Comparing BL and Markowitz

**Input Summary**

<table>
<thead>
<tr>
<th>Covariance Matrix 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0019 0.0003 0.0006</td>
</tr>
<tr>
<td>0.0003 0.0011 0.0002</td>
</tr>
<tr>
<td>0.0006 0.0002 0.0014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benchmark Asset returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
</tr>
<tr>
<td>0.01</td>
</tr>
<tr>
<td>0.01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk aversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tau</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benchmark weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.16666667 A</td>
</tr>
<tr>
<td>0.5 B</td>
</tr>
<tr>
<td>0.33333334 C</td>
</tr>
<tr>
<td>wf 0 Rf</td>
</tr>
<tr>
<td>Sum 1.00000001</td>
</tr>
</tbody>
</table>
Monte Carlo Approach

500 000 views are generated through random draws from normal distributions of mean 1% ($\Pi$) and volatilities 4.4%, 3.3% and 3.7% ($\Sigma$) for A, B and C, pairs (A,B), (B,C) and (A,C), and triplet (A,B,C) with and without uncertainty.
Monte Carlo Approach

On average Markowitz closer to the benchmark!
Monte Carlo Approach

On average Markowitz closer to the benchmark!
Monte Carlo Approach

BLACK-LITTERMAN MINUS MARKOWITZ WEIGHT DISTANCE TO BENCHMARK DISTRIBUTION
NO uncertainty, 3 views out of 3 assets, 500001 draws

Markowitz = Black Litterman
Monte Carlo Approach

Markowitz sells short and borrows less on average
Monte Carlo Approach

Markowitz sells short and borrows less on average.
Monte Carlo Approach

Markowitz = Black Litterman
Monte Carlo Approach

Return variance: Markowitz dominates Black-Litterman
Monte Carlo Approach

Utility: Markowitz dominates Black-Litterman
Monte Carlo Approach

Sharpe ratio: Markowitz dominates Black-Litterman
Monte Carlo Approach

Now with uncertainty in views:  
Same dominance
Monte Carlo Approach

On average Markowitz closer to the benchmark!
Monte Carlo Approach

On average Markowitz closer to the benchmark!
Monte Carlo Approach

On average
Black Litterman
closer to
benchmark!
Monte Carlo Approach

Markowitz sells short and borrows less on average
Monte Carlo Approach

Markowitz sells short and borrows less on average
Monte Carlo Approach

Black Litterman sells short and borrows less on average
Monte Carlo Approach

Now with uncertainty in views:
Same dominance
Monte Carlo Approach

Now with uncertainty in views:
Same dominance
Monte Carlo Approach

Now with uncertainty in views:
Same dominance
Conclusion

• **Big surprise:** on average Black Litterman beaten by Markowitz from weighting stability standpoint!

  despite favorable $\delta$ (= 15)

• Has **only average modest advantage** when all assets are forecasted

• In all cases **risk, Sharpe and utility deterministic dominance** by Markowitz
Further Research

Heuristic analysis of the performance of the risky component of BL solution portfolio