

FundCreator and the Reference Portfolio

FundCreator designs futures trading strategies that generate returns with predefined statistical properties, including the dependence with the reference portfolio, i.e. the portfolio with respect to which dependence is measured. In most applications the reference portfolio will be the investor's existing portfolio. This brings up the question how much the bottom line result depends on the reference portfolio. In other words, to what extent do investors who start off with different reference portfolios end up with significantly different results? In this brief note we answer this question.

The Set-Up

Since FundCreator strategies will typically be used to diversify a larger, more traditional portfolio, we take the reference portfolio to consist of three different mixes of S&P 500 and T-bond futures. More specifically, we look at a 20/80, 50/50 and 80/20 mix. Doing so, we assume that throughout the reserve asset consists of an equally-weighted portfolio of 3-month Eurodollar, 5-year note, 10-year note, S&P 500, Russell 2000 and GSCI futures, where, to compensate differences in volatility, we leverage the Eurodollar and 5-year note by a factor 5, and the 10-year note by a factor 4.

We study 3 significantly different cases: (1) replication of the HFRI Equity Market Neutral index, (2) replication of the HFRI Long-Short index, and (3) creation of a Zero-Correlation Fund. Case (1) and (2) correspond to what we did earlier in Kat and Palaro (2006b), while case (3) is taken from Kat and Palaro (2006a). Since the results could depend on the level of transaction costs and the rebalancing frequency, we allow the bid-offer spread to take on values of 0bp, 4bps, and 14bps, while rebalancing either daily, once every 2 days or once every 3 days.

Results

Table 1 shows the sample properties of the replicated returns on the HFRI Equity Market Neutral index for reference portfolios consisting of a 50/50 and 80/20 mix of T-bonds and S&P 500 over the period March 1999 – October 2006. The results for a 20/80 mix are very similar and therefore not reported.

	50/50 Reference Portfolio				80B/20E Reference Portfolio			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
HFRI EMN Index	6.26%	2.92%	0.60	-0.01	6.26%	2.92%	0.60	0.07
Synthetic 0bps, daily	6.79%	2.98%	0.22	-0.06	6.38%	2.88%	0.04	0.04
Synthetic 4bps, daily	6.75%	2.98%	0.20	-0.06	6.33%	2.88%	0.04	0.04
Synthetic 14bps, daily	6.65%	2.97%	0.19	-0.06	6.18%	2.88%	0.04	0.04
Synthetic 0bps, 2 daily	6.83%	3.00%	0.20	-0.07	6.43%	2.88%	0.07	0.04
Synthetic 4bps, 2 daily	6.81%	2.99%	0.19	-0.07	6.40%	2.88%	0.08	0.04
Synthetic 14bps, 2 daily	6.77%	2.99%	0.18	-0.07	6.36%	2.88%	0.07	0.04
Synthetic 0bps, 3 daily	6.65%	2.98%	-0.01	-0.07	6.43%	2.88%	0.07	0.05
Synthetic 4bps, 3 daily	6.64%	2.98%	-0.01	-0.07	6.41%	2.88%	0.07	0.05
Synthetic 14bps, 3 daily	6.60%	2.98%	-0.02	-0.07	6.36%	2.88%	0.06	0.05

Table 1: Sample properties HFRI Equity Market Neutral index and synthetic fund returns over the period March 1999 - October 2006.

From table 1 we see that for either reference portfolio the volatility and correlation of the synthetic fund match those of the index almost exactly. The means are quite similar as well. Comparing the results for different bid-ask spreads it appears that the 80/20 case requires a little more trading than the 50/50 case though, as the mean drops slightly faster for the 80/20 than the 50/50 portfolio when the bid-ask spread increases.

	50/50 Reference Portfolio				80B/20E Reference Portfolio			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
HFRI L-S Index	11.48%	10.68%	0.88	0.57	11.48%	10.68%	0.88	0.15
Synthetic 0bps, daily	13.55%	11.26%	1.13	0.61	15.30%	11.31%	0.92	0.14
Synthetic 4bps, daily	13.48%	11.26%	1.13	0.61	15.08%	11.31%	0.92	0.14
Synthetic 14bps, daily	13.18%	11.25%	1.13	0.65	14.50%	11.29%	0.91	0.14
Synthetic 0bps, 2 daily	13.10%	11.25%	1.15	0.61	12.93%	11.03%	0.66	0.13
Synthetic 4bps, 2 daily	13.04%	11.25%	1.15	0.61	12.81%	11.02%	0.66	0.13
Synthetic 14bps, 2 daily	12.86%	11.25%	1.15	0.61	12.56%	11.02%	0.66	0.13
Synthetic 0bps, 3 daily	12.78%	11.24%	1.14	0.61	13.61%	11.10%	0.71	0.14
Synthetic 4bps, 3 daily	12.73%	11.24%	1.14	0.61	13.54%	11.10%	0.71	0.14
Synthetic 14bps, 3 daily	12.65%	11.24%	1.14	0.61	13.32%	11.09%	0.71	0.14

Table 2: Sample properties HFRI Long-Short index and synthetic fund returns over the period March 1999 - October 2006.

Table 2 shows the sample properties of the replicated returns on the HFRI Long-Short index. Despite the much higher volatility of this index, the results for both reference portfolios are again very similar. In both cases the standard deviation, skewness and correlation of the synthetic fund almost exactly match those of the index. Again, we see that the 80/20 case requires more trading than the 50/50 case, as the drop in mean due to a higher bid-offer spread is slightly more pronounced in the 80/20 case.

	50/50 Reference Portfolio				80B/20E Reference Portfolio			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
Synthetic 0bps, daily	13.28%	11.50%	0.11	0.04	15.32%	11.84%	-0.14	-0.03
Synthetic 4bps, daily	13.13%	11.50%	0.11	0.04	15.08%	11.83%	-0.14	-0.03
Synthetic 14bps, daily	12.66%	11.49%	0.11	0.04	14.50%	11.82%	-0.14	-0.03
Synthetic 0bps, 2 daily	13.83%	11.43%	0.08	0.03	15.26%	11.80%	-0.18	-0.05
Synthetic 4bps, 2 daily	13.75%	11.43%	0.08	0.03	15.15%	11.80%	-0.18	-0.05
Synthetic 14bps, 2 daily	13.52%	11.43%	0.07	0.03	14.88%	11.79%	-0.18	-0.05
Synthetic 0bps, 3 daily	12.84%	11.28%	-0.07	0.04	15.62%	11.81%	-0.18	-0.05
Synthetic 4bps, 3 daily	12.77%	11.28%	-0.07	0.04	15.54%	11.80%	-0.18	-0.05
Synthetic 14bps, 3 daily	12.63%	11.28%	-0.07	0.04	15.33%	11.80%	-0.18	-0.05

Table 3: Sample properties Zero Correlation Fund returns over the period March 1999 - October 2006.

Finally, table 3 shows the results for the Zero Correlation Fund. The target in this case is to generate normally distributed returns with 12% volatility and zero correlation with the reference portfolio. Although the means for the two reference portfolios are somewhat different, the standard deviation, skewness and correlation results match the target very well in both cases. Again, the 80/20 reference portfolio seems to require more trading than in the 50/50 case, as the mean drops slightly faster when the bid-ask spread increases.

Conclusion

FundCreator strategies are robust with respect to the choice of reference index. This means that results obtained with one reference portfolio will typically be a good indication for what can be expected with other reference portfolios as well. Whenever differences arise, this is most likely to be in the mean return, not the risk profile. The reason for this is that FundCreator explicitly targets the risk profile of the returns to be generated but leaves it to the capital markets to generate the accompanying mean. Although in the longer-run risk and return will go hand in hand, this need not necessarily be the case over a shorter period of time.

References

Kat, H. and H. Palaro, Tell Me What You Want, What You Really, Really Want! An Exercise in Tailor-Made Synthetic Fund Creation, Alternative Investment Research Centre Working Paper 36, Cass Business School, 2006a.

Kat, H. and H. Palaro, Hedge Fund Indexation the FundCreator Way. Alternative Investment Research Centre Working Paper 38, Cass Business School, 2006b.