W. P. Carey School of Business

Undergraduate Fund
Semi-Annual Meeting
December 3rd, 2010
Today’s Agenda

- Team introduction & fund objectives
- Investment selection
- Fund performance
- Risk and return attribution
- Lessons learned & conclusion
Team

**Fund Manager**
- Tyler Rives

**Fundamental Analysts**
- Tom Bochenko
- Jay Joshi
- Michael Cohn
- Vincent Mendez
- Nate Irwin
- Dan Tram
- Cole Jackson

**Quantitative Analysts**
- Rob Hill
- Ryan Detlaff
- Steven Kutos
Investment Charter

- Long term focus
- Portfolio constraints
  - ≤ 95% Equity (up to 25% in Foreign Equity)
  - ≤ 20% Fixed Income
  - ≤ 10% Cash
  - ≤ 25% in a single sector
  - ≤ 15% in a single non U.S. Gov. issuer
Defining the Problem

- Charter constraints
- Quantitative and fundamental analysis
- Optimization methods

Our Solution: Asset Allocation
Quantitative Process

MVO | Black-Litterman
INTRODUCTION

QUANTITATIVE PROCESS

FUNDAMENTAL PROCESS

INVESTMENT SELECTION

FUND PERFORMANCE

ATTRIBUTION ANALYSIS

CONCLUSION

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Mean Variance Optimization

Constraints/Inputs

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Cash</th>
<th>Fixed Income</th>
<th>Ex-US Equity</th>
<th>US Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constraint (1st)</td>
<td>1%</td>
<td>20%</td>
<td>25%</td>
<td>95%</td>
</tr>
</tbody>
</table>

Inputs

Returns

- Historical vs. Expected
- Rolling Betas

Risk

- Volatility
- Correlations – 7 years
**Undergraduate SIM Fund**

**INTRODUCTION**

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**FUNDAMENTAL PROCESS**

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### Asset Allocation Weights

<table>
<thead>
<tr>
<th></th>
<th>Cash</th>
<th>Fixed Income</th>
<th>Ex-US Equity</th>
<th>US Equity</th>
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</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1.00%</td>
<td>16.35%</td>
<td>21.06%</td>
<td>61.59%</td>
</tr>
</tbody>
</table>

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[Graph showing mean-variance efficient frontier and random portfolios]

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**Unconstrained**

**Constrained**
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Undergraduate SIM Fund
Student Investment Management Fund

INTRODUCTION

QUANTITATIVE

Current U.S. Equity Market Weights

- Financials 16%
- Healthcare 12%
- Industrials 11%
- Technology 19%
- Materials 4%
- Utilities 4%
- Con Disc 11%
- Con Staples 12%
- Energy 11%

*as of 9/30/10
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Student Investment Management

Ex-US

US

FI

Fundamental Analysis

Data

Black-Litterman

Sector Weights
Black-Litterman Results
Fundamental Process

Industry Analysis
Industry Analysis

Industry overview
  - Current position of each sector
  - Composition

Fundamental analysis
  - Historical returns and volatility
  - Macroeconomic events
  - Sector drivers
Fundamental Example – Financials

- Macro events: regulation, banking restrictions
- Drivers: rate of recovery, unemployment, real estate prices, vacancies and supply
- Decision: underweight relative to market
  - 9/30/10 Market holds 16.00%
  - SIMF target weight 5.96%
Investment Selection
ETF Selection

General Considerations

- Holdings overlap
- Expense ratio
- Tracking error
- Composition
- Liquidity

<table>
<thead>
<tr>
<th>Sector</th>
<th>Ticker</th>
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<tbody>
<tr>
<td>Consumer Discretionary</td>
<td>XLY</td>
</tr>
<tr>
<td>Con Staples</td>
<td>VDC</td>
</tr>
<tr>
<td>Energy</td>
<td>VDE</td>
</tr>
<tr>
<td>Financials</td>
<td>XLF</td>
</tr>
<tr>
<td>Healthcare</td>
<td>VHT</td>
</tr>
<tr>
<td>Industrials</td>
<td>VIS</td>
</tr>
<tr>
<td>Technology</td>
<td>XLK</td>
</tr>
<tr>
<td>Utilities</td>
<td>XLU</td>
</tr>
<tr>
<td>Ex-Us</td>
<td>VFWIX</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>IPE</td>
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</tbody>
</table>
Fixed Income

- Charter restrictions
- Breakeven inflation from TIPS
- Long-term inflation → TIPS
- TIPS negative yield
- IPE in lieu of TIP
Fund Performance
# Holdings

<table>
<thead>
<tr>
<th>Sector</th>
<th>Ticker</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Discretionary</td>
<td>XLY</td>
<td>9.77%</td>
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<tr>
<td>Con Staples</td>
<td>VDC</td>
<td>12.64%</td>
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<tr>
<td>Energy</td>
<td>VDE</td>
<td>8.00%</td>
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<tr>
<td>Financials</td>
<td>XLF</td>
<td>3.52%</td>
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<tr>
<td>Healthcare</td>
<td>VHT</td>
<td>9.57%</td>
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<tr>
<td>Industrials</td>
<td>VIS</td>
<td>2.57%</td>
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<tr>
<td>Technology</td>
<td>XLK</td>
<td>12.63%</td>
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<tr>
<td>Utilities</td>
<td>XLU</td>
<td>3.35%</td>
</tr>
<tr>
<td>Ex-Us</td>
<td>VFWIX</td>
<td>21.27%</td>
</tr>
<tr>
<td>TIPS (Fixed Income)</td>
<td>IPE</td>
<td>15.72%</td>
</tr>
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Benchmarks

- MSCI World Equity Index
- S&P 500 US Index
- Composite Index
  - 60% US Equity
  - 25% Ex-US Equity
  - 14% US Investment Grade Debt
  - 1% Cash
Fund Performance

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Undergrad Constraint S&P 500 MSCI World
# Fund Performance

<table>
<thead>
<tr>
<th></th>
<th>Over Holding Period</th>
<th>Annualized</th>
<th>Volatility</th>
<th>Sharpe Ratio</th>
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</thead>
<tbody>
<tr>
<td>Undergraduates</td>
<td>1.37%</td>
<td>9.44%</td>
<td>13.46%</td>
<td>.252</td>
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<tr>
<td>Constrained BM</td>
<td>1.25%</td>
<td>8.58%</td>
<td>13.76%</td>
<td>.231</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>2.54%</td>
<td>18.08%</td>
<td>15.28%</td>
<td>.462</td>
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<tr>
<td>World Equity</td>
<td>0.42%</td>
<td>2.8%</td>
<td>16.37%</td>
<td>.069</td>
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</table>
Attribution Analysis
Risk Analysis

Return vs. Volatility
(Bubble Size Represents Weight in Portfolio)

- Con Discretionary
- Con Staples
- Energy
- Financials
- Healthcare
- Industrials
- Technology
- Utilities
- Ex US
- TIPS Fund
- Cash
- SIMF
- Constraint
- MSCI World

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Going Forward

- Continual monitoring of risk
- Monthly attribution framework
- Rebalance as necessary to match opinions
- Improve
  - IPE and liquidity