Overlay management for an ETF portfolio: methodology and application

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ETFs have become a popular tool for asset allocation as they provide cost efficient exposure to a broad range of asset classes and markets. By implementing a systematic overlay management to an ETF portfolio, the underlying market price risks can be managed actively via a multi-model framework.

**Key benefits from combining an ETF portfolio with an active overlay management**

The portfolio participates in increasing ETF prices as no hedging will be applied in times of rising markets. A systematic overlay management provides protection against significant negative market movements leading to improved returns compared to classic ‘long-only’ strategies.

**Construction and monitoring of a systematic decision making architecture**

In general, overlay management can be described as risk management. The decision to reduce risk in a portfolio is in our case implemented by a purely systematic multi-model framework. Exhibit 1 provides an overview on how such a decision-making architecture can be constructed and monitored.

Using a systematic approach intends to ensure high consistency and repeatability of all decisions made. In principal, discretionary interventions are prohibited and key-man risks can be eliminated.

As different models are used, various market anomalies can be systematised and exploited so that a trend behaviour in different time clusters (short, medium and long term) can be modelled.

The multi-model architecture implements latest findings in behavioural finance studies. Applying suitable models for each time cluster results in increased stability of generated returns and reduced volatility of the aggregated position.

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Constructing a multi-model framework we focus on developing quantitative models (awarded with the Paul Julius Reuters Innovation Award) on the one hand and choose models from external model providers applying a detailed due diligence process (quantitative scoring) on the other hand. As a result we identified three models for each asset class that fit best to managing market price risks of the underlying ETFs. The majority of our models are trend following while we also use models that are trend anticipating and applicable in unfavourable range markets. The three models can be distinguished by trade sensitivity, trade frequency, conditions and input data. All models have a portfolio weight of one-third (naively distributed).

While dealing with a quantitative multi-model architecture, risk management is of utmost importance. It is therefore necessary to continuously oversee each model’s applicability and apply plausibility checks for the generated returns. Furthermore, it is important to apply a constant monitoring of each model's performance.

Source: Berenberg Bank
Model positioning and portfolio duration

<table>
<thead>
<tr>
<th>Passive underlying</th>
<th>+</th>
<th>Overlay portfolio</th>
<th>=</th>
<th>Portfolio duration (duration management)</th>
</tr>
</thead>
<tbody>
<tr>
<td>95% German government bonds (Duration: approx. 7.8 years)</td>
<td>+</td>
<td>Two models long or neutral; one model short</td>
<td>=</td>
<td>66.6% duration of underlying bond portfolio</td>
</tr>
<tr>
<td>5% cash</td>
<td>+</td>
<td>One model long or neutral; two models short</td>
<td>=</td>
<td>33.3% duration of underlying bond portfolio</td>
</tr>
<tr>
<td></td>
<td>+</td>
<td>All three models short</td>
<td>=</td>
<td>Duration of 0 years</td>
</tr>
</tbody>
</table>

Source: Berenberg Bank

and risk structure as well as to constantly watch out for structural changes and paradigm shifts in the respective market segment. Another dimension of risk management is the implementation of best execution procedures. For risk management purposes highly liquid and cost efficient futures are used when executing the model’s signals. Due to state-of-the-art trading algorithms, slippage costs can thus be reduced to a minimum.

Combining a passive portfolio of ETFs with an active, future based overlay management

In the example shown below, a systematic decision making architecture is implemented into a ‘balanced’ portfolio consisting of ETFs and cash. Exhibit 2 provides an overview of the portfolio’s asset allocation.

Both equity and fixed income allocations are reproduced with ETFs. A cash quota is needed for future margin and buffering of draw downs.

The systematic, model based decision making architecture consists of three models for equity and fixed income respectively. The short-term model has a higher sensitivity (hourly) and intensity (40-50 signals a year) which makes it more responsive to sharp and sudden market movements. On the other end of the range, long-term models are suitable for modelling the market behaviour of long-term oriented investors.

For the fixed income portion of the portfolio, overlay management can be described with duration management. The systematic decision making architecture has been designed to generate explicit ‘long’ and ‘short’ signals for the EURO BUND future. Interpreting these signals the portfolio’s duration is reduced on every ‘short’ signal by selling BUND futures while it is increased by unwinding these short-positions on a long signal. If all models generate ‘long’ or ‘neutral’ signals no hedging will be applied, leading to an equal duration of both the portfolio and the defined benchmark.
If one of the models switches to a ‘short’ signal the duration of the bond portfolio is to be reduced by one-third (portfolio duration would then be two-thirds of the benchmark's duration). If a second model generates a ‘short’ signal the duration of the bond portfolio will be shortened by a further third (portfolio duration will then be one-third of the benchmark's duration). Finally, if all models are ‘short’ positioned, the bond portfolio would have a duration of zero (money market), as shown in Exhibit 3.

For the equity share of the ETF portfolio overlay management means beta management and hence equity exposure as shown in Exhibit 4.

As a result, the balanced portfolio combined with overlay management improves performance compared to a ‘long only’ benchmark. The performance characteristics also change, as the overlay transfers returns into the positive and protects from ‘negative tails’.

**Conclusion**

Reproducing a passive underlying with ETFs provides cost-efficient exposure to bond and equity markets. The quantitative investment process of active overlay management determines investment degree and asset allocation which leads to improved risk adjusted performance compared to 'long only' benchmarks.

**Note:**
1. Real Money Performance of balanced strategy with overlay management from January 1, 2002 to November 30, 2008 +46.20% compared to +27.97% ‘long only benchmark’ consisting of 60% German government bonds with duration of 7.8 years, -20% Dax and 20% EuroStoxx50 RI.

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