CS 7646: Machine Learning for Trading

Basic Assessment of a Fund

Find out how modern electronic markets work, why stock prices change in the ways they do, and how computation can help our understanding of them. Learn to build algorithms and visualizations to inform investing practice.
Objectives:

- Understand course viewpoint: Portfolio Manager.
- Understand portfolio manager incentives.
- Understand two main types of funds.
- Understand benchmarks.
Viewpoint

- I assume you want to be a portfolio manager.
Portfolio Manager / Hedge Fund Incentives

- Expense ratio
  - Used by mutual funds & ETFs.
  - Usually less than 1%.
- “Two and twenty”
  - Classic structure for hedge funds.
  - $1M with 20% / year = $60K/year.
- How/why different?
How to Attract Funds?

- Must have track record, or
- Very compelling story and back test.

- What do investors want to see?
Two Main Types of Fund Goals

- Reference to a benchmark.
- Absolute return.
Example: Compare with Benchmark

Thanks Lucena Research
Common Metrics

- Annual return.
- Risk: Standard deviation of return.
- Reward/Risk: Sharpe Ratio.
- Reward/Risk: Sortino Ratio.
- Jensen’s Alpha.
Example

<table>
<thead>
<tr>
<th></th>
<th>Return</th>
<th>Sharpe</th>
<th>STDEV</th>
<th>D-down</th>
<th>Corr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fund</td>
<td>33%</td>
<td>.94</td>
<td>0.58%</td>
<td>-8.67%</td>
<td>0.89</td>
</tr>
<tr>
<td>$DJI</td>
<td>43%</td>
<td>.63</td>
<td>1.23%</td>
<td>-27.38%</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Annual Return

- metric = (value[end]/value[start]) − 1
- Example: $100 to $110:
  - (110/100) − 1 = 0.10 = 10%
Standard Deviation of Daily Return

- $\text{daily\_rets}[i] = \frac{\text{value}[i]}{\text{value}[i-1]} - 1$
- $\text{std\_metric} = \text{stdev}(\text{daily\_rets})$
Max Draw Down
Sharpe Ratio

\[ S = \frac{E[R - R_f]}{\sigma} = \frac{E[R - R_f]}{\sqrt{\text{var}[R - R_f]}} \]

- metric = (average(daily_ret) / stdev(daily_ret)) * \(\sqrt{250}\)
Homework 1

- Find online broker to “paper trade.”
- Invest $1M in 4 equities.
- Assess your portfolio for 2011:
  - Annual return
  - Average daily return
  - Stdev of daily return
  - Sharpe Ratio
- Compare with benchmark: SPY
- Submit
  - .pdf printout of your spreadsheet.
  - Screenshot of your portfolio online.
Demo Using Excel