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**HEDGE FUND INDEXATION THE
FUNDCREATOR WAY**

Efficient Hedge Fund Indexation without Hedge Funds

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Abstract

Disappointing performance is leading hedge fund investors to look for cheaper alternatives. Hedge fund indexation has been suggested as a possible solution. Unfortunately, investable hedge fund indices are nothing more than funds of funds in disguise, with performance similar or even worse than real funds of funds. The core problem of hedge fund indexation is that as long as one still invests in hedge funds, the cost factor that indexation is meant to eliminate will still be there. In this paper we use our FundCreator technology to generate returns with statistical properties very similar to those of hedge fund indices, but without actually investing in hedge funds. The proposed strategies only trade liquid futures contracts and therefore not only offer investors an accurate replica, but at the same time solve many other problems typically surrounding hedge fund investments, such as illiquidity, lack of transparency, limited capacity, etc.

Introduction

Over the past 20 years, indexation of equity portfolios has become very popular with institutional as well as private investors. Strongly advocated by big names from academia as well as the industry, such as Princeton's Burton Malkiel and Vanguard's John Bogle, assets under management by index funds have grown from almost negligible in 1976, when the first index fund was introduced, to several trillions of dollars now. It is estimated that (excluding closet-indexers) currently 40% of institutionally managed assets are indexed, with US institutions quite far ahead of the rest of the world.

The idea behind indexation is simple. Casual observation as well as large-scale academic research shows that the added value of traditional alpha chasing tends to be negative. Put simply, most traditional active managers are unable to earn back the fee that they charge their investors. This means that hiring these managers is counter-productive. On balance they will reduce the after-fee return. The above observation has led many investors to abandon every form of security analysis and active trading altogether. They just buy and hold the market in the form of some index-replicating portfolio.

Of course, indexation is not without problems either. As argued in Kat (2003), the most important is the fact that there is no logical reason why an investor who thinks that active managers cannot justify their fees should buy and hold the index. Indices are created to reflect the overall movement of the market, not to be good investments. The stocks in the major stock market indices are not selected based on their risk-return profile but simply on market capitalization. Stocks come and go and their weights within the index change continuously. As a result, the risk-return characteristics of the index can change substantially over a short period of time. The name stays the same, but the risk-return properties of the underlying portfolio don't.

The rise of indexation over the past 20 years resulted from investors becoming aware of and admitting to the fact that the costs of traditional active management often exceed the value added. *A similar process is currently underway in the alternative investment, and especially the hedge fund industry, where fees tend to be a multiple of*

what they are in traditional investment management. More and more hedge fund investors are realizing that the days of the double digit returns that attracted them to the asset class are long gone. The golden goose has not produced any eggs for quite a while! The HFRI Fund of Funds Composite Index for example, returned 4.07% in 2000, 2.8% in 2001, 1.02% in 2002, 11.61% in 2003, 6.86% in 2004, 7.49% in 2005 and so far until October 2006 no more than 6.52%. Other well-known indices show a similar picture. Recent academic studies of hedge fund performance¹ confirm the above observation and clearly indicate that there is nothing special about hedge fund performance anymore.

Given the above, and very similar to what has happened in traditional investment management, more and more investors are currently looking to improve their after-fee return by cutting costs. This brings us to the concept of hedge fund indexation. There are many different hedge fund indices around these days, so why not simply buy one of those, just as one does for stocks and bonds? Unfortunately, there are several reasons why this is going to be problematic:

1. As hedge fund managers seldom report to more than 2 databases, different indices cover different subsets of the hedge fund universe. This makes choosing an index to invest in far from trivial.
2. Some of the better-known hedge fund indices contain over 1000 individual hedge funds. Some contain even more than 2000 funds. In addition, most index providers do not explicitly list their index's components, which means it is impossible to find out what funds to actually invest in.
3. Most hedge fund indices contain a large number of funds that are closed for new, and sometimes even existing, investors. Also, most funds are highly illiquid due to lock-ups and notice periods. This makes any periodic rebalancing of an index-replicating portfolio highly problematic.

¹ See for example Kat and Palaro (2006a, 2006b).

4. Most hedge fund administrators take a couple of weeks to work out the end-of-month NAV. This means that an index-replicating portfolio can only be rebalanced with a very significant delay.
5. Buying a hedge fund index will only allow one to eliminate the fund of funds manager's fee, but not the fees of the underlying hedge fund managers, which tend to be twice as high.

As a result of the above, the majority of existing hedge fund indices are simply not investable. Recently, several high profile index providers have attempted to solve this problem by introducing what they refer to as 'investable' hedge fund indices.² Unfortunately, the latter are nothing more than (more or less mechanically managed) funds of funds in disguise. Roughly speaking, investable hedge fund indices result from a joint venture between an index provider and a fund of funds manager. First, the manager puts together a portfolio of funds, in line with a number of criteria with respect to track record,³ liquidity, valuation, transparency, capacity, etc. Subsequently, the index provider declares that portfolio to be the index. Apart from the obvious commercial incentive, the problem with investable indices is that there are not many hedge funds that fit all applicable criteria. As a result, investable indices are even less representative of the hedge fund universe than their non-investable counterparts.

The main problem with all existing hedge fund indexation schemes is that they still require investors to invest in hedge funds, which leaves the main cost factor, i.e. managers' fees, unaffected. Obviously, this is not a satisfactory solution for investors looking for a cheaper alternative. *To eliminate hedge fund managers' fees we need to find a way to obtain hedge fund index-like returns without actually investing in hedge funds.* This may sound farfetched, but actually it can be done with remarkable ease. This is what we discuss in the next section.

² It is estimated that currently around \$15 billion of the total \$1200 billion invested in hedge funds is index-linked in some way.

³ Since indices are big business these days, there appears to be a tendency for providers of investable indices to initially only include funds with good track records. Since there is little or no persistence in hedge fund returns, this explains why the actual performance of some investable indices has been so much worse than their pro-forma historical performance. In addition, investable indices have not outperformed the average fund of funds, which is not surprising as they are funds of funds themselves.

The FundCreator Approach to Hedge Fund Indexation

Before we move on, we need to take a step back and ask ourselves why exactly investors are so keen on indexation. Investors' fascination with indexation is driven by a desire to cut costs and improve after-fee returns. Although they want lower costs, they still want a risk profile that is similar to that of an actively managed portfolio though. What they are really after therefore, is cheap replication: a portfolio with the same risk characteristics as an actively managed portfolio, but without the burden of an expensive manager. Since traditional managers are all fishing in the same pond and don't trade very actively, in equity and fixed income this can easily be achieved by buying and holding a nice selection of the stocks or bonds that make up the universe available to the manager who is to be eliminated, i.e. by buying and holding a suitable index.

Unfortunately, with hedge funds things are more complicated. Hedge fund managers are all doing something different, use derivatives, and may follow highly dynamic strategies. Combined with a serious lack of transparency, this makes it impossible to 'drill down' to the portfolio level, like we do when indexing traditional equity and fixed income managers. Running our own hedge fund approximating portfolio is therefore out of the question. However, if all that investors are after is "a portfolio with the same risk characteristics as an actively managed portfolio, but without the burden of an expensive manager", then this need not necessarily be detrimental. In Kat and Palaro (2005, 2006c) it is shown that it is fairly straightforward to design mechanical futures trading strategies, which generate returns with predefined statistical properties. We can use this technique to design futures trading strategies, which generate returns with the same characteristics as hedge fund index returns. Doing so, we would completely eliminate the need to invest in hedge funds and thereby the need for expensive managers. As such it provides a very satisfactory solution to the most crucial problem of hedge fund indexation: how to eliminate the manager without changing the risk profile on offer. Following Kat (2006), we will refer to the above approach as "the FundCreator approach".⁴

⁴ Also see Kat and Palaro (2006c) or www.FundCreator.com. The FundCreator approach is very different from the usual factor model approach. The shortcomings of the factor model approach and the differences with FundCreator are discussed in more detail in Kat (2006a).

The returns generated by the FundCreator approach will statistically be very similar to the actual hedge fund index returns. There is one important difference though: the FundCreator returns are likely to arrive in a different sequence than the actual hedge fund index returns. For investment purposes this should not make a difference, however, as all that matters in an investment context are the statistical properties of the returns on the various assets and asset classes, and not the exact sequence in which those returns come in.

Synthetic Hedge Fund Index Returns

Having developed a potentially workable approach to hedge fund indexation, the big question of course is how it performs in practice. In this section we therefore take a detailed look at the returns from replicating a number of well-known hedge fund indices up to October 2006.

Before we proceed, it has to be noted that several studies have shown reported highly significant autocorrelation in monthly hedge fund index returns.⁵ This primarily results from the fact that many hedge funds invest in illiquid securities, which their administrator often will find hard to mark to market. When confronted with this problem, hedge fund administrators will either use the last reported transaction price or a conservative estimate of the current price, which creates artificial lags in the evolution of hedge funds' net asset values, resulting in artificial smoothing of the reported monthly returns, i.e. artificially low volatility. One possible way to correct for this autocorrelation is to “unsmooth” the observed returns to create a new set of returns which are more volatile and whose characteristics are believed to more accurately capture the characteristics of the underlying property values. Nowadays, there are several unsmoothing methodologies available. We use the method originally proposed by Geltner (1991).

Having cleaned up the autocorrelation, we have to decide what futures contracts to trade to produce our synthetic hedge fund index returns with. In FundCreator terminology, this means we need to select our ‘reference portfolio’ and our ‘reserve

⁵ See for example Brooks and Kat (2002).

asset'. The 'reference portfolio' is the portfolio with respect to which we will measure correlation. Since hedge funds are typically used to diversify larger, more traditional portfolios, we will take the reference portfolio to consist of 50% S&P 500 and 50% T-bond futures. In the remainder of this paper, when we talk about correlation, we mean the correlation between the index (or its replica) and this particular portfolio. The 'reserve asset' is the core portfolio of the replication strategy and therefore the main source of uncertainty. Since the outlook for the various asset classes will change over time, in practice the choice of the reserve asset is a dynamic process, producing time-varying allocations. Unfortunately, the latter process is very difficult to simulate in a backtest without the suggestion of data mining. In what follows we therefore assume that the composition of the reserve asset is fixed though time. More specifically, we assume the reserve asset consists of an equally-weighted portfolio of 3-month Eurodollar, 2-year note, 10-year note, S&P 500, Russell 2000 and GSCI futures.⁶

Given the above choices, we replicated the returns on the Edhec, CISDM and HFRI indices. The CISDM and HFRI indices are calculated in the usual way, i.e. as portfolios of a (large) number of individual hedge funds.⁷ The Edhec indices, however, are indices of indices, calculated as the first component of a principal component analysis of a large number of competing hedge fund indices.⁸

Table 1-3 show the sample properties of the monthly excess returns (over 1-month LIBOR) of the Edhec, CISDM and HFRI hedge fund indices as well as the synthetic funds designed to replicate them, over the period March 1999 – September (Edhec), May (CISDM), October (HFRI) 2006. When interpreting these results, it has to be kept in mind that the available hedge fund indices typically suffer from a variety of upward biases, including:

- **Self-reporting bias:** Only the more successful funds will report to a database.

⁶ Since the volatility of the various asset classes is quite different, before forming the portfolio, we leveraged the Eurodollar, 2Y note by a factor 5, and the 10Y note by a factor 4 to give these components a level of volatility more in line with stocks and commodities.

⁷ Although the CISDM indices reflect the performance of the median, instead of the average fund.

⁸ Details on the composition and construction of the Edhec indices can be found in Edhec (2004).

- **Survivorship bias:** Some index providers remove funds that close down from the index's history.
- **Selection bias:** Database and index providers may have strict criteria to decide which funds to include in the database and/or index.
- **Backfill bias:** When a fund enters a database, typically its complete track record is included.

Although estimates vary quite widely, it is generally thought that the combined upward bias in hedge fund indices due to the above adds up to 2-3% per annum. In this context two other observations are of interest as well. First, most hedge funds only report to one or two databases. This means that there is little overlap between databases and the indices derived from them. Second, it is not uncommon for recorded performance for the same fund to vary between databases. Together, this means that indices from different index providers may exhibit significantly different behaviour, with differences in monthly return sometimes exceeding 5% or even more!

Edhec Index	Index				Synthetic Fund			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
Convertible Arbitrage	5.68%	6.58%	-0.02	0.22	5.04%	6.57%	0.10	0.24
Distressed Securities	5.69%	6.77%	0.25	0.46	7.10%	7.02%	0.39	0.46
Emerging Markets	12.60%	13.35%	-0.19	0.67	13.89%	13.65%	0.71	0.67
Long/Short Equity	6.21%	8.53%	0.22	0.59	7.49%	8.55%	0.51	0.59
Equity Market Neutral	4.46%	2.36%	0.53	0.30	2.08%	2.25%	0.13	0.31
Fixed Income Arb.	3.36%	2.90%	-0.17	0.26	3.80%	3.07%	-0.10	0.25
Global Macro	5.24%	5.37%	0.58	0.42	5.82%	5.39%	0.82	0.42
Merger Arbitrage	4.78%	4.08%	-1.15	0.45	3.00%	4.06%	-0.17	0.44
Short Selling	-3.58%	21.57%	-0.32	-0.62	14.80%	23.24%	0.06	-0.61
CTA Global	2.26%	9.40%	0.04	-0.10	9.06%	9.51%	0.02	-0.10
Funds of Funds	5.29%	6.74%	0.74	0.49	6.39%	6.91%	1.06	0.48

Table 1: Sample properties Edhec index and synthetic fund excess returns over the period March 1999 - September 2006.

CISDM Index	Index				Synthetic Fund			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
Convertible Arbitrage	5.40%	5.35%	-0.17	0.25	3.36%	5.17%	-0.24	0.29
Distressed Securities	9.04%	6.21%	0.23	0.51	6.06%	6.22%	0.25	0.53
Emerging Markets	11.36%	11.07%	0.08	0.63	12.51%	11.65%	1.08	0.63
Long/Short Equity	6.42%	8.81%	0.62	0.56	8.03%	9.07%	0.91	0.61
Equity Market Neutral	4.37%	2.79%	0.56	0.34	2.89%	2.71%	-0.03	0.35
Fixed Income Arb.	3.35%	1.57%	0.28	0.25	0.83%	1.51%	-0.13	0.39
Global Macro	3.54%	4.03%	0.77	0.45	3.13%	3.83%	0.41	0.47
Merger Arbitrage	4.51%	3.84%	-0.28	0.45	2.73%	3.82%	-0.21	0.46
CTA (equal weighted)	3.28%	8.39%	0.28	-0.02	8.06%	8.46%	0.10	-0.05
Funds of Funds	4.08%	4.19%	0.07	0.49	3.56%	4.13%	0.63	0.50

Table 2: Sample properties CISDM index and synthetic fund excess returns over the period March 1999 - May 2006.

HFRI Index	Index				Synthetic Fund			
	Mean	StDev	Skew	Corr	Mean	StDev	Skew	Corr
Convertible Arbitrage	4.98%	5.44%	-0.04	0.21	3.89%	5.44%	-0.03	0.23
Distressed Securities	9.48%	7.72%	0.23	0.15	8.56%	7.95%	0.28	0.12
Emerging Markets	13.69%	16.82%	-0.15	0.68	17.49%	17.40%	0.66	0.68
Long/Short	7.47%	10.52%	0.64	0.58	9.28%	10.94%	0.79	0.59
Equity Market Neutral	2.76%	2.77%	0.27	-0.03	3.58%	2.87%	0.04	-0.07
Fixed Income Arb.	4.29%	3.67%	-0.14	0.50	4.17%	3.92%	0.09	0.51
Global Macro	5.39%	6.51%	0.36	0.31	6.69%	6.60%	0.39	0.31
Merger Arbitrage	4.49%	3.86%	-0.92	0.37	3.54%	3.72%	-0.19	0.36
Short Selling	-1.99%	23.61%	-0.52	-0.55	17.06%	25.61%	0.22	-0.54
Funds of Funds	4.69%	7.14%	0.40	0.51	7.89%	7.19%	1.17	0.49

Table 3: Sample properties HFRI index and synthetic fund excess returns over the period March 1999 - October 2006.

To facilitate comparison, in the above tables the entries in blue are the cases where the average return on the synthetic fund exceeds that of the index. The entries in red are the cases where the average return on the index exceeds that of the synthetic fund. Finally, the entries in black are the cases where index and synthetic fund performance is very similar.

From table 1-3, we can draw a number of very interesting conclusions:

- Our synthetic funds beat the Edhec indices 8 out of 11 times, the CISDM indices 3 out of 8 times, and the HFRI indices 6 out of 9 times. Given the upward bias present in these indices, this is an extremely good result. If we assume the average index return is upwardly biased by 2.5%, then all synthetic funds comfortably outperform the indices they are designed to replicate.
- Without exception, the volatility of the index return and the correlation with the 50/50 stock/bond portfolio are very accurately replicated.
- Keeping in mind the sensitivity of the traditional skewness measure for extreme observations and the fact that we only have 92 observations available, skewness is very satisfactorily replicated as well.
- Across the three index families, the emerging markets, long/short, global macro, short selling and funds of funds indices are consistently dominated by their replicating synthetic funds.

The entries in table 1-3 are calculated as per the end of September (Edhec), May (CISDM), October (HFRI) 2006. However, the synthetic funds started in March 1999. It is therefore interesting to have a look at the evolution of the various sample parameters over time. The results for the Edhec funds of funds index are reported figure 1-4. All 4 graphs start in March 2001 as with less than 24 observations reliability would simply be too low.

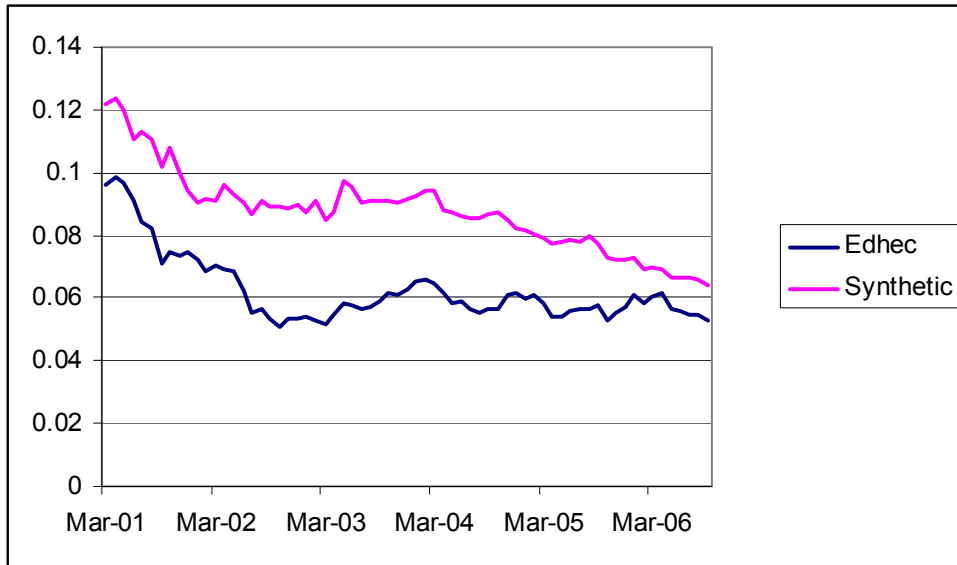


Figure 1: Mean excess return Edhec funds of funds index and replicating synthetic fund, March 2001 – September 2006.

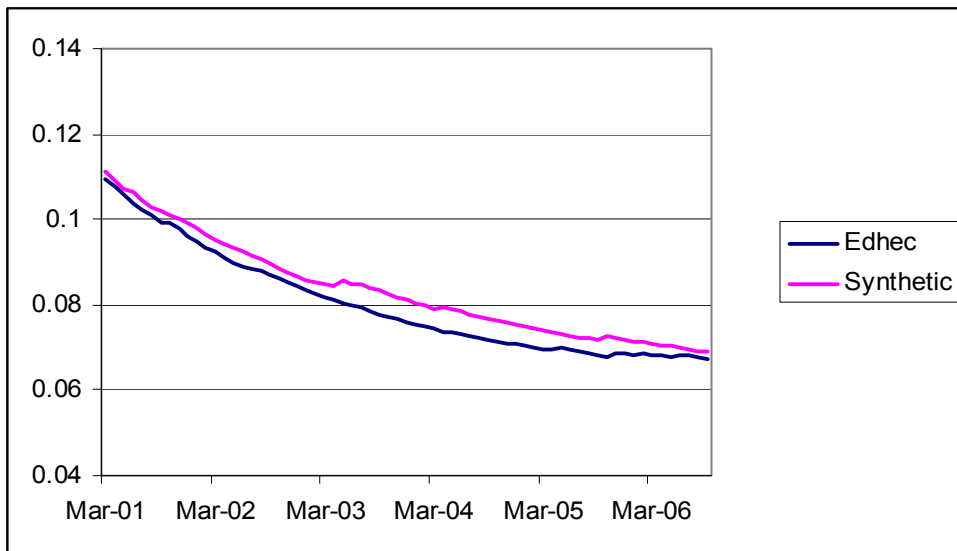


Figure 2: Volatility Edhec funds of funds index and replicating synthetic fund, March 2001 – September 2006.

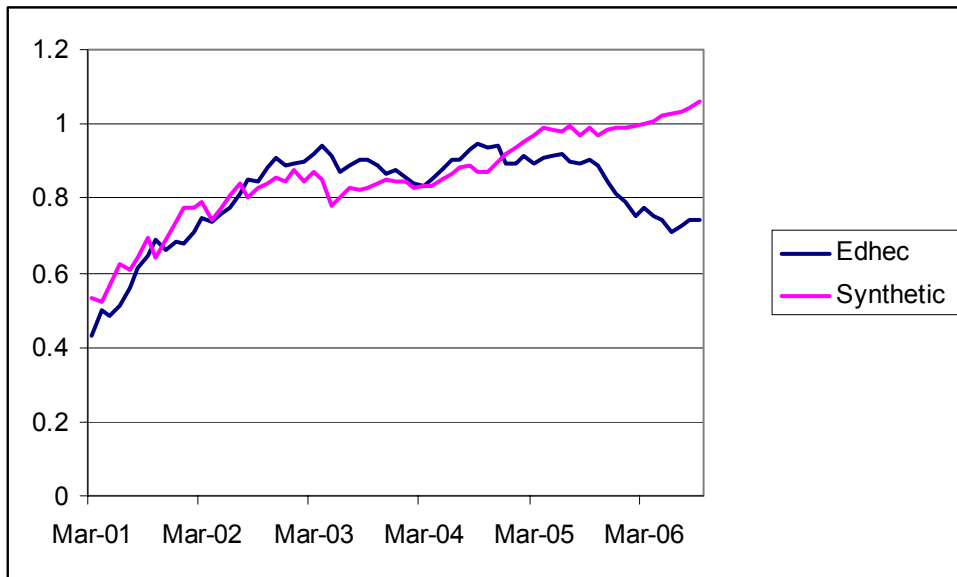


Figure 3: Skewness Edhec funds of funds index and replicating synthetic fund, March 2001 – September 2006.

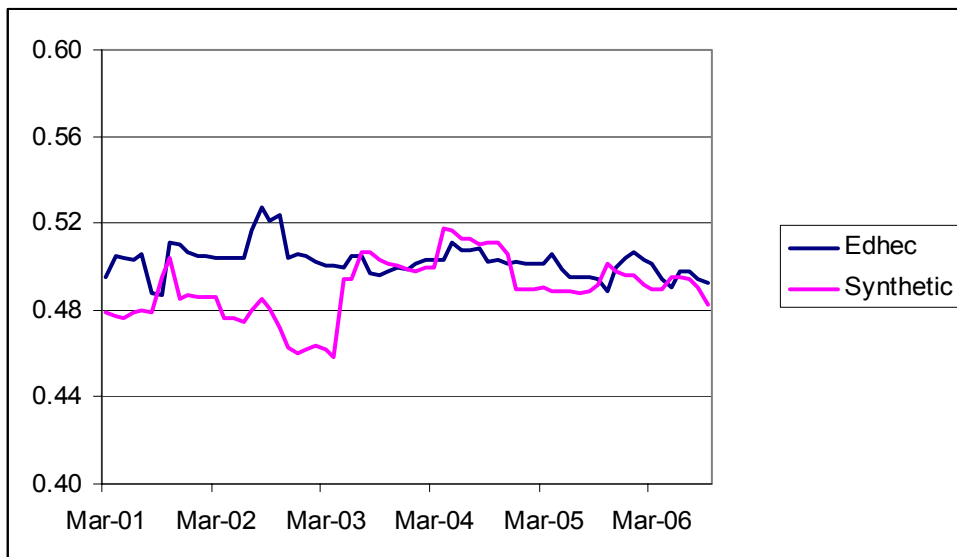


Figure 4: Correlation Edhec funds of funds index and replicating synthetic fund with portfolio of 50% S&P 500 and 50% T-bonds, March 2001 – September 2006.

The graphs in figure 2-4 show that the synthetic fund matches the risk parameters of the Edhec funds of funds index directly from the start. The graphs also show that the synthetic fund is quite capable of following the changes in the index parameters over time. From figure 3 we see that the difference in skewness reported in table 1 only arose over the last year. Before that, the match was almost perfect. Finally, figure 1 shows that over time the synthetic fund's mean excess return has been consistently higher than that of the index. Similar results were obtained for all other indices.

From the above it is clear that for all 3 families of hedge fund indices the FundCreator approach more than achieves its objective of providing investors with returns with the same characteristics as hedge fund indices, but without actually investing in hedge funds. *In all cases, risk profiles are very similar and, taking into account the upward bias present in these indices, the average return is markedly better.* In addition, for a moment assuming these indices are investable, the synthetic fund returns have no liquidity or transparency problems, which, as argued in Kat (2006b), makes them even more valuable.

Conclusion

Disappointing performance is leading hedge fund investors to look for cheaper alternatives. Hedge fund indexation has been suggested as a possible solution. Unfortunately, investable hedge fund indices are nothing more than funds of funds in disguise, with performance similar or even worse than real funds of funds. The core problem of hedge fund indexation is that as long as one still invests in hedge funds, the cost factor that indexation is meant to eliminate will still be there. In this paper we have shown that it is possible to generate returns with statistical properties that are very similar to hedge fund indices, but without actually investing in hedge funds. The proposed strategies only trade liquid futures contracts and therefore not only offer investors an accurate replica, but at the same time solve many other problems typically surrounding hedge fund investments, such as illiquidity, lack of transparency, limited capacity, etc.

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