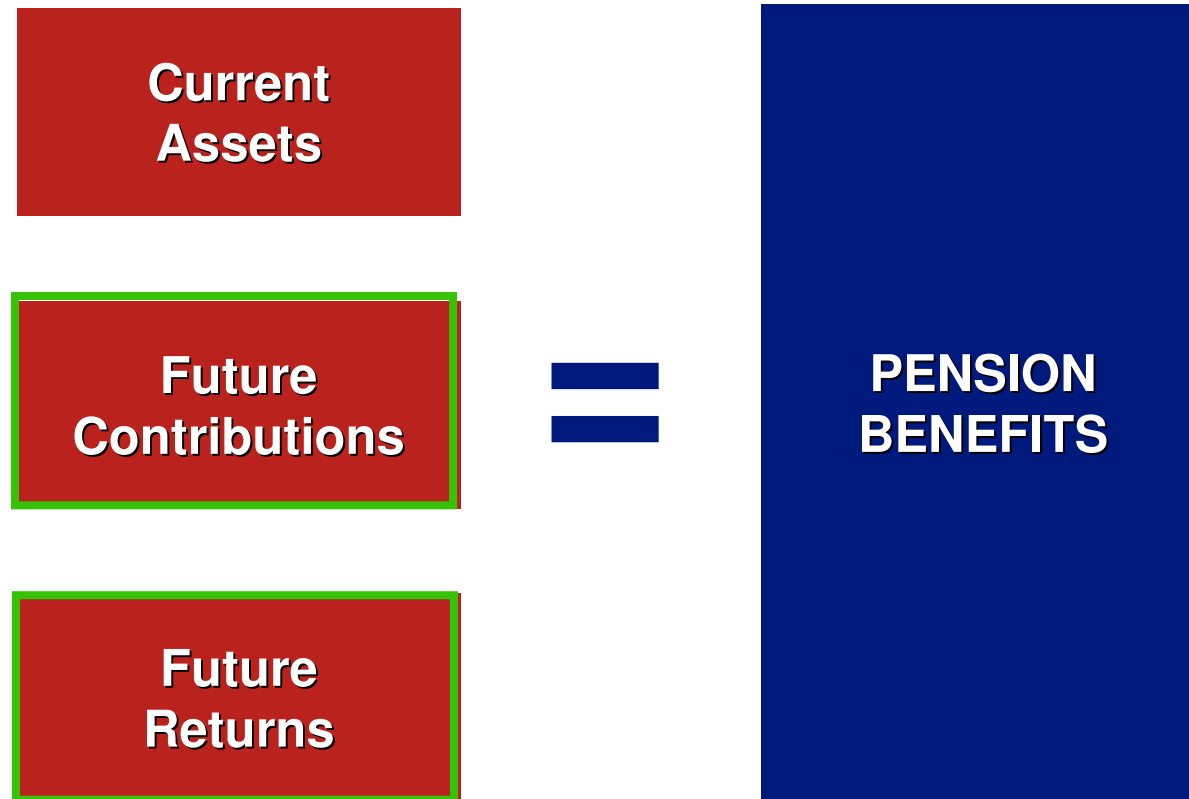


- The pension fund balance sheet
- Pension fund structure and responsibilities
- Rebalancing options: ALM, monthly or risk/range based?
- All asset-only rebalancing is ACTIVE
- Can add meaningful returns from informed decisions
- AlphaEngine™: empower clients to make better decisions

# The Pension Fund Balance Sheet



**Funded ratio = assets/liabilities**



**Goal is to set all policies to safely pay benefits**

# Pension Fund Responsibilities



	Asset- Liability Risk	Tactical & Benchmark Risk	Manager/ Active Risk
Responsibility	Trustees	Internal Staff	Managers
Decision Frequency	Annually	Daily/Monthly	Monthly
How to Manage the Risk	Strategic Allocations & Funding Policy	Asset, Sector, Style and Currency Allocations	Manager Selection and Allocation

**Staff are making many decisions periodically**

# What Does Responsibility Mean?

---



- Defined benefit plan: Risk is borne by the plan sponsor
  - Governed by a board of retirement
  - Trustees are *personally* liable for imprudent decisions
- In the management of other people's money, the law holds you to the highest standard.
- Must monitor all decisions made with other people's money.
- On a \$3 billion dollar portfolio, an additional return of 20 basis points per year is a \$6 million dollar decision/year.

*Source: Donald Pierce presentation to SBCERA Board*

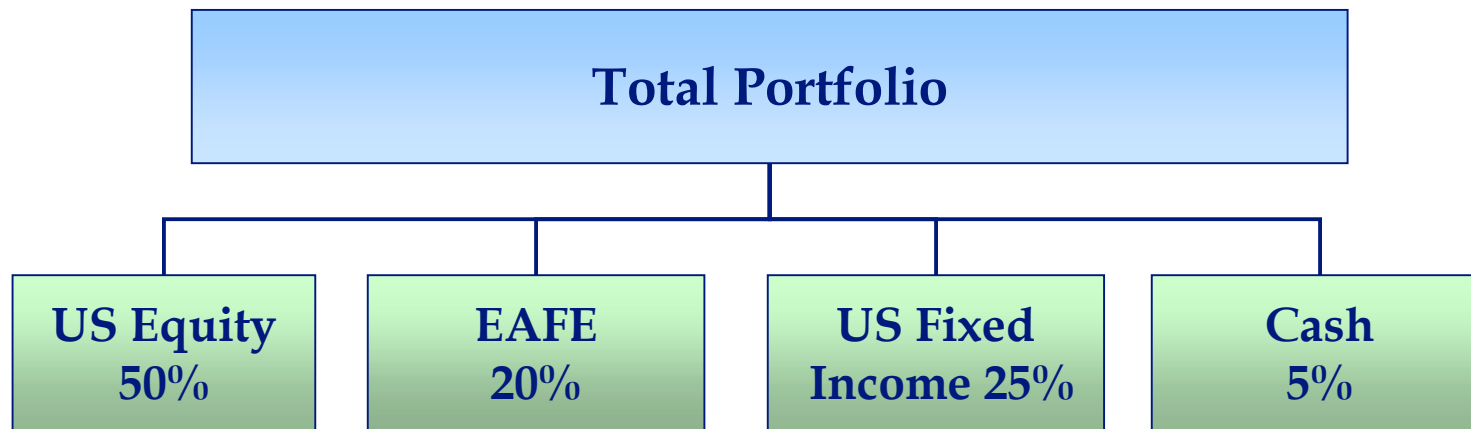
# Rebalancing is an Active Decision!



- Most effective: Asset-liability (i.e. based on funded ratio)
  - Equity allocation =  $15\% + 0.5 \times \text{Funded Ratio}$
  - Problem: Few plans or consultants do this
- Typical asset rebalancing options:
  - Time based: Monthly, Quarterly
  - Range based: Equal (+/-5%) or unequal ranges
  - Volatility based: Rebalance based on tracking error

**Asset-only choices are not return/cost neutral**

# Case Study: Client Portfolio Structure



Decisions to be made on allocation between asset classes:

- Domestic vs International Equities (Stock-Stock)
- Domestic Equities vs Domestic Bonds (Stock-Bonds)
- Domestic Bonds vs Cash (Bonds-Cash)

**Assume Asset Limits of +/- 5% from Benchmark Weight**

# Effective Decision Making

---



- Low asset correlations allow “informed decision making”
- Identify rule ideas to allocate across asset classes
- Select criteria for rule/strategy evaluation (excess return, information ratio, skill, success rate, drawdown)
- Analyze rule performance, test different strategies (rule combinations) - diversification benefits not obvious
- Test alternative policies versus rebalancing options

**Assumed Monthly Decisions (1998-2004); No Transaction Costs**

# Simple/Intuitive Rules Tested



<b>Rule</b>	<b>Rule Description</b>
<i>Cash vs. Bonds, based on Gold</i>	Duration choice based on price of gold. If the spot price of gold is higher than it was a year ago, overweight cash, otherwise overweight bonds
<i>Stocks vs Bonds: Halloween Effect</i>	Stocks tend to underperform bonds between June and Sept - apparently works in 16 out of 18 stock markets, so underweight stocks during this period
<i>Stocks vs Bonds: Inflation/Growth</i>	Equities undervalued when inflation rises (Modigliani-Cohn insight); equities favored when industrial production is increasing
<i>Market Volatility</i>	Low equity volatility in a rising stock environment is bullish for equities.
<i>Oil and Economy</i>	Rising oil prices affect the economy and tend to depress equities.
<i>P/E Ratio Rule</i>	Value rule for equity (vs FI) using the S&P 500 P/E
<i>Fed Model</i>	When equity yield is higher than treasury yield then buy equity, else sell equity
<i>Unemployment Rate</i>	Buy stocks when the unemployment rate is falling (good for economy)
<i>US/EAFE: LIBOR Rates</i>	Overweight equity market with the stronger currency (higher interest rate)
<i>US/EAFE: Favor Underperformer</i>	Overweight equity market which has underperformed over past year (i.e., buy the laggard)

# Rule Performance (1998-2004)



Rule	Excess Annualized Return	Information Ratio	Confidence in Skill	Success Ratio	Ratio Good /Bad Risk	Max Drawdown
Cash vs. Bonds, based on Gold	0.04%	0.20	68.8%	56.4%	1.30	-0.44%
Halloween Effect	0.98%	0.88	98.0%	63.8%	1.42	-1.58%
Inflation/Growth	0.50%	0.57	93.1%	79.7%	1.07	-1.31%
Market Volatility	0.12%	0.11	67.8%	56.4%	1.41	-2.74%
Oil and Economy	0.45%	0.57	91.6%	70.5%	1.16	-0.84%
P/E Ratio Rule	0.17%	0.39	87.1%	50.0%	2.12	-0.80%
Fed Model	0.47%	0.50	91.8%	61.5%	1.43	-2.17%
Unemployment Rate	0.51%	0.61	94.1%	59.0%	0.99	-1.11%
US/EAFE: LIBOR Rates	0.17%	0.43	84.7%	55.1%	1.07	-0.71%
US/EAFE: Favor Underperformer	0.53%	0.95	99.3%	64.1%	1.33	-1.07%

# Strategies (Mix of Rules) Tested



Strategy Name	Strategy Description
<i>Rebalancing I</i>	Quarterly Rebalancing to Benchmark Weights
<i>Rebalancing II</i>	Rebalance to Benchmark Weights when Range of +/-5% Breached
<i>Combination of Rules: Strategy 1</i>	<u>6 Best Excess Annualized Returns (<math>\alpha</math>) and Information Ratios</u> - <i>Cash vs Bonds, Halloween Effect, Inflation/Growth, Unemployment Rate, Fed Model, US/EAFE: Favor Underperformer (all equally weighted)</i>
<i>Combination of Rules: Strategy 2</i>	<u>6 Lowest Annualized Standard Deviation (Risk)</u> - <i>Cash vs Bonds, Oil and Economy, P/E Ratio, Unemployment Rate, US/EAFE: LIBOR Rates, US/EAFE: Favor Underperformer (all equally weighted)</i>
<i>Combination of Rules: Strategy 3</i>	<u>3 Highest <math>\alpha</math> and 3 Lowest Risk</u> - <i>Cash vs Bonds, Halloween Effect, P/E Ratio, Unemployment Rate, US/EAFE: LIBOR Rates, US/EAFE: Favor Underperformer (all equally weighted)</i>

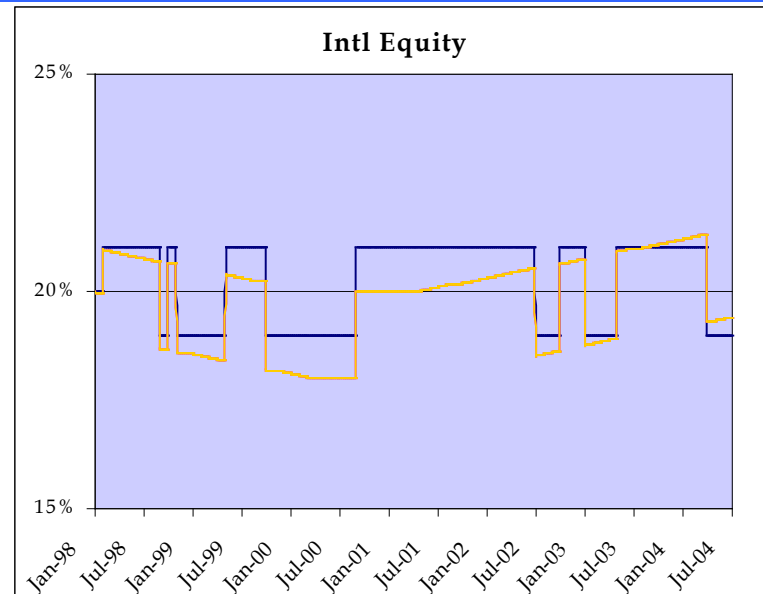
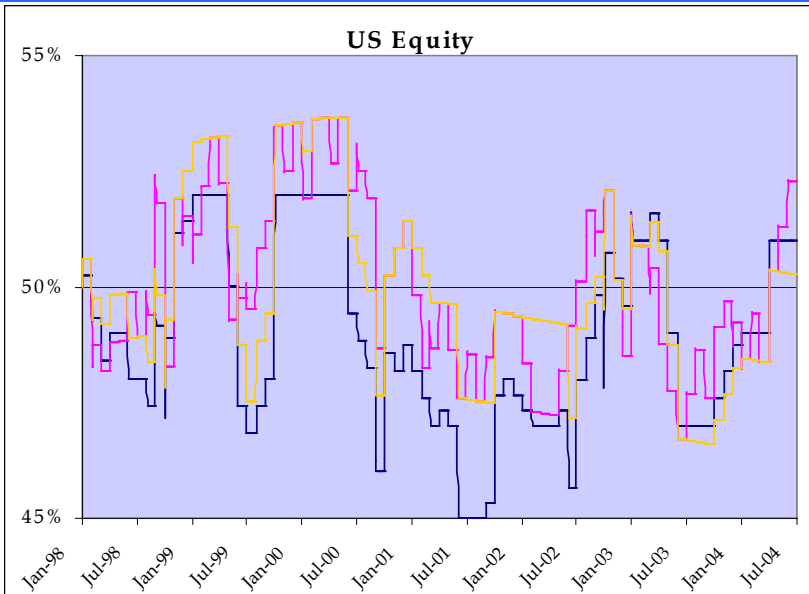
# Strategy Performance (1998-2004)



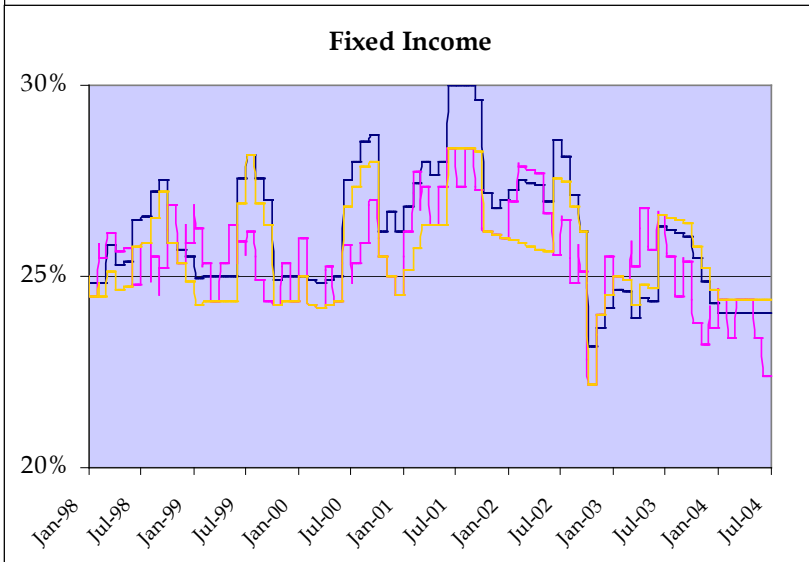
Strategy	Excess Annualized Return	Information Ratio	Confidence in Skill	Success Ratio	Ratio Good /Bad Risk	Max Drawdown
Rebalancing I - Quarterly	-0.22%	-0.87	NM	29.5%	1.26	-1.50%
Rebalancing II - Range of 5%	-0.42%	-1.11	NM	33.3%	0.96	-2.74%
Strategy 1 (highest 6 Excess Returns/IR)	0.44%	1.29	99.97%	64.1%	2.11	-0.21%
Strategy 2 (lowest 6 risk)	0.32%	1.20	99.90%	61.5%	1.54	-0.28%
Strategy 3 (Highest 3 Excess, lowest 3 Risk)	0.36%	1.42	99.99%	57.7%	2.09	-0.20%

**Informed decisions significantly outperform rebalancing**  
**Rule diversification enhances information ratios**

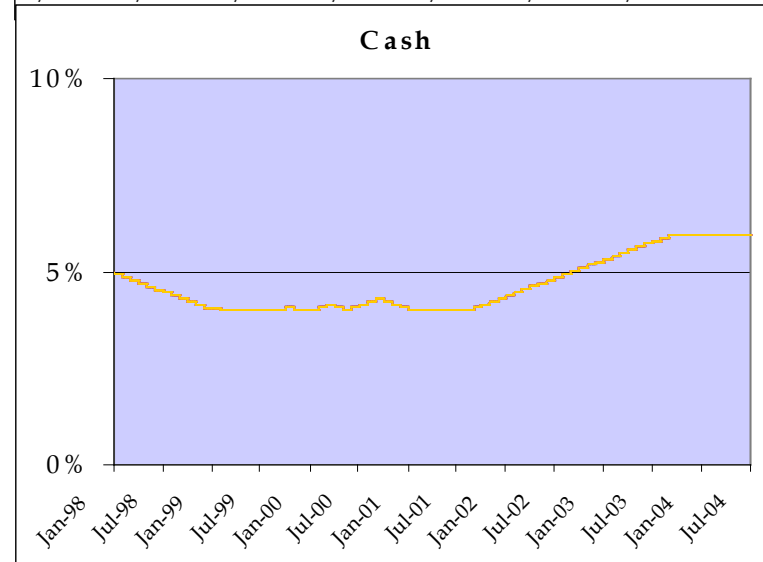
# Historical Allocations to Asset Classes



Strategies 2 & 3  
have same  
rules/allocation

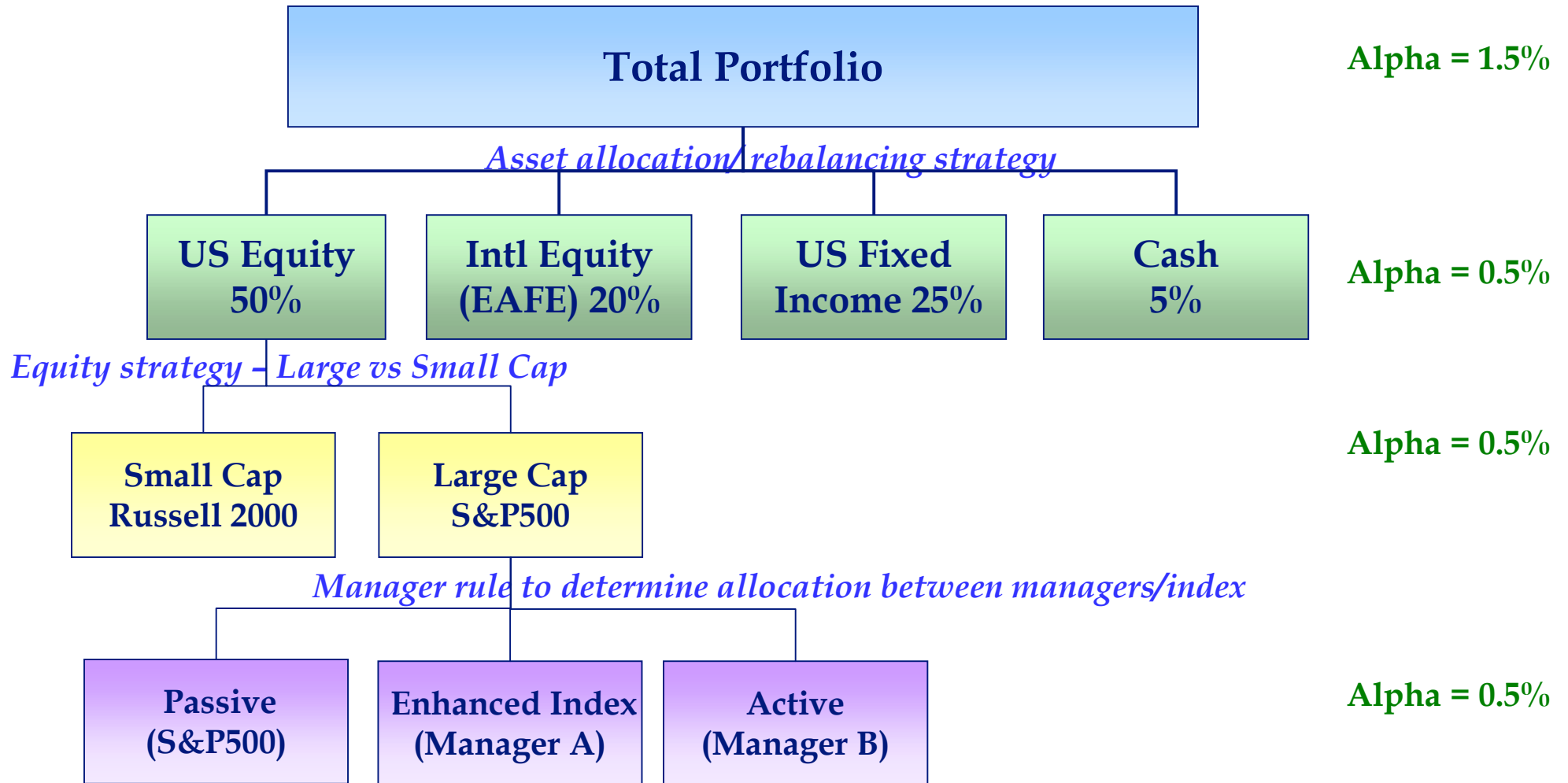


Strategy 1  
Strategy 2  
Strategy 3



All strategies  
have same  
rule/allocation

# Multi-tiered Alpha Aggregation



# AlphaEngine™: Empower Clients

---



- Brings state-of-the-art management to pension funds
- Easy to use: Clients generate ideas – software does work
- Test all possible rebalancing options in a few minutes
- Client can customize to their structure and objectives
- No consulting!! Client can make all decisions better
- Very transparent: See impact of all decisions on individual asset class or entire fund (easy to read)

# Summary

---



- Many (explicit and implicit) decisions in a portfolio
- Each is an opportunity for alpha/risk management
- Risk management = more effective decisions
- Good governance: cost/return impact of every decision
- Must aggregate impact of all decisions on portfolio
- AlphaEngine<sup>TM</sup>: adopt best practices quickly and easily

# Appendix

# Extensions



- Each decision is an opportunity for more returns/risk management
- More tiers = greater diversification, efficacy = more returns
  - Within asset classes (Fixed Income, Equities, Currencies)
  - Managers: Active versus passive and across managers
- Leverage asset managers to generate research ideas for decisions
- Rule were equally weighted; opportunity to further improve
- Evaluate ideas in isolation as well as part of a total portfolio (aggregation produces results that are not obvious)

**Improve fund governance, and in turn, returns and risk**

# Relaxing Asset Limits to +/- 10%



Strategy	Excess Annualized Return	Information Ratio	Confidence in Skill	Success Ratio	Ratio Good /Bad Risk	Max Drawdown
Rebalancing II - 5% Range	-0.42%	-1.11	NM	33.3%	0.96	-2.74%
Rebalancing II - 10% Range	-0.11%	-0.16	31.95%	46.2%	1.60	-2.48%
Strategy I - 5% limit	0.44%	1.29	99.97%	64.1%	2.11	-0.21%
Strategy I - 10% limit	0.93%	1.29	99.97%	68.0%	1.91	-0.50%
Strategy II - 5% limit	0.32%	1.20	99.90%	61.5%	1.54	-0.28%
Strategy II - 10% limit	0.51%	1.16	99.85%	62.8%	1.91	-0.26%
Strategy III - 5% limit	0.36%	1.42	99.99%	57.7%	2.09	-0.20%
Strategy III - 10% limit	0.75%	1.50	99.99%	66.7%	1.90	-0.44%

Change in asset range produces higher  $\alpha$ ; other measures improve or stay within acceptable range