I-5
Investment Risk Management Update

Committee on Investments / Investment Advisory Group
September 10, 2009
Outline

• Overview of Pension / Endowment Risk Management

• Risk Management at UC

• State of Risk Management today

• Future Directions for Risk Management
What Is Investment Risk?

• **Investment Risk** is the potential for loss accepted by an investor in order to earn a return.

• Risk is characterized by
  - The **range** of possible negative outcomes (losses)
  - The **likelihood** of those outcomes
  - The **impact** of loss on the organization

• **Risk tolerance** articulates the magnitude of loss an investor is willing to sustain in order to generate an acceptable return.
Framework for Risk Management

- **Bearing risk is an essential part of investing**

- **Risk in itself is intrinsically neither good nor bad; risk is a scarce resource used to generate investment returns**

- **Risk management is not about eliminating risk, but balancing risk and expected return**

- **“The essence of investment management is the management of risks, not the management of returns”**

- **“You can’t control outcomes, you can only manage risk”**

- **“Risk forecasts are not forecasts of losses; they are conditional forecasts of potential loss”**
Risk Management Value-Added

• Ensure that sources of risk ("risk factors") are identified, understood, and quantified

• Ensure that assumption of risk is intentional and consistent with investment objectives

• Ensure that risks are adequately compensated (expected return is commensurate with risk)

• Enable fiduciaries to assume the amount of risk consistent with investment objectives and standards of prudence
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Mission/ Objectives

• Mission
  – To ensure that the investment activities do not expose the University to potential or unexpected losses beyond the Regents risk tolerance levels

• Objectives
  – Identify and bound possible losses for all portfolios
  – Develop and monitor guidelines and limits on the investment process to maintain the probability of loss within acceptable limits
Risk Management Roles

• **Fiduciaries approve investment policy**
  - Express **tolerance** for risk
  - **Asset allocation, benchmarks, guidelines**

• **CIO/staff implements policy**
  - Maintain asset weights within set ranges
  - Select strategies and managers
  - **Allocate** risk to various strategies

• **Risk management ensures policy is followed**
  - **Risk exposures are appropriate and properly diversified**
  - Risk is adequately rewarded
Risk Measurement and Models

• Measuring risk is not as simple as computing past ("realized") volatility of returns

• However, volatility is useful to know: it indicates the range of past outcomes

• A risk measure is an estimate of future potential losses, given current conditions

• A risk model is a methodology to measure risk for portfolios based on the current holdings
Risk Measurement and Models continued

• We use “factor models” which identify common sources of risk among similar securities
  – E.g., common movement of all stocks in an industry
  – E.g., credit quality of corporate bonds

• Risk measurement consists of:
  – Exposure to risk factors
  – Volatility of those factors
  – Co-movement of risk factors

• Risk and risk measurement is multi-dimensional
A Common Language

- The innovation of risk management is a common framework and uniform metric to quantify all investment decisions

- Allowing us to trade-off risk in one area with risk in another

- A risk budget is an optimal allocation of a given level of risk to various investment choices

- If we have “used up” our risk budget, we must reduce risk in one or more strategies in order to take risk in another one
Traditional Management of Risk

• Managing investments has always been about managing risk

• Traditionally done with inefficient guidelines and constraints, e.g.,
  – Position and sector limits
  – Limits on manager size
  – Long only constraint
  – No derivatives
  – Credit limits

• These are all examples of risk proxies

• Why not manage the risk factors directly, and link risk to expected return?
Why Is This Inefficient?

- Constraints are proxies for risk; crude (but sometimes effective) risk controls

- They don’t account for actual contribution to risk of different positions

- Constraints don’t account for volatility, correlations, or hedges

- Constraints cannot be combined or traded off against each other
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Are the Risk Models “Broken?”

- The risk models used at the Office of the Treasurer are not the same as the models the Rating Agencies used to give AAA ratings to CDO’s backed by sub-prime mortgages.

- However, all risk models use the past volatility of securities and markets as inputs to generate forecasts.

- The period preceding the 2007-9 decline experienced low volatility, and so most risk models underestimated the range of possible outcomes.

- “Experience is a hard teacher; she gives the test first and the lesson afterwards.”
Emerging Consensus

• **Risk measures should be somewhat *counter-cyclical***
  - To enable Buffet-type contrarian strategies

• **Develop risk measures which are **less dependent on price movements**
  - Incorporate *macro-environmental* signals
  - Focus on **avoiding loss**, rather than reducing volatility
  - Use models appropriately, to **ask questions** not to give answers

• **Continually question**
  - What assumptions are built into our models?
  - What if we are wrong? (to balance overly optimistic portfolio managers)
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What Can’t We Do Better?

• Predict when market indexes will decline precipitously

• Predict turning points in market indexes

• Predict how long trends will continue
  – Trends in return
  – Trends in volatility
  – Trends in co-movement of risk factors
What Can We Do Better?

• Combine economic and asset valuation signals in risk forecasts

• Focus more on total risk, as well as risk relative to the benchmark

• Recognize the limits of the normal distribution in measuring and interpreting risk (e.g., “fat tails”)

• Replace correlations with more general measures of return co-variation

• Focus more on downside risk, and on the explicit trade-offs of adopting a more conservative position when risk measures decrease but risk seeking behavior increases