Fund Manager Selection Conference 2013

Risk Shifting and Performance in Equity Portfolios

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Zurich, 25th September 2013

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Outline

• Introduction
• What is Risk Shifting?
• Performance Implications
• Implications for Manager Selection
• Conclusion
Introduction
"Climbing is high risk. But for me, there are intrinsic rewards in this risk—an ability to fill the desire for adventure, which we have 7-Elevened out of our life”

- Conrad Anker
Introduction
Dimensions of risk shifting (1)

• Absolute risk: **Volatility**
Introduction
Dimensions of risk shifting (2)

• Relative risk: Tracking Error

Rolling Tracking Error p.a.
Rolling period: 12 months

Source: PPCmetrics AG
Introduction
Dimensions of risk shifting (3)

- Style risk: **Style drifts** over time (2000 - 2013)

Source: PPCmetrics AG
Introduction
Dimensions of risk shifting (3)

Factor Exposure Global Equity
Rolling period: 24 months

- Value/Growth
- Small/Large
- Momentum
- Volatility


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Introduction
Dimensions of risk shifting (4)

• **Active Share** of Fidelity Magellan fund over time
Introduction
Reasons behind risk shifting (1)

Case #1: “Tournament Behavior”
Mutual funds compete in annual fund tournaments based on year-end performance rankings.

• Investors have a penchant for perceiving patterns ("Hot-Hand” fallacy, 1985)
  – Investors who relied on past information became overly optimistic about stock market winners (Behavioral Finance, DeBondt/Thaler)
  – Investors tend to quickly shift money into funds with stellar performance

• Tournament Hypothesis: Mutual funds try to exploit this behavior. While mid-year winner funds tend to decrease risk to lock in performance, mid-year loser funds increase risk.
**Introduction**
Reasons behind risk shifting (2)

**Case #2: Investment Management Skill**
Skilled fund managers change absolute or relative risk to exploit market opportunities.

- Managers take advantage of market opportunities by **market timing** and/or **stock selection**.
- If fund managers have superior investment skills, this behavior should benefit fund investors.
- There is evidence that some fund managers have investment ability:
  - funds with higher industry concentration (Kacperczyk et al. 2005)
  - funds that deviate more from the benchmark (Cremers 2009)
  - time-varying fund manager skill (Kacperczyk et al. 2011)
Introduction
Reasons behind risk shifting (3)

Case #3: Misaligned Interests
Managers trade to increase portfolio activity and generate transactions. This can result in conflicts of interest between investors and managers.

• Mutual funds engage in opportunistic risk shifting, increase portfolio activity and generate trading costs.
• Investment-bank affiliated mutual funds underperform unaffiliated funds (Hao and Yan 2012).
Introduction
Reasons behind risk shifting (4)

Case #4: Style Drifts of Mutual Funds
Divergence of a mutual fund from its stated investment style or objective.

• **Style drifts** occur intentional (factor timing) or unintentional (stocks change their characteristics).

• Style drifts affect fund investors at different areas:
  – Total risk level of fund may change.
  – The fund’s diversification potential in the context of the overall portfolio may diminish.

• Style drifts can be the result of changing investment opportunities, a new fund management, or increased fund inflows that force the manager to change the strategy.
Introduction
Issues for fund manager selection

- Is risk shifting rational intention or by-product of misaligned interests between investor and manager?

- What are the implications of risk shifting on investment performance?

- What are the economic drivers behind risk shifting?

- How can investors avoid negative implications of risk shifting?
What is Risk Shifting?
What is Risk Shifting?
Mechanics of risk shifting

• A manager can change a fund’s risk level along different dimensions.
• Changes in **asset allocation**
  – Reduce/increase cash holdings
• Change of **systematic risk**
  – shifting from low-beta to high beta stocks
  – Change factor exposures of the fund (size, value, growth, momentum)
• Change in **portfolio concentration**
  – Reduce/increase number of stocks
  – Reduce/increase industry, sector or country concentration
What is Risk Shifting?
Risk Shifting Measure

• There exist different risk shifting measures that measure different aspects.
• In order to capture the “pure” impact of a risk shift, the measure must not be affected by changes in market risk.
• A general risk shifting measure is proposed by Huang et al. (2011).

Risk Shiftung (RS) can be defined as the difference between a fund’s current holdings volatility (ex ante volatility) and its past realized volatility:

\[
\text{Risk Shifting} = \text{Vol}^{\text{CurrentHoldings}} - \text{Vol}^{\text{Realized}}
\]
Quantitative Evaluation of Risk Shifting
Study from Huang, Sialm and Zhang (2011)

• Sample Selection
  – Study on **actively managed US equity mutual funds**.
  – The study covers the time period from **1980 - 2009**.
  – Sample includes **2’979 mutual funds**. The number of funds ranges from 188 (year 1983) to 1’754 (year 2009).

• Methodology
  – The Risk Shifting Measure is calculated **quarterly** for every fund.
  – Each quarter, all funds are grouped into five buckets according to their risk shifting measure (from **bucket 1 = lowest risk shifting measure** to **bucket 5 = highest risk shifting measure**).
  – To analyze the performance impact of risk shifting, the risk-adjusted performance over the next month is calculated for each risk shifting bucket.
Asymmetry in Risk Shifting
Historical evidence

<table>
<thead>
<tr>
<th>RS Portfolio</th>
<th>Risk Shifting Measure</th>
<th>Current Holdings Volatility</th>
<th>Past Realized Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-6.3%</td>
<td>15.6%</td>
<td>22.0%</td>
</tr>
<tr>
<td>2</td>
<td>-1.6%</td>
<td>15.6%</td>
<td>17.3%</td>
</tr>
<tr>
<td>3</td>
<td>0.2%</td>
<td>15.7%</td>
<td>15.6%</td>
</tr>
<tr>
<td>4</td>
<td>2.0%</td>
<td>18.3%</td>
<td>16.3%</td>
</tr>
<tr>
<td>5</td>
<td>6.4%</td>
<td>24.5%</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

- “Positive” risk shifting funds **temporarily increase their risk** above the average risk level.
- “Negative” risk shifting funds **decrease their risk from elevated levels back to average**.

Source: Huang et al. (2011) and PPCmetrics AG
The «Anatomy» of Risk Shifters
Who is risk shifting? (1)

**Risk shifting funds** (both positive and negative) exhibit different characteristics than funds with constant risk levels.

**“Risk shifters”** tend to be younger, smaller and more expensive funds with higher portfolio turnover and transaction costs.

<table>
<thead>
<tr>
<th>RS Portfolio</th>
<th>Risk Shifting (Volatility % p.a.)</th>
<th>Net Assets (USD Mio.)</th>
<th>Age (Years)</th>
<th>Expense Ratio</th>
<th>Portfolio Turn-Over</th>
<th>Relative Trade Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
<td>-6.3%</td>
<td>621</td>
<td>16.6</td>
<td>1.4%</td>
<td>131.6%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>-1.6%</td>
<td>912</td>
<td>18.3</td>
<td>1.2%</td>
<td>86.6%</td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
<td>0.2%</td>
<td>1'211</td>
<td>20.1</td>
<td>1.1%</td>
<td>68.7%</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2.0%</td>
<td>1'011</td>
<td>17.8</td>
<td>1.2%</td>
<td>80.9%</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>6.4%</td>
<td>695</td>
<td>15.9</td>
<td>1.4%</td>
<td>107.9%</td>
</tr>
</tbody>
</table>

Source: Huang et al. (2011) and PPCmetrics AG
The «Anatomy» of Risk Shifters
Who is risk shifting? (2)

<table>
<thead>
<tr>
<th>RS Portfolio</th>
<th>Non-Equity Holdings</th>
<th>Market Beta</th>
<th>Idiosyncr. Volatility</th>
<th>Size Score</th>
<th>Value Score</th>
<th>Momentum Score</th>
<th>Number of Stocks</th>
<th>Industry Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Levels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12%</td>
<td>1.16</td>
<td>3.6%</td>
<td>3.82</td>
<td>2.72</td>
<td>3.33</td>
<td>85</td>
<td>18.6</td>
</tr>
<tr>
<td>2</td>
<td>9%</td>
<td>1.02</td>
<td>2.3%</td>
<td>4.03</td>
<td>2.83</td>
<td>3.20</td>
<td>91</td>
<td>13.6</td>
</tr>
<tr>
<td>3</td>
<td>8%</td>
<td>0.93</td>
<td>2.0%</td>
<td>4.18</td>
<td>2.91</td>
<td>3.11</td>
<td>100</td>
<td>11.7</td>
</tr>
<tr>
<td>4</td>
<td>9%</td>
<td>0.96</td>
<td>2.2%</td>
<td>3.97</td>
<td>2.86</td>
<td>3.17</td>
<td>90</td>
<td>13.3</td>
</tr>
<tr>
<td>5</td>
<td>10%</td>
<td>0.97</td>
<td>2.9%</td>
<td>3.74</td>
<td>2.85</td>
<td>3.25</td>
<td>67</td>
<td>21.2</td>
</tr>
<tr>
<td>Panel B: Changes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6%</td>
<td>-0.29</td>
<td>-1.2%</td>
<td>0.13</td>
<td>0.06</td>
<td>-0.06</td>
<td>4.6</td>
<td>-1.43</td>
</tr>
<tr>
<td>2</td>
<td>1%</td>
<td>-0.10</td>
<td>-0.2%</td>
<td>0.08</td>
<td>0.01</td>
<td>-0.03</td>
<td>4.8</td>
<td>-0.62</td>
</tr>
<tr>
<td>3</td>
<td>-1%</td>
<td>0.01</td>
<td>0.0%</td>
<td>0.04</td>
<td>-0.02</td>
<td>-</td>
<td>4.2</td>
<td>-0.35</td>
</tr>
<tr>
<td>4</td>
<td>-3%</td>
<td>0.11</td>
<td>0.3%</td>
<td>0.02</td>
<td>-0.03</td>
<td>0.02</td>
<td>2.2</td>
<td>-0.02</td>
</tr>
<tr>
<td>5</td>
<td>-5%</td>
<td>0.30</td>
<td>1.2%</td>
<td>-0.04</td>
<td>-0.06</td>
<td>0.03</td>
<td>1.0</td>
<td>1.39</td>
</tr>
</tbody>
</table>

• Levels: Average over the prior 3 years.
• Changes: Difference between the most recent characteristic and the average characteristic.

Source: Huang et al. (2011) and PPCmetrics AG
The «Anatomy» of Risk Shifters
How does risk shifting take place?

• Clear pattern between risk shifting funds and funds with constant risk level.

• Risk shifting funds tend to
  … hold more cash
  … exhibit higher systematic and idiosyncratic risk
  … be less diversified (less stocks, higher industry concentration)

• Risk shifting takes place at different dimensions, by means of
  … changing cash quota
  … changing systematic risk (beta, market sensitivity of the portfolio)
  … changing factor exposures (size, value, momentum)
  … changing portfolio concentration (country, industry or securities)
Performance Implications
## Performance Implications

### Monthly risk-adjusted returns

- “Negative” risk shifting has **no performance implications**.
- “Positive” risk shifting leads to statistically significant **negative risk-adjusted performance**.
- The performance pattern is **robust across different performance measures**.

### Table: Risk Shifting and Performance

<table>
<thead>
<tr>
<th>RS Portfolio</th>
<th>Risk Shifting (Volatility % p.a.)</th>
<th>Active Returns</th>
<th>Risk-adjusted Performance (Alpha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CAPM</td>
</tr>
<tr>
<td>1</td>
<td>-6.3%</td>
<td>-0.09%</td>
<td>-0.09%</td>
</tr>
<tr>
<td>2</td>
<td>-1.6%</td>
<td>-0.03%</td>
<td>0.00%</td>
</tr>
<tr>
<td>3</td>
<td>0.2%</td>
<td>-0.04%</td>
<td>0.00%</td>
</tr>
<tr>
<td>4</td>
<td>2.0%</td>
<td>-0.05%</td>
<td>-0.05%</td>
</tr>
<tr>
<td>5</td>
<td>6.4%</td>
<td>-0.26%</td>
<td>-0.30%</td>
</tr>
</tbody>
</table>

Source: Huang et al. (2011) and PPCmetrics AG
**Performance Implications**  
Alternative risk shifting measures – monthly returns

<table>
<thead>
<tr>
<th>Risk Measure</th>
<th>Absolute Risk (Volatility)</th>
<th>Asset Allocation</th>
<th>Systematic / Idiosyncratic</th>
<th>Active Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RS Portfolio</strong></td>
<td>All Holdings</td>
<td>Equity Holdings</td>
<td>Proportion Non-Equity Positions</td>
<td>CAPM Beta</td>
</tr>
<tr>
<td>1</td>
<td>-0.06%</td>
<td>-0.03%</td>
<td>-0.05%</td>
<td><strong>-0.21%</strong></td>
</tr>
<tr>
<td>2</td>
<td>-0.02%</td>
<td>-0.06%</td>
<td>-0.05%</td>
<td>-0.03%</td>
</tr>
<tr>
<td>3</td>
<td>-0.05%</td>
<td>-0.04%</td>
<td>-0.05%</td>
<td>-0.04%</td>
</tr>
<tr>
<td>4</td>
<td>-0.08%</td>
<td>-0.13%</td>
<td>-0.09%</td>
<td>-0.04%</td>
</tr>
<tr>
<td>5</td>
<td><strong>-0.29%</strong></td>
<td><strong>-0.23%</strong></td>
<td><strong>-0.10%</strong></td>
<td><strong>-0.13%</strong></td>
</tr>
</tbody>
</table>

Source: Huang et al. (2011) and PPCmetrics AG

- Underperformance is caused by “negative” risk shifting only.
- This performance pattern is **robust across different risk shifting measures**.
Implications for Manager Selection
### Economic Drivers of Risk Shifting
Fund characteristics and performance impact

<table>
<thead>
<tr>
<th>RS Portfolio</th>
<th>Prior Year Fund Performance</th>
<th>Active Share</th>
<th>Industry Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>1</td>
<td>62%</td>
<td>38%</td>
<td>39%</td>
</tr>
<tr>
<td>2</td>
<td>52%</td>
<td>48%</td>
<td>51%</td>
</tr>
<tr>
<td>3</td>
<td>48%</td>
<td>52%</td>
<td>58%</td>
</tr>
<tr>
<td>4</td>
<td>48%</td>
<td>52%</td>
<td>46%</td>
</tr>
<tr>
<td>5</td>
<td>45%</td>
<td>55%</td>
<td>33%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probabilities</th>
<th>Risk-adjusted Performance</th>
<th>RS Portfolio</th>
<th>Prior Year Fund Performance</th>
<th>Active Share</th>
<th>Industry Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.06%</td>
<td>0.11%</td>
<td>0.00%</td>
<td>-0.17%</td>
<td>-0.10%</td>
</tr>
<tr>
<td>2</td>
<td>-0.06%</td>
<td>0.04%</td>
<td>-0.09%</td>
<td>-0.14%</td>
<td>-0.07%</td>
</tr>
<tr>
<td>3</td>
<td>-0.06%</td>
<td>-0.02%</td>
<td>-0.07%</td>
<td>-0.12%</td>
<td>-0.07%</td>
</tr>
<tr>
<td>4</td>
<td>-0.12%</td>
<td>-0.01%</td>
<td>-0.13%</td>
<td>-0.09%</td>
<td>-0.07%</td>
</tr>
<tr>
<td>5</td>
<td>-0.39%</td>
<td>-0.08%</td>
<td>0.03%</td>
<td>-0.29%</td>
<td>-0.14%</td>
</tr>
</tbody>
</table>

Source: Huang et al. (2011) and PPCmetrics AG
Popular Conjectures Revisited

• “Tournament” Hypothesis (e.g. Chevalier und Ellison 1996)
  – No evidence for hypothesis that “loser”-funds increase risk while “winner”-funds decrease risk
  – Risk shifting has only a negative performance impact for funds with inferior performance in the past year.

• More active funds exhibit superior performance (Cremers and Petajisto 2009)
  – Funds with high active share are more affected by negative risk shifting implications

• Funds with high industry concentration exhibit superior performance (Kacperczyk et al. 2005)
  – Funds with high industry concentration are more affected by negative risk shifting implications
Risk Shifting and Manager Selection
Take aways (1)

• On average, risk shifting is associated with a negative performance impact. There is no evidence that changing a fund’s risk level in order to exploit market opportunities results in superior performance.
  ▶ Avoid funds that engage in risk shifting

• Risk shifting funds are characterized by high portfolio turnover and expense ratio, two easy observable measures in the selection process.

• The empirical finding that funds with high portfolio turnover and transaction costs are negatively affected by risk shifting also suggests that risk shifting is the result of principal-agent issues.
  ▶ Select funds with state-of-the-art governance structures
Risk Shifting and Manager Selection
Take aways (2)

• Style drifting and risk shifting are closely related. Risk shifting is also done by changing factor exposures.
  ▶ Select style consistent funds

• There is no empirical evidence on the long-term performance implications of risk shifting.

• Once a manager is selected, monitor risk and factor exposures, not just performance!
Risk Shifting in Equity Portfolios

Conclusion

- Risk shifting has a negative performance impact for funds that increase risk but not for funds that decrease risk.
- Overall, risk shifting seems to be the result of inferior timing and stock selection abilities as well as misaligned interests between investors and managers.
- “Risk shifters” tend to be younger, smaller, more active and expensive funds with higher portfolio turnover and transaction costs.
- The real intention behind risk shifting is difficult to capture. However, risk shifting funds have clear characteristics which can be used in the manager selection process.
Literature (1)


