

M^{cube} Investment Technologies, LLC

Risk Management

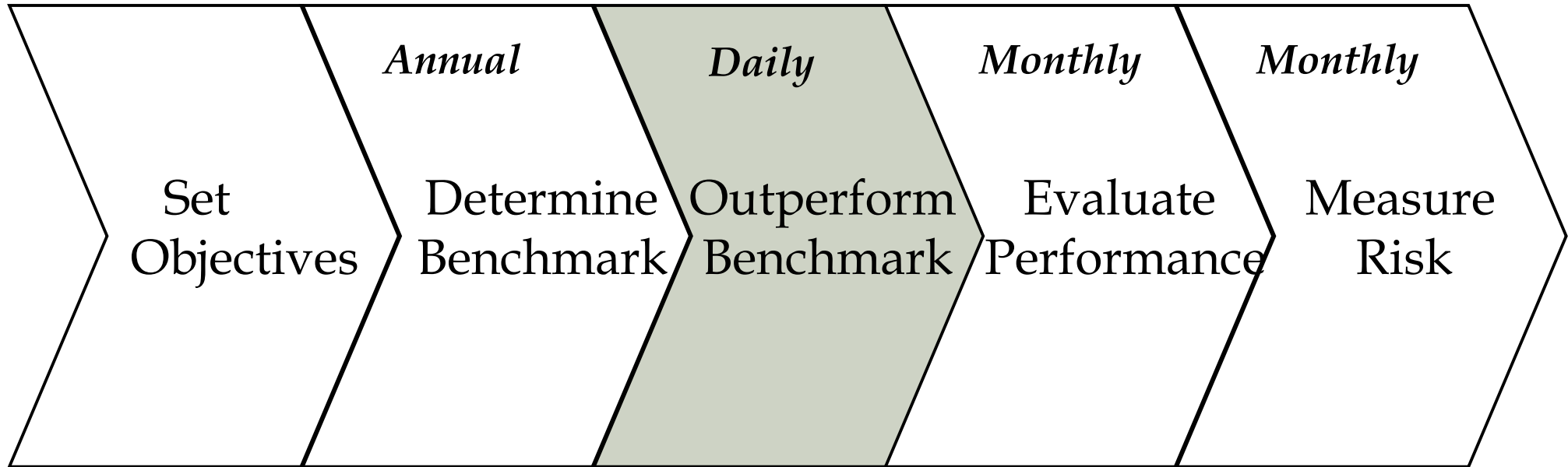
in an

Uncertain World

Outline

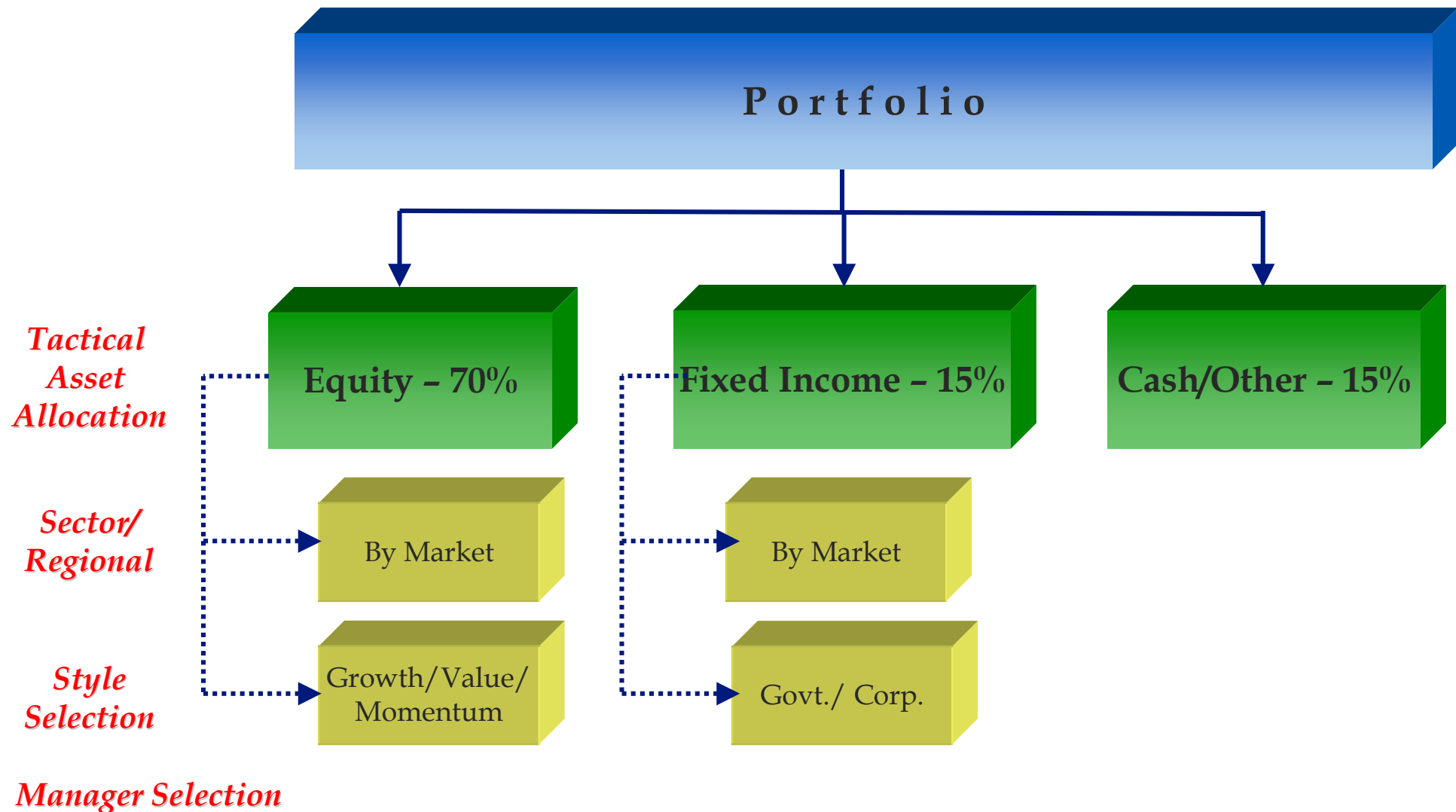
- Risk Management Framework
 - Strategic and Tactical Risk
- How to Manage these Risks?
 - Tactical Asset (and Manager) Allocations
- Measurement and Monitoring
 - Metrics depend on Objectives

Key to Success – Effective Decisions



- Establish Rules for Active Management
- Monitor Rules and Update as Necessary
- Governance/Oversight of Decisions

Portfolios Involve Decisions at Multiple Levels



Solve Challenges Faced by Clients

Ongoing Challenges

1. Manage ongoing cash flows
2. Evaluate & implement rebalancing strategies
3. Manager allocations
4. Tactical asset allocation



Product Attributes

1. Provides framework and process
2. Layered decisions
3. Consistent evaluation
4. Evaluates portfolio impact of all decisions

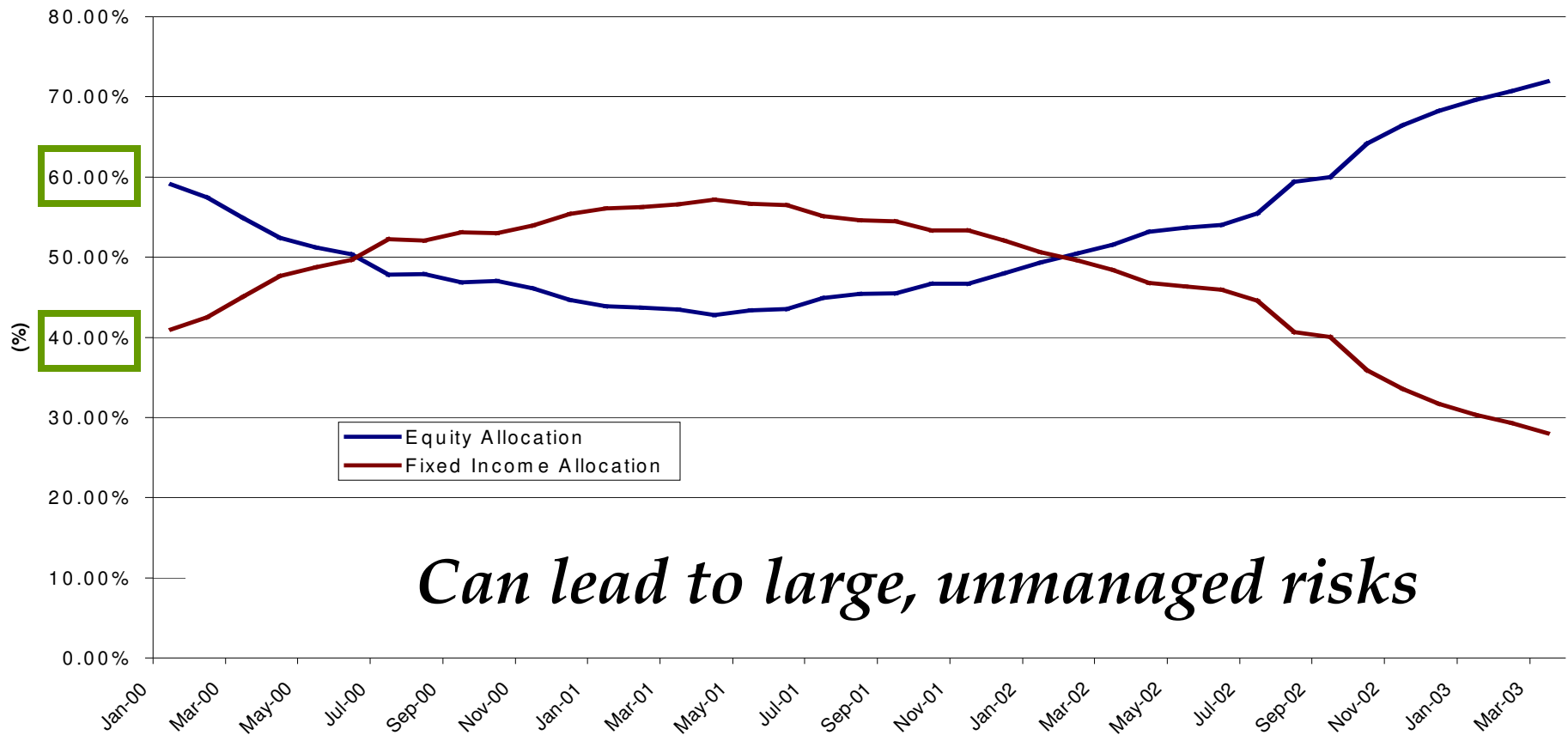
*Good decisions add significant value to returns.
Unmanaged decisions can increase risk and lower returns*

Asset Allocation – Implementation Options

- Naïve rebalancing
 - Many approaches; how to evaluate them?
- Add value/manage risk through informed decisions
 - Internal staff – portfolio managers, researchers
 - Published research (Beating the Dow, Momentum Indicators, “Halloween Effect”)
 - Leverage external managers/relationships

Rebalancing Options - No Rebalancing

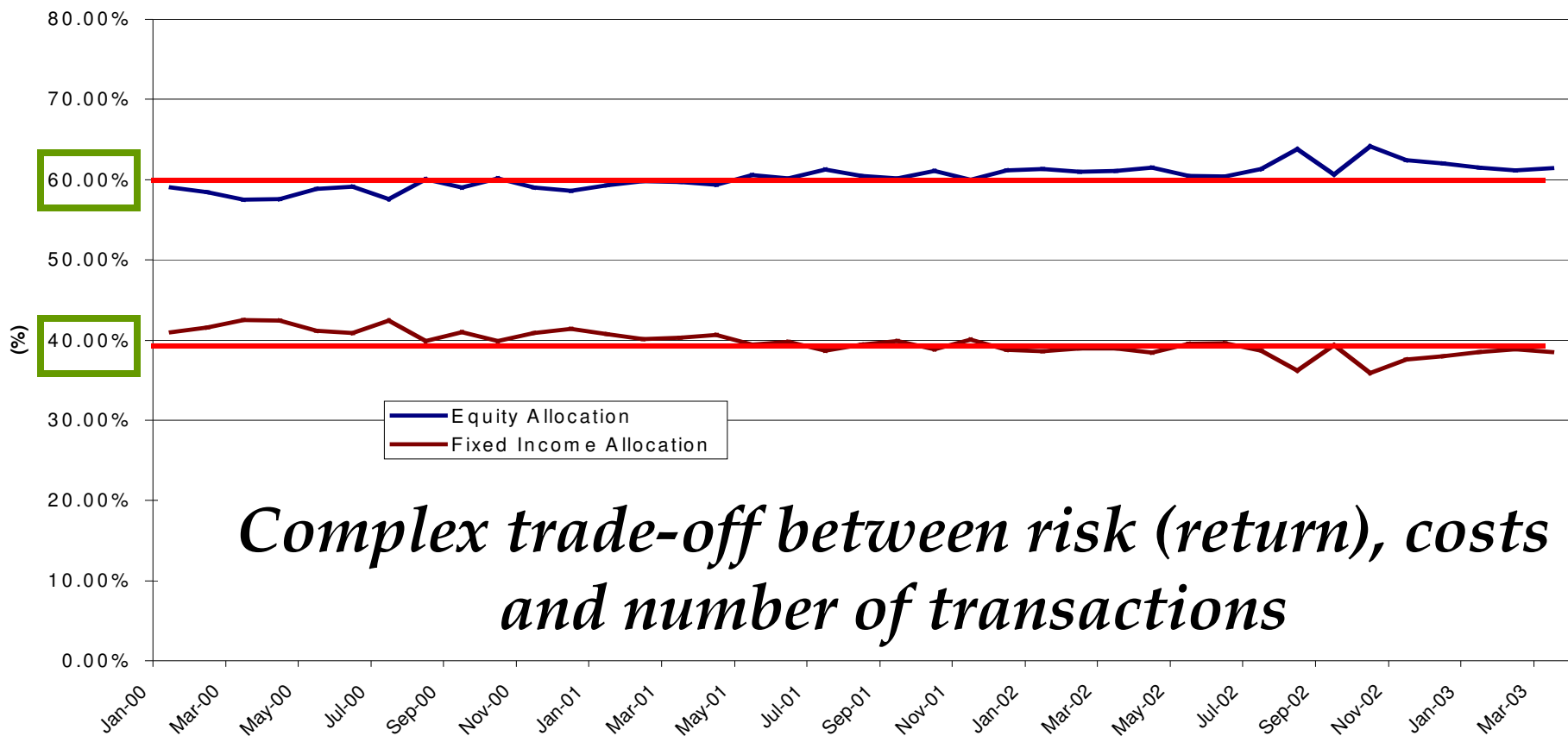
Allocations (No Rebalancing)
60% Equity/40% Bonds



Can lead to large, unmanaged risks

Rebalancing Options - Monthly Rebalancing

Allocations (Monthly Rebalancing)
Rebalance to 60/40 Mix at Start of Month



Case for Actively Managing some Decisions

- Some markets have non-profit participants (FX)
- Some benchmarks are notoriously inefficient (EAFE)
- Markets are cyclical – cannot time turning points, but can improve on “do nothing approach”
- Allowing portfolio to drift is an active (implicit) decision; better to have an explicit view
- Cash inflows/outflows require some management and can be managed better within an active framework

Rules to Improve Performance

- “Beating the Dow” - *Favor stocks when earning yield is greater than yield of AAA corporate bonds*
- Momentum Rule - *Favor stocks when today's price is greater than 200 day moving average*
- Seasonality - *Stocks underperform between May and September*

Beating the Dow with Bonds

Equity-Bond Earnings Yield Rule

IF (S&P500 Earnings Yield > AAA Corporate Bond Yield) **THEN**

BUY 3 % OF S&P 500 INDEX (ALLOCATE MORE TO STOCKS)

ELSE

IF (S&P500 Earnings Yield < AAA Corporate Bond Yield) **THEN**

SELL 3 % OF S&P 500 INDEX (ALLOCATE LESS TO STOCKS)

ELSE

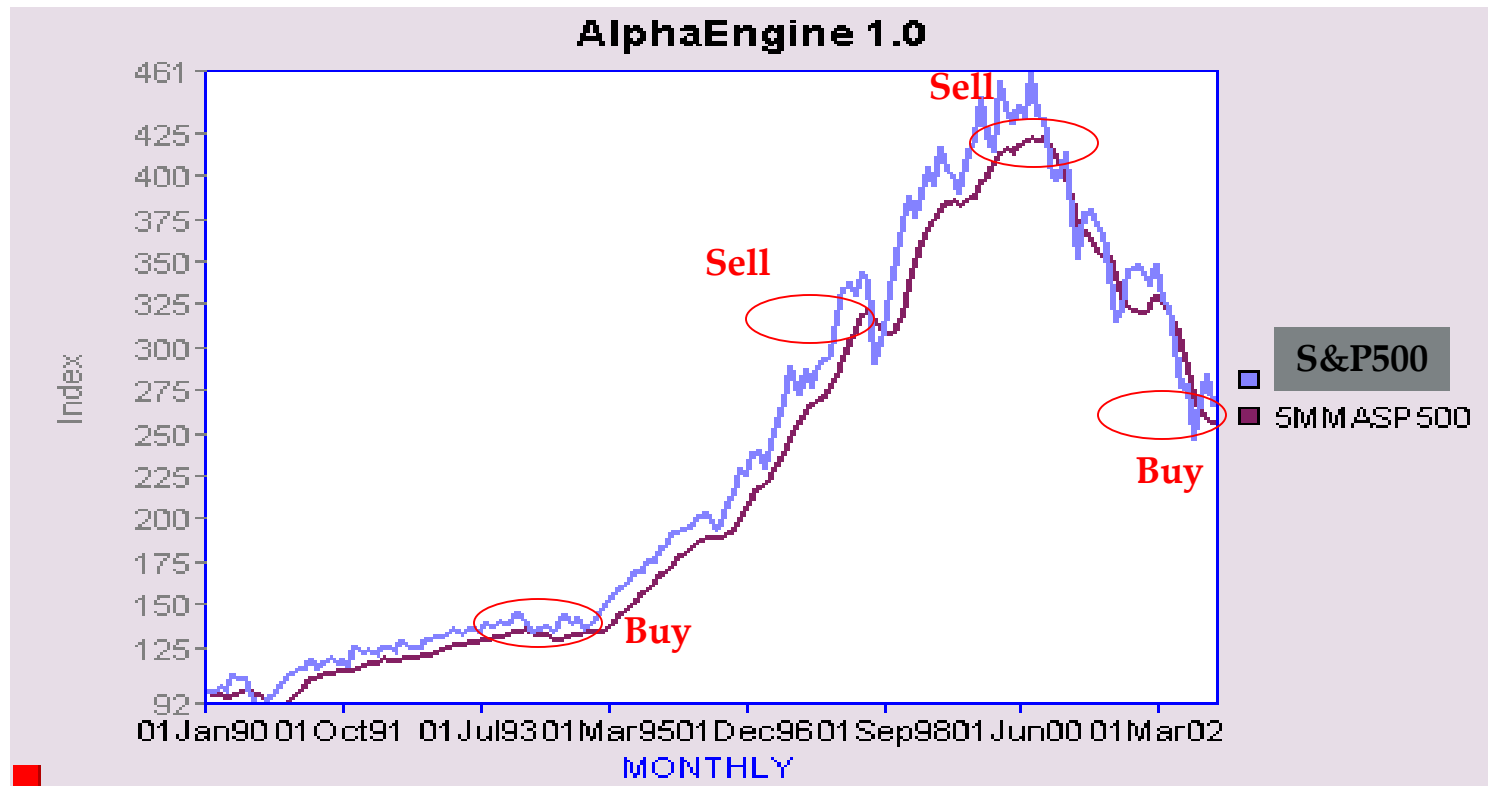
DO NOTHING

Benchmark Investment of **S&P 500 INDEX STOCKS = 60.0 %** ; [Primary Asset]

Benchmark Investment of **SSB BROAD INVT-GRADE BOND INDX = 40.0 %** ; [Alternative Asset]

Trend in Market – Momentum Rules

January 1990 – December 2002



Price-Based Analysis – Risk Budgets

Momentum-based (200 day Moving Average)

IF (S&P 500 INDEX - 200 Day Moving Average of S&P500) > 0 **THEN**

BUY X % OF S&P 500 INDEX (ALLOCATE MORE TO STOCKS)

ELSE

IF (S&P 500 INDEX - 200 Day Moving Average of S&P500) < 0 **THEN**

SELL X % OF S&P 500 INDEX (ALLOCATE LESS TO STOCKS)

Such that the Tracking Error < 4.0 %

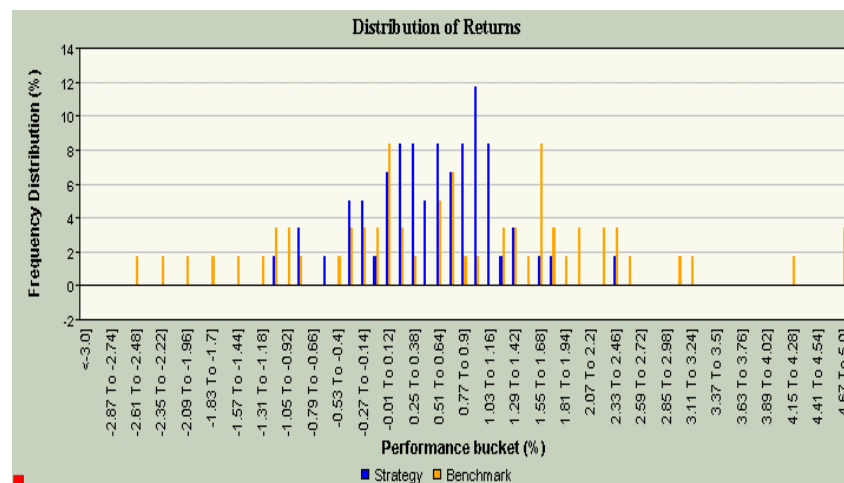
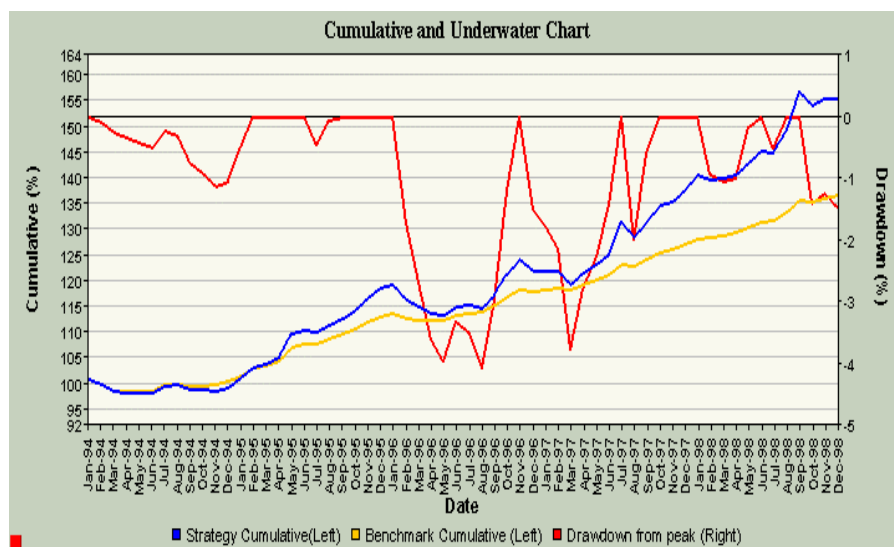
Initial Investment of **S&P 500 INDEX STOCKS = 60.0 %** ; [Primary Asset]

Initial Investment of **SSB BROAD INVT-GRADE BOND INDX = 40.0 %** ; [Alternative Asset]

Create Custom Reports to Evaluate Strategies

Performance Measures - Comparative

	Benchmark	Strategy	Excess
Return %	6.47	9.25	2.78
Cum. Return %	36.79	55.64	18.85
Risk %	2.28	5.58	3.55
Return / Risk Ratio	2.84	1.66	0.78

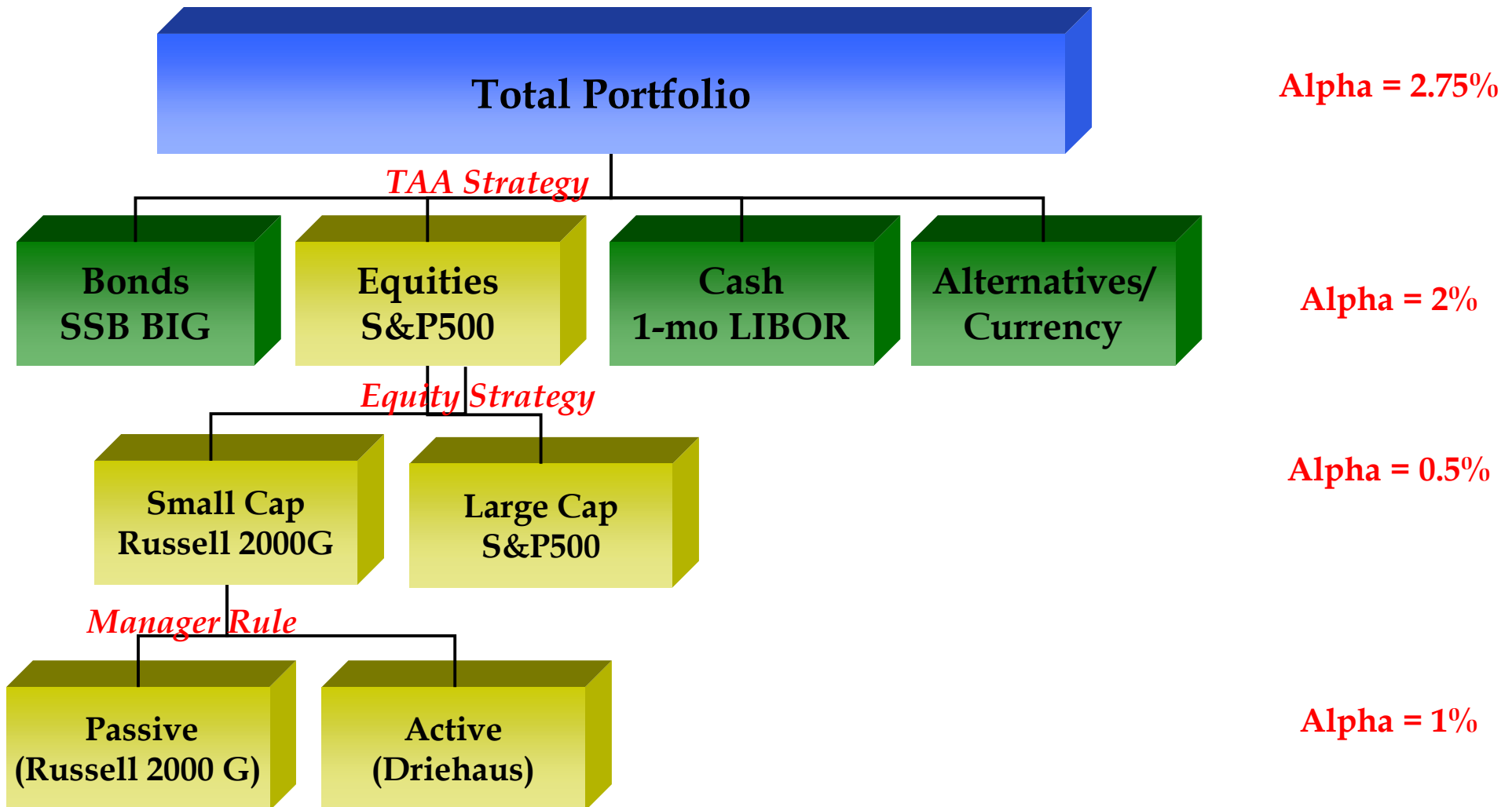


	Strategy	Excess
Success ratio of the rule %	70	56.67
Average returns when positive %	1.51	0.86
Average returns when negative %	-1.02	-0.60
Max. consecutive periods of positive returns	7	7
Max. consecutive periods of negative returns	4	5
Max. relative loss for a period %	-2.54	-1.99

Asset Allocation Analysis - 3 Rules

	Earnings Yield	200 Day Momentum	Seasonality of Market
Current Signal	Favor Bonds	Favor Stocks	Favor Bonds
Previous Signal	Favor Bonds	Favor Bonds	Favor Stocks
Cumulative Performance	1%	2%	0.5%

Alpha Aggregation Can Be Beneficial



Summary

- Risk management is about making more effective decisions
- Need to distinguish measurement from management
- Leverage external relationships to develop a better process to manage asset and manager allocations
- Make such decisions with existing resources
- Funds can adopt best practice quickly and easily

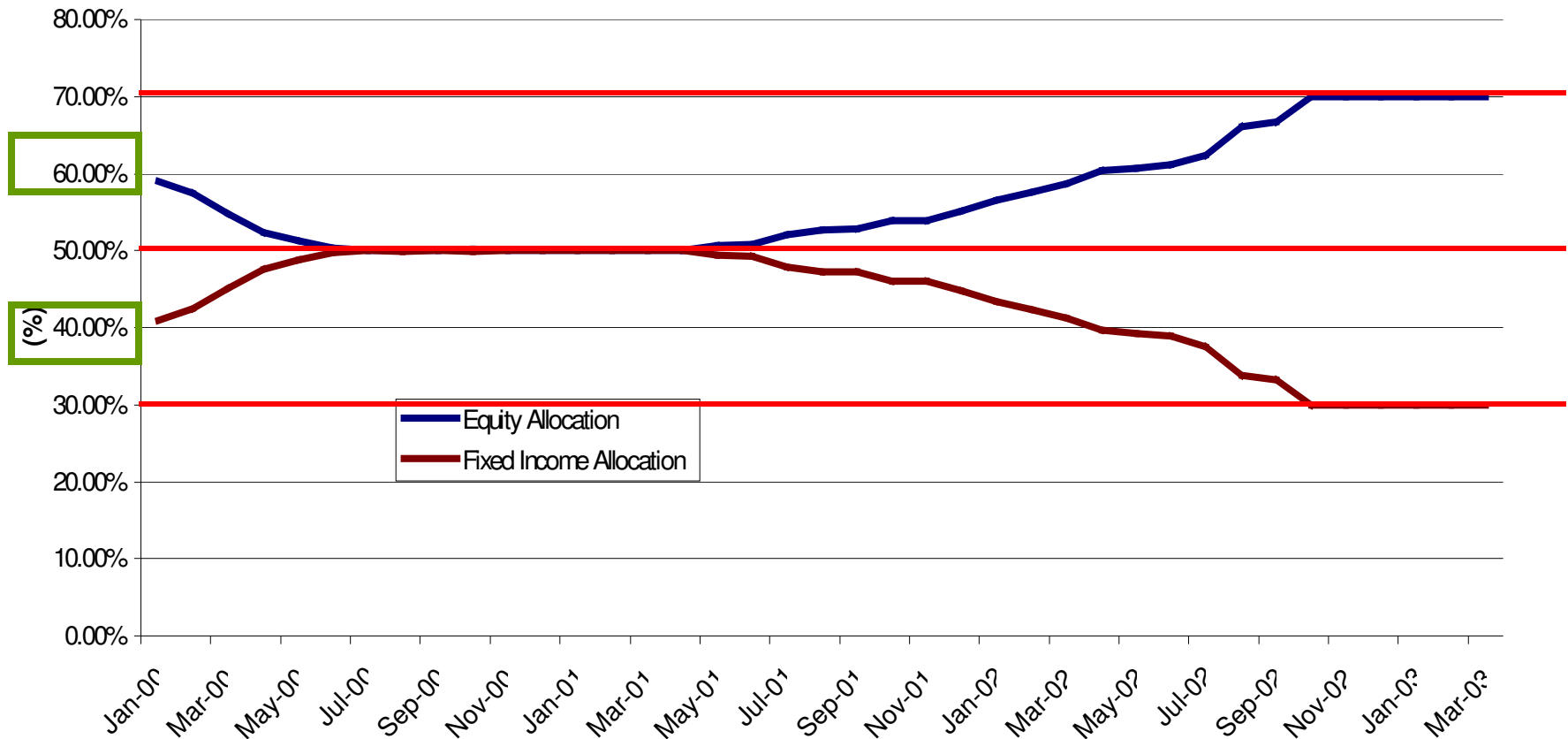
Appendix

Pension Fund Risks – Measure & Manage

	Asset- Liability Risk	Tactical & Benchmark Risk	Manager/ Active Risk
Responsibility	Oversight Committee	Internal Staff	Managers
Frequency of Action	Annually	Daily/Monthly	Monthly
How to Manage the Risk	Strategic Allocations & Funding Policy	Tactical Allocations	Manager Allocations

Rebalancing Options - Rebalance to Limits

Allocations (Monthly Rebalancing)
Rebalance to Range Boundary at Start of Month if Range is Breached
Range = +/- 10% around 60/40 Equity Bond Mix



MA Rules (Trade Based on Another Series)

Manager allocation - Absolute return

IF (Russell 2000 Growth Index - 3MO Moving Avg Russell 2000 Growth) > 0 **THEN**

BUY 1 % OF Driehaus Small Cap Fund

ELSE

IF (Russell 2000 Growth Index - 3MO Moving Avg Russell 2000_Growth) < 0 **THEN**

SELL 1 % OF Driehaus Small Cap Fund

ELSE

HOLD Investments

} **ENDIF**

Initial Investment of **Driehaus Small Cap Fund = 100.0 % ; [Primary Asset]**

Initial Investment of **Russell 2000 Growth Index = 0.0 % ; [Alternative Asset]**