“A Brief Survey of Hedge Fund Research”
The London School of Economics’ Financial Markets Group
14 February 2006

Ms. Hilary Till (LSE, MSc in Statistics, 1987) *
Premia Risk Consultancy, Inc.* E-mail: info@premiacap.com *
Phone: 312-583-1137 * Chicago * Fax: 312-873-3914
Presentation Outline

I. Return Sources

II. Properties of Returns

III. Performance Measurement

IV. Risk Management

V. Investor Preferences and Choices

VI. Conclusion

Based on Till and Gunzberg (2005).
I. Return Sources

A. Inefficiencies

Capacity of Hedge Fund Industry (With an “Alpha Advantage”) in Billions of Dollars

| Allowable Inefficiency in Private, Mutual Fund and Institutional Fund Management |
|--------------------------------------|----------------|----------------|----------------|
|                                     | -0.5% | -0.75% | -1.0% |
| Required Excess                     | 10.0% |        |      |
| Return for Hedge Funds              | 7.5%  |        |      |
| Hedge Funds                         | 5.0%  |        |      |
| Required Excess                     | 10.0% | 2,750  | 4,125 |
| Return for Hedge Funds              | 7.5%  | 3,667  | 5,500 |
| Hedge Funds                         | 5.0%  | 5,500  | 8,250 |
| Required Excess                     | 10.0% | 2,750  | 4,125 |
| Return for Hedge Funds              | 7.5%  | 3,667  | 5,500 |
| Hedge Funds                         | 5.0%  | 5,500  | 8,250 |
| Required Excess                     | 10.0% | 2,750  | 4,125 |
| Return for Hedge Funds              | 7.5%  | 3,667  | 5,500 |
| Hedge Funds                         | 5.0%  | 5,500  | 8,250 |

Similar Argument also in Ross (2004).
I. Return Sources

B. Risk Premia

- Relative-Value Bond Funds
- Equity Risk Arbitrage
- Value vs. Growth Strategy
- Small Capitalization Stocks
- High-Yield Currency Investing

Examples were drawn from Cochrane (1999a,b), Harvey and Siddique (2000), and Low (2000).
I. Return Sources

C. Illiquidity

• Benefits: Tick-by-Tick Evaluation of a Good Investment is Painful

<table>
<thead>
<tr>
<th>Scale</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>93%</td>
</tr>
<tr>
<td>1 quarter</td>
<td>77%</td>
</tr>
<tr>
<td>1 month</td>
<td>67%</td>
</tr>
<tr>
<td>1 day</td>
<td>54%</td>
</tr>
<tr>
<td>1 hour</td>
<td>51.3%</td>
</tr>
<tr>
<td>1 minute</td>
<td>50.17%</td>
</tr>
<tr>
<td>1 second</td>
<td>50.02%</td>
</tr>
</tbody>
</table>

Source: Taleb (2001), Table 3.1.
I. Return Sources

C. Illiquidity (Continued)
   • Costs: Default and Liquidation Risk

Source: Krishnan and Nelken (2003).
I. Return Sources

D. Eventful Periods

- Managed Futures programs are now expected to benefit from event risk.

The Myth of Hedge Fund Market Neutrality: Good News for Managed Futures

Declines in the S&P 500 of Greater Than 6% Since 1980

<table>
<thead>
<tr>
<th>Week Period</th>
<th>S&amp;P 500</th>
<th>Managed Futures a</th>
<th>Hedge Funds b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep-Nov 1987</td>
<td>-30%</td>
<td>8.5%</td>
</tr>
<tr>
<td>2</td>
<td>Apr-Jul 2002</td>
<td>-20%</td>
<td>10.6%</td>
</tr>
<tr>
<td>3</td>
<td>Jun-Sep 2001</td>
<td>-17%</td>
<td>1.9%</td>
</tr>
<tr>
<td>4</td>
<td>Jul-Aug 1998</td>
<td>-15%</td>
<td>5.8%</td>
</tr>
<tr>
<td>5</td>
<td>Feb-Mar 2001</td>
<td>-15%</td>
<td>4.0%</td>
</tr>
<tr>
<td>6</td>
<td>Jun-Oct 1990</td>
<td>-15%</td>
<td>19.4%</td>
</tr>
<tr>
<td>7</td>
<td>Sep-Nov 2000</td>
<td>-13%</td>
<td>2.7%</td>
</tr>
<tr>
<td>8</td>
<td>Sep 2002</td>
<td>-11%</td>
<td>1.9%</td>
</tr>
<tr>
<td>9</td>
<td>Dec 2002 to Feb 2003</td>
<td>-10%</td>
<td>12.1%</td>
</tr>
<tr>
<td>10</td>
<td>Aug-Sep 1981</td>
<td>-10%</td>
<td>0.1%</td>
</tr>
<tr>
<td>11</td>
<td>Feb-Mar 1980</td>
<td>-10%</td>
<td>10.3%</td>
</tr>
<tr>
<td>12</td>
<td>Dec 1981-Mar 1982</td>
<td>-10%</td>
<td>7.9%</td>
</tr>
<tr>
<td>13</td>
<td>Sep 1986</td>
<td>-8%</td>
<td>-4.2%</td>
</tr>
<tr>
<td>14</td>
<td>Dec 1980-Jan 1981</td>
<td>-7%</td>
<td>9.5%</td>
</tr>
<tr>
<td>15</td>
<td>Feb-Mar 1994</td>
<td>-7%</td>
<td>0.3%</td>
</tr>
<tr>
<td>16</td>
<td>Jan-Feb 2000</td>
<td>-7%</td>
<td>0.9%</td>
</tr>
<tr>
<td>17</td>
<td>Jan 1990</td>
<td>-7%</td>
<td>3.2%</td>
</tr>
<tr>
<td>18</td>
<td>May-July 1982</td>
<td>-7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>19</td>
<td>Jul-Sep 1999</td>
<td>-6%</td>
<td>-0.5%</td>
</tr>
</tbody>
</table>

Average: -12% 5% -2%

a: CISDM (Center for International Securities and Derivatives Markets) Trading Advisor Qualified Index.
b: HFR (Hedge Fund Research) Fund Weighted Composite Index.

Based on Horwitz (2002), Slide 8.
II. Properties of Returns

A. Short-Options-Like Returns

HFR Event Driven Returns vs. Traditional Portfolio Returns

LOESS Fit (degree = 3, span = 1.0000)

LPP Pictet Index: a benchmark index for Swiss institutional investors, which includes Swiss equities, global equities, and global bonds.

LOESS Fit (Regression): a type of regression used to fit non-linear relationships. Here, the researchers fit the relationship between hedge fund returns and market returns. Market returns, in turn, are represented by the LPP Pictet Index.

HFR: Hedge Fund Research, Inc.
Event Driven (Strategy): Also known as “corporate life cycle investing.”

II. Properties of Returns

A. Short-Options-Like Returns (Continued)

Returns of an Options-Based Index Strategy that Maximizes the Sharpe Ratio vs. an Index

Source: Goetzmann et al. (2002), Figure 4.
II. Properties of Returns

B. Long-Options-Like Returns
   • Call option

Payoff Profile

Investors expect long-options-like profiles from CTA’s and global macro hedge fund managers.

Histogram of Monthly Returns of the Barclay CTA Index

Source: Lungarella (2002), Figure 1.
II. Properties of Returns

B. Long-Options-Like Returns (Continued)

- Straddle

![Graph: Global Macro Style versus the Dollar](image)

Source: Fung and Hsieh (1997), Figure 5.
III. Performance Measurement

A. Sharpe Ratio
   • Required Assumptions

1. Historical Results Have Some Predictive Ability;

2. The Mean and Standard Deviation Are Sufficient Statistics;

3. The Investment’s Return Are Not Serially Correlated; and

Source: Sharpe (1994).
III. Performance Measurement

A. Sharpe Ratio (Continued)

- Required Assumptions (Continued)

4. The Candidate Investments Have Similar Correlations with the Investor’s Other Assets.

5. Conclusion: Sharpe himself states that the use of historical Sharpe ratios as the basis for making predictions …

“is subject to serious question.”

III. Performance Measurement

B. Alternative Metrics

• Asset-Based Style Factors

**Hedge Fund Styles That Can be Modeled with Asset-Based Style Factors**

- Market Timing or Directional Strategies
  - High beta to standard asset classes

- Long/Short or Relative Value Strategies
  - Low beta to standard asset classes

- Trend Following
- Reversal

- Event-Driven

- Stocks
- Bonds
- Currencies
- Commodities

**Convergence on:**
- Capitalization Spread
- Value/Growth Spread

**Trend Following:**
1 and/or 2 above

**Convergence on:**
- Credit Spread
- Mortgage Spread

Excerpted from Fung and Hsieh (2003), Exhibit 5.5.
III. Performance Measurement

B. Alternative Metrics (Continued)

• Asset-Based Style Factors

Equity Arbitrage Strategies

IV. Risk Management

A. Incorporating Extreme Events

Sample Portfolio with a Maximum Investment in Hedge Funds of 10%

Efficient frontier with consideration of S + K
Efficient frontier without consideration of S + K

(S refers to skewness, and K refers to kurtosis).

IV. Risk Management

B. Event Risk: Individual Managers

<table>
<thead>
<tr>
<th>Event</th>
<th>Maximum Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 1987 stock market crash</td>
<td>-4.11%</td>
</tr>
<tr>
<td>Gulf War in 1990</td>
<td>-4.12%</td>
</tr>
<tr>
<td><strong>Fall 1998 bond market debacle</strong></td>
<td><strong>-6.42%</strong></td>
</tr>
<tr>
<td>Aftermath of 9/11/01 attacks</td>
<td>-3.95%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worst-Case Event</th>
<th>Maximum Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 1998 bond market debacle</td>
<td>-6.42%</td>
</tr>
</tbody>
</table>

Value-at-Risk based on recent volatility and correlations 3.67%

IV. Risk Management

C. Event Risk: Fund-of-Funds

Source: Johnson et al. (2002).
IV. Risk Management

D. Transparency and the Limitations to Quantitative Techniques

• Bismarck’s Advice

From experience, it seems that hedge fund investors apply Baron von Bismarck's advice on sausages and legislation to their investments:

“Anyone who likes legislation or sausage should watch neither one being made.”
IV. Risk Management

D. Transparency and the Limitations to Quantitative Techniques (Continued)

- Inferring Exposures

Hedge-Fund Style Radars

“The figure shows the hedge fund radars obtained for a convertible arbitrage fund (left) and a fund of hedge funds (right). The sensitivities (i.e., style-beta coefficients) are estimated using three years of historical data.”

IV. Risk Management

D. Transparency and the Limitations to Quantitative Techniques (Continued)

- Inferring Exposures (Continued)

This graph illustrates Premia Capital’s rolling exposures in energies, metals, U.S. fixed income, livestock, and agriculture during the first eight months of 2004. More technically, the graph shows the conventional benchmarks that were most effective in jointly explaining Premia’s daily return variance using an advanced returns-based-analysis technique.

The benchmarks are the Goldman Sachs (GS) Commodity sector excess return (ER) indices and a Bloomberg U.S. fixed-income index. The graph’s y-axis is the fraction of R-squared that can be attributed to a benchmark exposure. This is also known as the benchmark’s variance component. The middle chart shows each benchmark’s contribution to R-squared over the whole history.

IV. Risk Management

D. Transparency and the Limitations to Quantitative Techniques (Continued)

• Cautionary Example

Simulated Short Volatility Investment Strategy

Source: Anson (2002), Exhibit 1. (This chart was created by Professor J. Clay Singleton of Rollins College using the algorithm in Anson’s article.)
V. Investor Preferences and Choices

A. Types of Products

- Risk and Loss Aversion
- In a Situation of Surplus or Not

Sources: Chen et al. (2002) and Siegmann and Lucas (2002).
V. Investor Preferences and Choices

B. How to Incorporate Hedge Funds in an Investor’s Overall Portfolio

Six Possible Conceptual Frameworks for Hedge Funds, Part I

<table>
<thead>
<tr>
<th>HOW HEDGE FUNDS SHOULD BE CHARACTERIZED</th>
<th>POTENTIAL IMPLICATIONS FOR MANAGER SELECTION</th>
<th>IMPLICATIONS FOR INSTITUTIONAL ASSET ALLOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Equity Proxies</td>
<td>Want managers who capture the premium of asset class but also curtail downside risk</td>
<td>Replace traditional equity managers with hedge fund managers.</td>
</tr>
<tr>
<td>2. Unconventional Betas/Non-Standard Performance Characteristics</td>
<td>Could decide to only use style-pure managers once factor exposures are defined; Use investable style tracker funds instead of managers; and/or Be careful to not pay high &quot;alpha&quot; fees for what is actually a type of &quot;beta.&quot;</td>
<td>Include unconventional betas in plan's long-term asset allocation modeling. Opens up possibility for tactical style selection. Decide which hedge fund styles are appropriate, given an institution's level of risk and loss aversion.</td>
</tr>
<tr>
<td>3. Alpha Generators/Exploiting Inefficiencies</td>
<td>Emphasis on managers whose performance cannot be linked to major risk factors Manager selection is a bottom-up exercise.</td>
<td>Expectation is that return patterns will be unrelated to asset classes in the core portfolio. Cannot use hedge fund style and index data in asset allocation modeling. For every investor that benefits from exploiting an inefficiency, there must be an investor supplying the inefficiency: Strategies are therefore inherently capacity constrained.</td>
</tr>
</tbody>
</table>

## V. Investor Preferences and Choices

### B. How to Incorporate Hedge Funds in an Investor’s Overall Portfolio (Continued)

#### Six Possible Conceptual Frameworks for Hedge Funds, Part I (Continued)

<table>
<thead>
<tr>
<th>HOW HEDGE FUNDS SHOULD BE CHARACTERIZED</th>
<th>POTENTIAL IMPLICATIONS FOR MANAGER SELECTION</th>
<th>IMPLICATIONS FOR INSTITUTIONAL ASSET ALLOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Traditional Factor Exposures with Additional Returns from Market Segmentation and Liquidity Premia</td>
<td>Manager selection would be part of a top-down approach.</td>
<td>A holistic framework in which all investments are represented in terms of a common set of factors.</td>
</tr>
<tr>
<td>5. Total Return Provision Through a Fund-of-Funds</td>
<td>Emphasis on fund-of-funds or multi-strategy managers. &quot;Style Drift&quot; is acceptable on the part of both managers and the fund-of-funds. Within a fund-of-funds portfolio, rebalancing is not a viable option.</td>
<td>Diversify idiosyncratic operational risk of individual hedge funds. Additional advantage in modeling is as follows: of the hedge fund data that is available, fund-of-fund data have the least biases. Optimal fund-of-fund construction is a responsibility of the fund-of-fund manager, not the plan sponsor.</td>
</tr>
<tr>
<td>6. Unstable Factor Exposures</td>
<td>Hedge Funds can’t be integrated into an institutional framework.</td>
<td>Don’t use hedge funds</td>
</tr>
</tbody>
</table>

## V. Investor Preferences and Choices

### B. How to Incorporate Hedge Funds in an Investor’s Overall Portfolio (Continued)

#### Six Possible Conceptual Frameworks for Hedge Funds, Part II

<table>
<thead>
<tr>
<th>HOW HEDGE FUNDS SHOULD BE CHARACTERIZED</th>
<th>BENCHMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Equity Proxies</strong></td>
<td>Want correlation with S&amp;P but with truncated downside.</td>
</tr>
<tr>
<td></td>
<td>Equity mutual funds</td>
</tr>
<tr>
<td><strong>2. Unconventional Betas/Non-Standard Performance Characteristics</strong></td>
<td>Benchmark is either a linear function of basic factor exposures, or asset-based style factors, or hedge fund styles.</td>
</tr>
<tr>
<td><strong>3. Alpha Generators/Exploiting Inefficiencies</strong></td>
<td>A total-return benchmark</td>
</tr>
<tr>
<td><strong>4. Traditional Factor Exposures with Additional Returns from Market Segmentation and Liquidity Premia</strong></td>
<td>Derived from the factors assumed to drive each hedge fund strategy's returns.</td>
</tr>
<tr>
<td><strong>5. Total Return Provision Through a Fund-of-Funds</strong></td>
<td>Balanced 60/40 Portfolio: But note that this bogey has been difficult to outperform.</td>
</tr>
<tr>
<td><strong>6. Unstable Factor Exposures</strong></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

VI. Conclusion

• We cannot all be exploiters of inefficiencies, providers of insurance, and suppliers of liquidity.

• Therefore, one will need to accept that most investors’ long-term performance will be due to an appropriately designed and executed asset allocation policy.
References


References (Continued)


References (Continued)


Presentation Prepared By Katherine Farren, Premia Risk Consultancy, Inc., farren@premiacap.com