

## The management of hedge fund portfolios during crisis periods: the contribution of systematic overlays

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### Summary

*In this focus, we show that the implementation of systematic overlays can be considered as an alternative to short-term rebalancing of hedge fund portfolios, or as an active component of alternative allocations. By applying our model of systematic overlay on the Global HFRI index over the period January 2008 - August 2011, we show that:*

- *the annualized performance of the benchmark portfolio is improved by 4.4%, the cumulative increase in performance over the period is estimated at 15%;*
  - *the volatility level is reduced by 2%;*
  - *the maximum drawdown is divided by 2.5 ;*
  - *the return distribution is « normalized », i.e. skewness and excess kurtosis are estimated around 0 v.s. negative skewness and significant excess kurtosis without the overlay.*
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## Why overlays?

During transition periods - from growth to risky environment - it is not straightforward to manage the risks carried by alternative allocations. This is especially the case for hedge fund allocations, which exhibit low level of liquidity (quarterly or monthly at best) and which exhibit significant inertia. In the case of UCITS or managed account allocations which are more liquid, market risk management can be tricky in the short term. Beyond the liquidity issue, large scale rebalancing can cause operational issues: significant concentration of the allocation in certain investment styles, frequent in and outs can be problematic with certain managers, exiting from closed funds...

The implementation of overlays can be a good alternative to large scale rebalancing. This type of hedging technique lies on the identification of the systematic risks embedded by the underlying funds, and by the implementation of effective hedges with liquid instruments (future contracts). The first advantage of this approach is that it allows the investor to keep its allocation unchanged. The hedge can then be triggered, waiting the confirmation of a trend which would validate the reallocation of the portfolio. The second advantage is that this approach does not require high amounts of cash (deposit x beta). Finally, the overlay can be priced in real time and be liquidated at anytime.

### Discretionary vs. systematic overlays

In addition to the problems inherent to the identification of the risk exposures and the choice of hedging instruments, the timing of the trigger of the overlay is a central issue. Two options are available to investors and multi-managers. The first is based on the discretionary trigger of the overlay, depending on the investor views. From our point of view, this solution is not efficient, because medium term views are already reflected in the tactical allocation. The second approach is based on the use of a systematic signal to trigger the overlay. The major advantages of the latter are the objectivity of this approach and the ability to set up contrarian views.

### Implementation

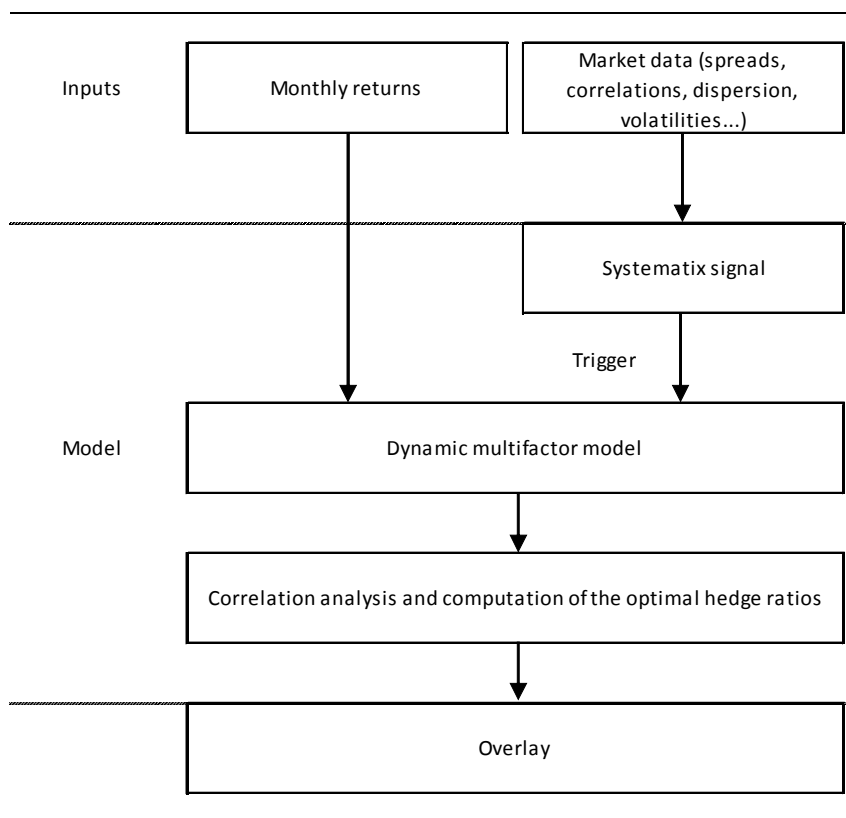
The overlay process requires the use of specific quantitative tools:

- a risk signal, which takes into account standard risk metrics (volatilities, credit spreads), but also second order risk metrics (dispersion, cross-asset correlation...);
- a multifactor style analysis model, designed to identify the pertinent risk factors for each underlying fund, to take into account changes in risk exposures (tactical allocation, style drift...) and which allows the non-linearity of the underlying risk structure.

*See « A Dynamic Style Analysis Model for Hedge Funds », Research paper, Orion Financial Partners, 2011 and « A Non-Parametric Test of Market Timing for Hedge Funds: Beyond Alpha and Beta », Research paper, Orion Financial Partners, 2011.*

- a transition matrix which links the identified risk factors with hedging instruments.

## Implementing an overlay



### Limits and risks

- In the case of poor market timing, the (non-)trigger of the risk signal can be a source of loss. Note however that in the case in which the overlay is not triggered when needed, the performance of the portfolio will not be affected. At the opposite, i.e. if the overlay is triggered in the wrong timing, the performance of the portfolio will be cut from a part of its systematic component. In that case, alpha will not be affected.
- The quantitative analysis of the risk factors may imply a miss-specification of the risks to hedge.
- Certain risks can only be partially hedged (high yield debt, emerging equities, commodities...).
- The changes in risk exposures imply that the computed hedge ratios can diverge significantly from optimal hedge ratios.
- Specific risks (i.e. independent from market risks) cannot be identified, nor hedged. As a consequence, overlays are not efficient when applied to strategies which exhibit no or limited exposures to systematic risks (especially relative value strategies).

## Example: implementation of a systematic overlay on the HFRI Global index, from January 2008 to August 2011

### Assumptions

- To reflect delays in performance reporting (end of month + 20 days on average), the overlay in month  $t$  will be implemented from exposures calculated two months earlier, in  $t-2$ .
- The hedge signal used is derived from the Orion Risk Index. The observation of a hedging signal in day  $j$  implies the trigger of the overlay 2 days later, in  $j+2$ .
- In this example, the overlay is designed to hedge equity market risk only. Interest rates, credit, FX and commodities exposures will not be hedged.
- Hedging instruments are S&P500 future contracts, the hedge ratios  $\gamma_{i,t}$  to other equity markets (small caps, Euro or emerging equities) will be written  $\gamma_{i,t} = \beta_{i,t} \beta_{i,t}^{SP500}$ , with  $\beta_{i,t}^{SP500}$  being the exposure of beta market  $i$  to the S&P500 index.

Chosen assumptions are not optimal, but they provide a simple and very conservative example. Indeed, the quality of the overlay could be significantly improved by (i) estimating the risk structure of the allocation from the performances of individual funds (vs. the performance of the portfolio, the index here), (ii) considering a wider range of hedging instruments, (iii) reducing the delay between the estimation of the model and the implementation of the overlay (2 months here), or by considering funds with higher reporting frequency.

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### Results

During the period January 2008 - August 2011, our systematic signal triggered 3 times:

- from the beginning of the period to April 08, 2009. Performance of the overlay: +15% ;
- from May 20, 2010 to September 21, 2010. Performance of the overlay: -1.8% ;
- from July 19, 2011 to today. Performance of the overlay: +2.3%.

The implementation of the overlay implies:

- an **outperformance over the benchmark portfolio** (HFRI Global Index) of 15% over the period (**Figure 2.A-B**) and an increase in the annualized return of over 4.4%;
  - a **significant reduction of the volatility level**, from 8.2% to 6.2%, and a significant reduction of the VaR, from -4.5% to -3%;
  - a **huge decrease in the maximum drawdown** (from -20.1% to -8.3%, **figure 2.C**);
  - a « **normalization** » of the return distribution: skewness and excess kurtosis around 0, vs. negative skewness and significant excess kurtosis without the implementation of the overlay (**figure 2.D - table 2**).
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**Table 2: Statistics (January 2008 - August 2011)**

	HFRI Global	Overlay hedged
Rendement moyen annualisé	1.8%	6.2%
Volatilité	8.2%	6.2%
Ratio de Sharpe	0.10	0.85
VaR (95%, 1 mois)	-4.5%	-3.0%
Skewness	-0.77	0.05
Kurtosis	4.32	2.95
CVaR	-6.5%	-3.1%
Max DD	-20.1%	-8.3%

**Figures 2-A à 2-D: Impact of the implementation of a systematic overlay on the HFRI Global index**

