



Applying Post-Modern Portfolio Theory to International Performance Measurement

Brian M. Rom, President
Investment Technologies





Outline

- Post-Modern Portfolio Theory
- Case Studies

Post-Modern Portfolio Theory

- Downside risk replaces standard deviation
- Distributions do not have to be normal or symmetric

Downside Risk

- The standard deviation of returns below the goal
- Differentiates between risk and uncertainty
- Naturally incorporates skewness
- Recognizes that upside volatility is better than downside volatility
- Combines frequency and magnitude of bad outcomes
- No single riskless asset

Elements of PMPT

The Goal

- Questions to Identify the Proper Goal:
 - What is at stake here?
 - What are we trying to accomplish?
 - When does it go from good to bad?
- Examples of Goals:
 - Minimum achievable return
 - Benchmark or index portfolio
 - Comparative universe median
 - Maintain pension contribution below specified amount
 - Achieve target wealth in order to retire

Elements of PMPT

Sortino Ratio

- $[\text{Return}-\text{Goal}]/\text{Downside Risk}$
- PMPT analogue of Sharpe Ratio
 $(\text{Return}-\text{Riskfree Rate})/\text{Standard Deviation}$



Elements of PMPT

Volatility Skewness

[Percent variance above the mean]/
[Percent variance below the mean]



Elements of PMPT

Downside Frequency

Frequency of failure to achieve the
goal



Elements of PMPT

Average Downside Deviation

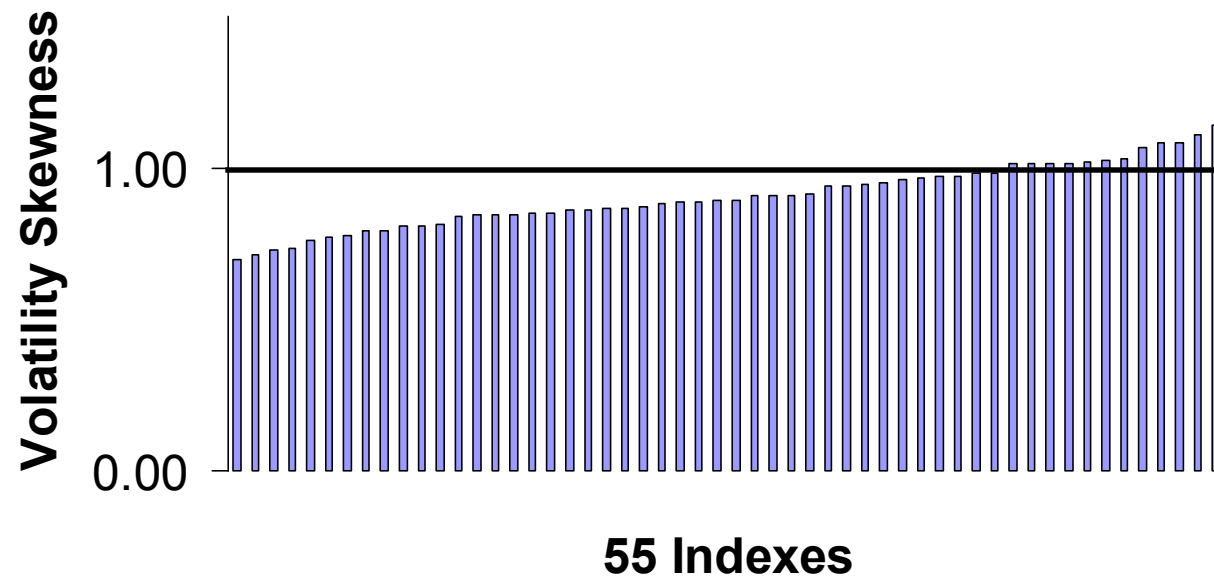
Average deviation below the goal



Case Study #1

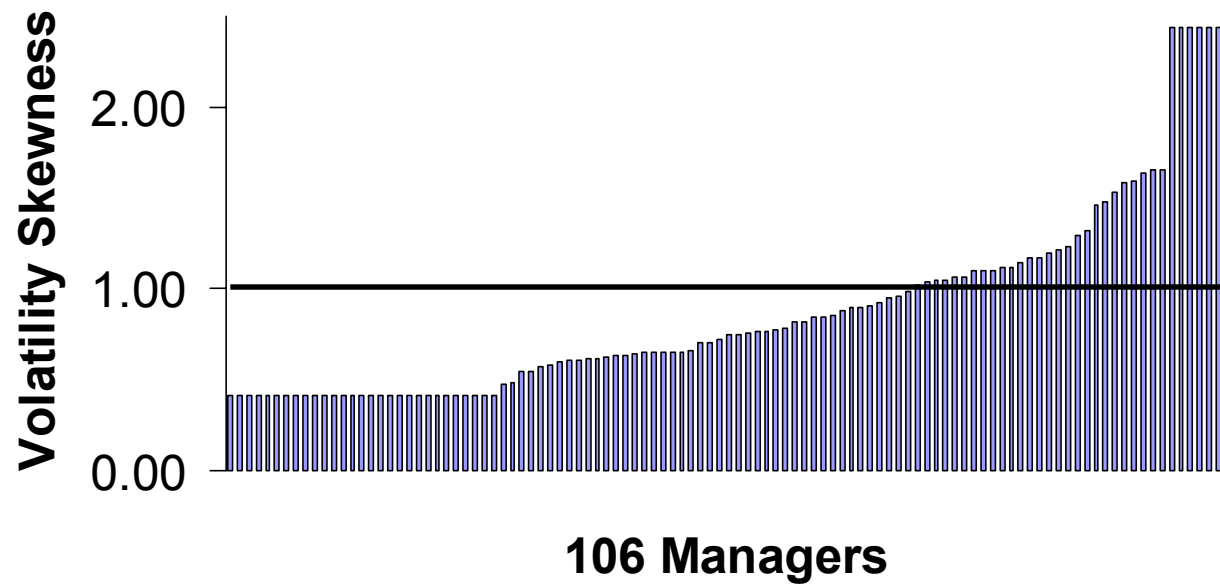
How Asymmetrical are
International Investment
Returns?

Skewness of International Equity Indexes: 1988-1997



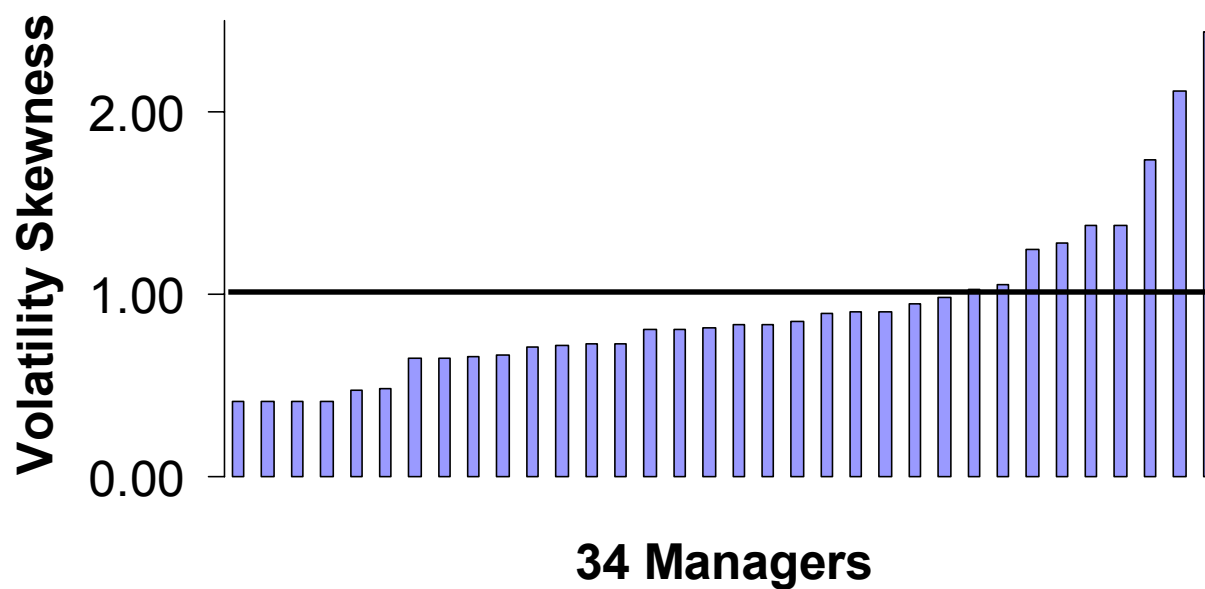
Sources: Barings, Lipper Analytical, Goldman Sachs, Independence International Associates, Inc., MSCI

Skewness of International Large-Cap Equity Managers: 1993-1997



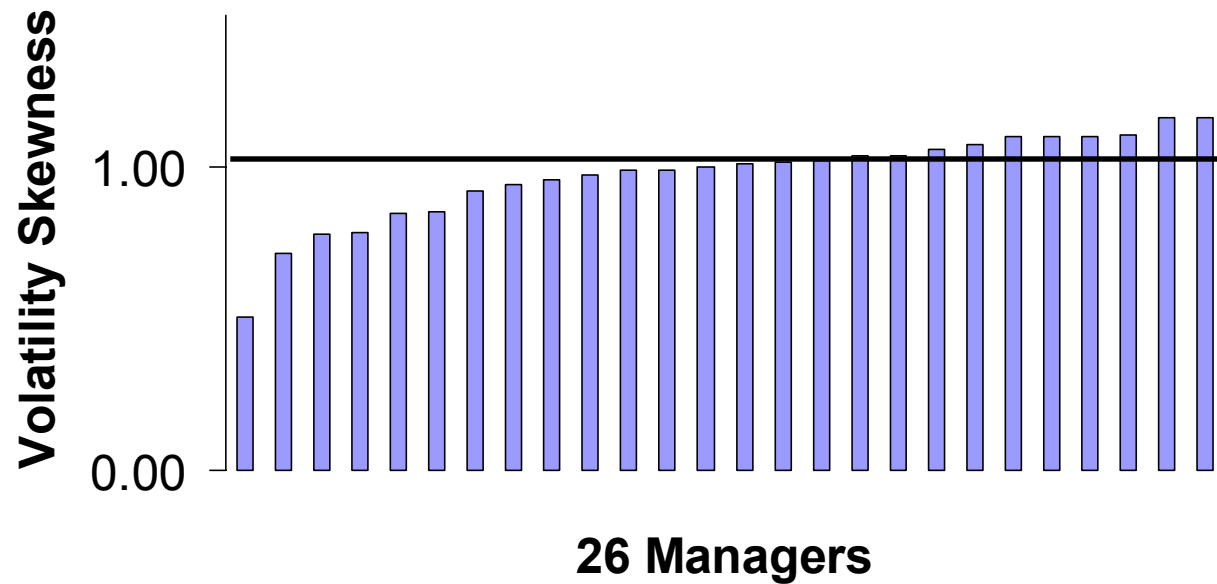
Source: Efron/PSN

Skewness of International Small-Cap Equity Managers: 1993-1997



Source: Efron/PSN

Skewness of International Fixed Income Managers: 1993-1997



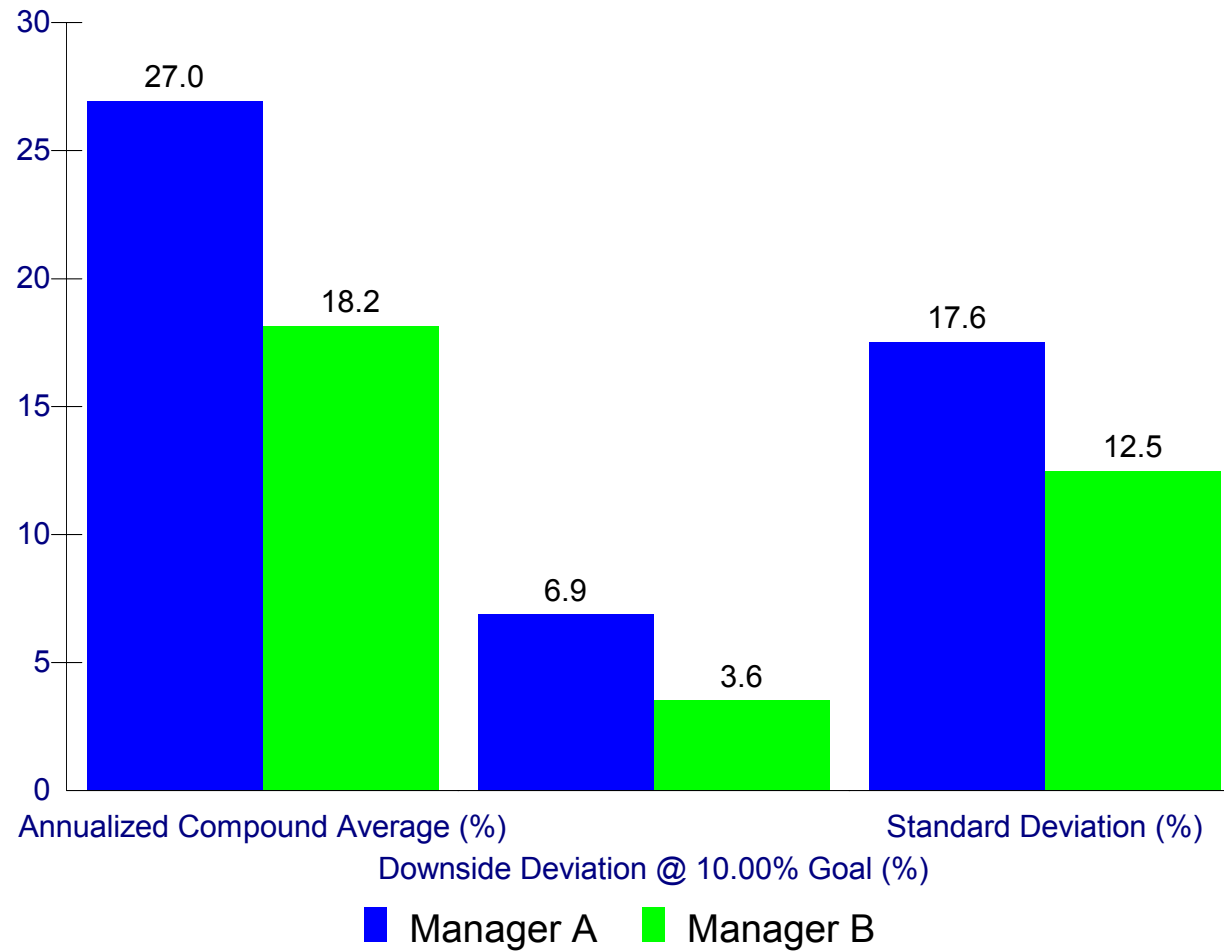
Source: Efron/PSN



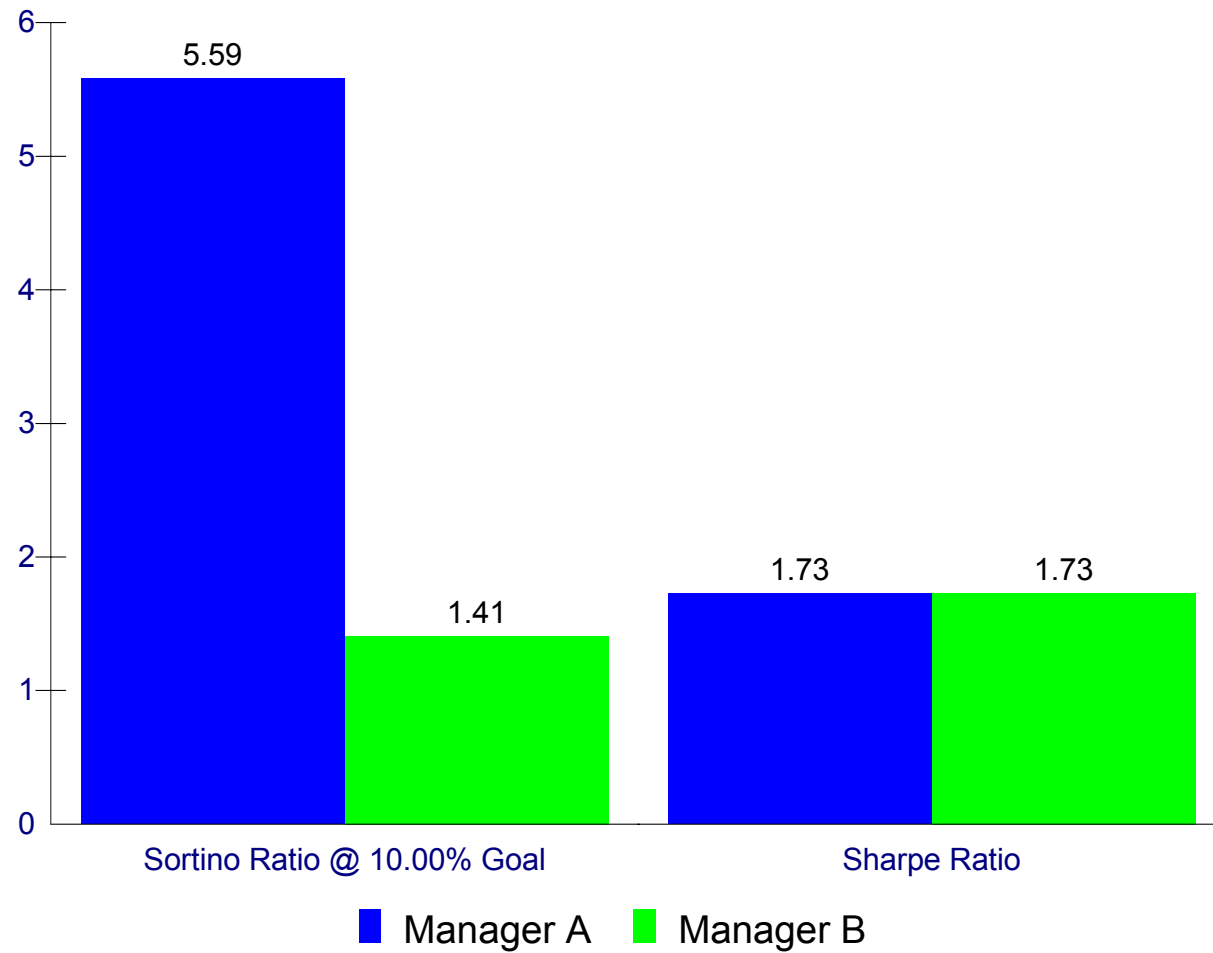
Case Study #2

Performance analysis of two large-cap
international equity investment
managers for period
1993-1997

Risk and Return

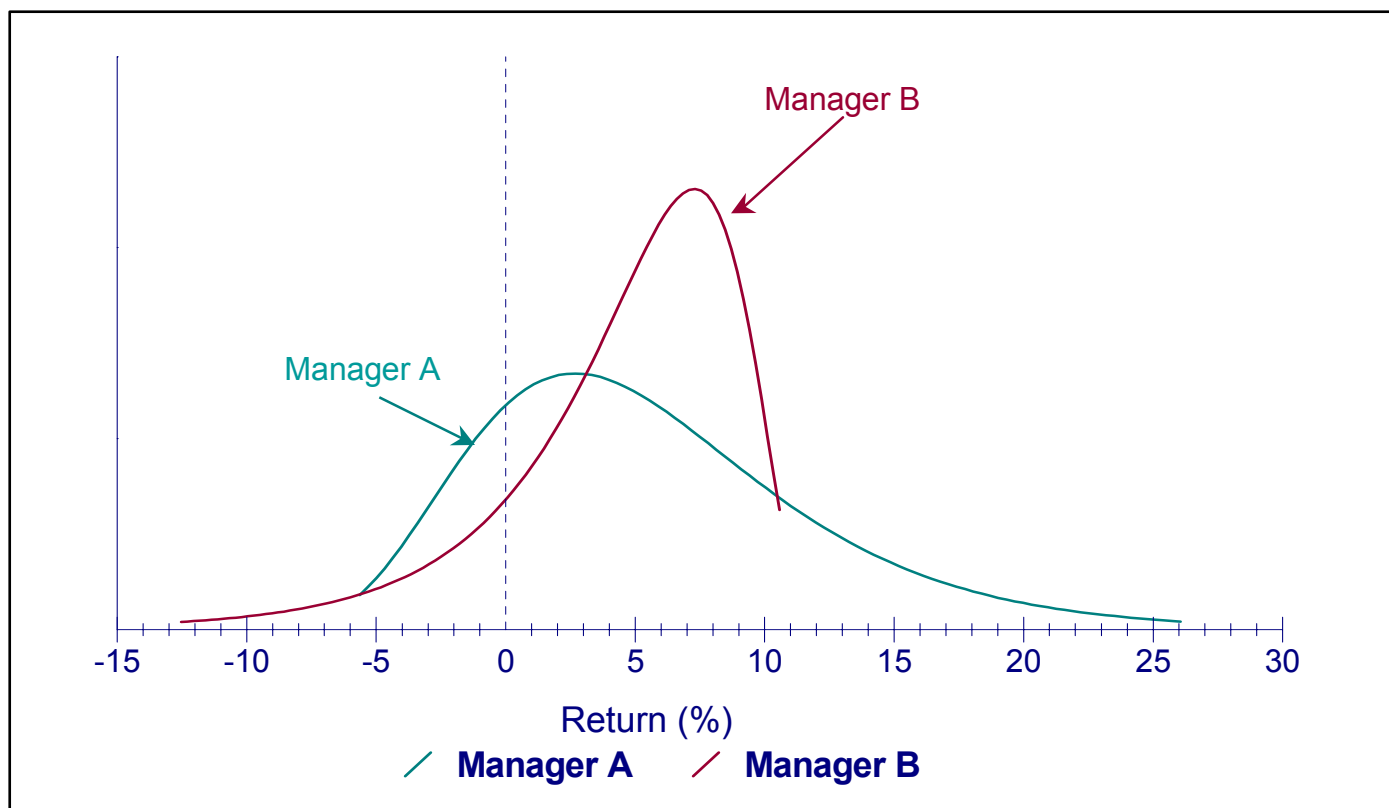


Risk-Adjusted Returns



Skewness Analysis

Manager	Volatility Skewness	% Upside Volatility	% Downside Volatility
A	1.30	56.5%	43.5%
B	0.65	39.5%	61.5%





**THE INVESTMENT WORLD
IS NOT ALWAYS SYMMETRICAL!**

Wrap Up

- DR is standard deviation of returns below the goal
- Differentiates between risk and uncertainty
- Naturally incorporates skewness
- Recognizes that upside volatility is better than downside volatility
- Skewness of returns can be significant
- DR handles skewness; SD does not
- Concepts are theoretically sound and experimentally validated