HOW TO EVALUATE A NEW DIVERSIFIER
WITH 10 SIMPLE QUESTIONS

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Introduction

Over the last 5-10 years investors, private as well as institutional, have increasingly turned to ‘alternative investments’. Having lost confidence in traditional stocks and bonds, and hungry for returns and/or diversification, investors have allocated over $2 trillion to hedge funds, private equity, commodities, etc. Given the amounts involved and the sophistication of many of the players, one would expect these allocations to have been made after thorough analysis. Reality, however, could not be more different. The process leading up to the decision to invest in alternatives is often seriously flawed and appears to contain a strong ‘keeping up with the Joneses’ element. As discussed in Kat (2004), part of this is due to the fact that many investors tend to analyse alternative investments in the same way as large cap stocks and government bonds. Due to the special nature of alternative investments, however, proper analysis requires a much more sophisticated framework. In addition, many investors seem to lose sight of the ultimate goal of investment management, which is to put together a portfolio of assets that satisfies all the relevant goals and criteria. Instead of in a portfolio context, however, assets and asset classes are often analysed primarily on a stand-alone basis, using criteria that might be entirely misplaced in a wider portfolio context.

In this paper we present a framework for the analysis of a new diversifier, which consists of no more than 10 simple but effective questions. Along the way we also provide some useful rules of thumb. We distinguish between 3 different cases:

1. Investor invests in nothing else than the new diversifier and has no liabilities.
2. Investor will add new diversifier to portfolio, but has no significant liabilities.
3. Investor will add new diversifier to portfolio and has significant liabilities.

Obviously, case 1 is not very realistic, but it provides a good starting point for further discussion. Case 2 models high net worth private investors, family offices, etc. Case 3 models pension funds, life insurance companies, etc.
Case 1: Stand-Alone Evaluation

Assuming there is nothing else we are going to invest in and there are no liabilities either, the minimum checklist for a new diversifier is as follows:

1. What risk premium is offered?
2. How volatile are the returns?
3. Are returns positively or negatively skewed or explicitly floored or capped?
4. How certain are you of the above?
5. How liquid is the investment?
6. Is the fee charged fair in relation to the above?

Question 1-3 relate to the statistical properties of future returns, i.e. the investor’s future bottom line. To establish longer-term growth potential we need to know what risk premium is offered, i.e. by how much the expected return exceeds the prevailing interest rate. However, this is not enough, as longer-term growth does not only depend on the risk premium, but also on the volatility and skewness of the returns on offer. Consider the following example. Suppose we purchase an asset at 100. Over the following year its price rises to 150. We realize a 50% return. The next year something terrible happens and the price drops to 75. We loose 50%. Over the 2-year period, the average 1-year return is 0% (+50% in year 1 and – 50% in year 2). This does not give us a good indication of what really happened though. Our initial 100 is now worth only 75, implying an average return of –13.4%. \(^1\) This discrepancy arises because of the volatility of our returns. As is easily checked, more (less) volatility will increase (reduce) the discrepancy.

Figure 1 shows, for different levels of volatility, what 1-year risk premium is required to provide a long-term growth rate equal to the interest rate. As such, figure 1 shows the lowest acceptable risk premium for a risk neutral investor. From the graph we clearly see that the higher the volatility, the higher the risk premium required. With 20% volatility we already need a risk premium of 2% for example. Also note that the relationship is non-linear. With 30% volatility, we will need a risk premium of 4.5%,

\(^1\) Among statisticians the –13.4% average is known as the geometric and the 0% average as the arithmetic average.
while with 40% volatility we need a risk premium of 8% to maintain the targeted growth rate. It is important to note that apart from compensation for the costs of volatility in terms of long-term growth, risk-averse investors should also require compensation for just taking the risk. For a risk-averse investor therefore, figure 1 only tells half the story and the required risk premium is higher than what is depicted.

![Risk Premium vs Volatility](image)

**Figure 1: Risk premium required to maintain a long-term growth rate equal to the interest rate as a function of volatility.**

Unfortunately, past returns only provide a partial answer to question 1-3. What we are interested in is not so much what has happened in the past, as what is likely to happen in the future. This means that historical estimates, of the risk premium in particular, may need quite a bit of adjustment. First of all, there might be indications of, or at least the potential for, data manipulation, biases and/or errors. In that case the available data need to be thoroughly checked and subsequently cleaned of all irregularities. Second, after a strong bull (bear) market, it makes good sense to set the risk premium below (above) its historical estimate. The same applies when a new type of players enters the market, or when the inflow of new money starts to threaten future potential. Furthermore, it is important to keep an eye on possible operational risks as well. The manager behind a new diversifier may start out small, but when he is successful his organization will have to grow, which could give rise to a whole new
range of problems. All this and more will have to be made explicit and taken into account when deciding on the diversifier’s risk-return characteristics.

A similar argument as for volatility goes for skewness. When a distribution exhibits negative skewness it has a prolonged tail to the left, while positive skewness indicates a prolonged tail to the right. More intuitively, with negative skewness there is an increased probability of a big loss, while with positive skewness there is an increased probability of a substantial gain. Obviously, such extreme returns will have quite an impact on the long-term growth rate. It may take years to make up for a 30% loss, while a 30% gain will significantly boost long-term growth. Therefore, increase the required risk premium in case of negative and reduce it in case of positive skewness.

This brings us to question 4. Stocks and bonds have two centuries of history, so we have at least some idea what is normal and what isn’t. In alternative investments things are very different. Sometimes there is none, sometimes there is only a few years of history available. This means that without further study and analysis, which could be difficult due to low transparency and systematic style drift, we have little or no idea what to expect. In fact it means we are not just uncertain about future returns, but we are also uncertain about the uncertainty. Obviously, when this is the case it needs to be explicitly recognized, the uncertainty needs to be priced, i.e. we need to say how much higher the risk premium should be to make this risk acceptable, and incorporated in the decision-making process.

Question 5 deals with another neglected aspect of proper investment management. Large cap stocks and government bonds are highly liquid. Moving in or out of the market takes little time and has minimal market impact. Again, in alternative investments things are very different. In many cases investors are locked in for anything between 1 and 5 years and are confronted with monthly or quarterly notice periods when they want to redeem afterwards. Again, when this is the case it needs to be explicitly recognized and priced. Since liquidity is a valuable commodity, not doing so will make alternative investments artificially look more attractive. Suppose a

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2 It is not uncommon for investors to claim that “this time it is all different”. Unfortunately, it never turns out that way.
A diversified came with a 2-year lock-up and quarterly redemption afterwards. Suppose we thought this to be worth 1.5% per annum. In that case, when comparing the new diversifier with stocks and bonds, we should first reduce the diversifier’s risk premium by 1.5% to account for it’s relative illiquidity. If not, we would be comparing apples with oranges.

At this point many investors will proclaim they are in it for the long run and that therefore illiquidity is not a problem for them. Unfortunately, this is just greed talking. Liquidity is like a prenuptial agreement or any other contract for that matter. When all goes well, liquidity is not an issue because you don’t want out. Liquidity does become an issue, however, when things turn sour. In that case being locked up can make the difference between achieving an acceptable recovery rate and losing a lot more. Liquidity is not to be taken on face value either. One has to make sure that it will be there when needed. Not convinced? Then think back of this passage from a letter of Amaranth to its investors on September 29, 2006: “As you know, the Amaranth multi-strategy funds have recently received substantial redemption requests. In light of the volume of these requests, as well as informal feedback from a number of investors, Amaranth has determined that it is in the best interests of the funds and their investors to temporarily suspend redemptions for September 30 and October 31, 2006.”

This leaves question 6. When selecting managers, many investors appear to work on the basis of the “What’s Expensive Must Be Good” principle. Although this may be true in some markets, unfortunately there is no evidence that it also holds in investment management. As a rule of thumb, in the asset management industry, what is expensive is primarily just that: expensive. Forty years of study by 1000s of researchers all over the world has shown that not many investment managers are able to make up for the fees that they charge. Of course, there are some managers that do have enough skill to systematically add value, even after fees. Unfortunately, almost by definition, there are only a handful of them and most are closed for new investors. Of course, even unskilled managers provide a service and should not be expected to work for free. In the absence of skill, however, depending on the type of strategy followed, a fee between 0.1% and 0.4% per annum should be sufficient to allow them to make a decent living. The rule therefore is as follows: only pay more than 0.4% per
annum if you are confident that the manager in question is able to earn back more than the difference. If not, you’re throwing money away.

As an illustration of the detrimental effect of paying away unjustifiable fees, consider the following example. Suppose we had the choice between an active manager charging a flat fee of 1.4% and a mechanical replica that offered the same risk profile but which cost only 0.3% per annum. Suppose also that the manager in question indeed had some special skills, allowing her to beat the market by 0.5% per annum. Finally, let’s assume the market went up by 7% each year. If we invested 100 in the replica, then after 10 years we would be worth 191. If we invested with the manager on the other hand, we would only be worth 181. Of course, on a longer horizon the difference only becomes more pronounced. After 30 years, the replica would produce a terminal value of 700, while the manager would only generate 590. In this case the manager’s fee is still relatively low, but imagine the potential for wealth destruction when fees are 2 or 3 times as high, as is quite common in alternative investments. Sticking with the above example, if instead of 1.4% the manager charged 3%, after 30 years the investor would barely reach 375, as opposed to a whopping 700 for the replica. If that doesn’t put you off paying unjustifiable fees, nothing will.

Case 2: Asset-Only Portfolio Evaluation

Having discussed the most important elements of stand-alone evaluation, we now turn to a more realistic, and therefore more complex, setting where there is an existing portfolio to consider as well. Of course, the stand-alone questions 1-6 still apply. However, there are some additional questions to ask as well now, such as:

7. What is the correlation with the existing portfolio?
8. What is the co-skewness with the existing portfolio?

Both these questions concern the relationship between the new diversifier and the portfolio that it will be added to. It is information necessary to determine whether to incorporate the new diversifier or not. Correlation measures to what extent the existing portfolio and the new diversifier go up and down together. Positive correlation means that both tend to move in the same direction, while negative
correlation indicates there is a tendency for both to move in opposite directions. Co-skewness measures to what extent the diversifier buffers or amplifies extreme returns in the existing portfolio. A diversifier with positive co-skewness acts as a buffer for extreme portfolio returns, while a diversifier with negative co-skewness acts as an amplifier.\(^3\) Co-skewness is different from correlation. The latter is an overall measure of dependence, while co-skewness only looks at extreme events.

To make a good diversifier, we want to see low correlation and positive co-skewness. However, these are not the only requirements for a good diversifier. The stand-alone criteria discussed earlier are still relevant as well. This introduces a clear potential for conflict. An asset that looks good on a stand-alone basis may look a lot less attractive when viewed in a portfolio context, i.e. after taking correlation and co-skewness into account. Alternatively, a diversifier’s co-properties may more than make up for any shortcomings observed on a stand-alone basis. Trade-offs like these are extremely important and require careful evaluation. One way to do so is to check whether after adding the diversifier rebalancing of the portfolio to its old risk level improves the overall expected return. If this is indeed the case, then the diversifier is making a valuable contribution. If not, it should be rejected.

Let’s look at a simple example. Suppose an investor had a portfolio consisting of 30% bonds, 40% stocks, and 30% real estate, for which he expected returns of 4%, 7% and 6% respectively. Given a new diversifier, how low can its expected return be before it is no longer interesting as an addition to the investor’s portfolio? To answer this question we have to find out at what expected return of the diversifier, rebalancing the portfolio to its old risk level no longer improves the overall expected return. Doing so, we of course have to take into account that due to differences in liquidity some asset classes are much easier to rebalance than others. Direct real estate investments are very sticky. We will therefore assume that we can only rebalance the stock and bond allocations. The real estate allocation has to remain unchanged.

\(^3\) A simple test for co-skewness is to regress the diversifier’s returns on the portfolio returns and subsequently check whether the residuals from that regression are correlated with the squared portfolio returns. Positive correlation indicates positive co-skewness and vice versa.
Figure 2: Minimum risk premium diversifier required for inclusion in existing portfolio.

Under the above assumptions, figure 2 shows for every possible level of correlation between the diversifier and the investor’s existing portfolio what the minimum risk premium is for inclusion in the portfolio. The graph in figure 2 allows our investor to do a quick check on the attractiveness of any diversifier that comes on his way. If a diversifier's risk premium is lower than what is indicated in the graph, adding it to the existing portfolio is not a good idea and therefore no further study is required. Funds of hedge funds typically have a correlation with a traditional stock/bond portfolio in the range of 0.4 - 0.5. According to figure 2, this means they should offer our investor a risk premium of at least 0.5 – 1.0% to be of interest\(^4\). Likewise, commodities are largely uncorrelated with stocks and bonds. According to figure 2 they should therefore offer an expected return of at least –0.5% to make a worthwhile diversifier.

The latter example shows that as long as it comes with a low enough correlation with the existing portfolio, in a portfolio context an asset with a negative risk premium is not necessarily something to back away from. This clearly illustrates the important difference between case 1 and case 2. On a stand-alone basis, assuming our investor is

\(^4\) Note that this is after making the corrections discussed previously. The required uncorrected risk premium would probably be more in the range of 2.5 – 3.0%.
risk-averse, investing in an asset offering a negative risk premium is irrational, as simply putting the money in the bank would provide a much more attractive return.

**Case 3: Asset-Liability Portfolio Evaluation**

When an investor has significant liabilities, things become more complicated again and more questions need to be asked. In addition to question 1-8, we now also need to know:

9. What is the correlation with the liabilities?
10. What is the co-skewness with the liabilities?

Again, the answer to these questions may conflict with the answers to the asset-only questions. In other words, *what looks attractive in an asset-only context can be highly unattractive in an asset-liability context and vice versa*. Long-dated bonds for example are not very attractive on a stand-alone basis or on an asset-only basis. For a pension fund or life insurer, however, whose liabilities are very similar to long-dated bonds, they provide a very useful tool to somewhat bridge the duration gap between assets and liabilities.

Again, this means we need a way to evaluate these kind of trade-offs. Unfortunately, at this point things really become complicated, as to do so we need a realistic model of the behavior of not only the investor’s assets but also his liabilities. For a pension fund for example, we will need to take into account the age of the fund, i.e. whether on balance there is money coming in or going out, the way pensions are linked to inflation, different scenarios for membership development, and many other important aspects. Given the above, every investor with significant liabilities needs a tailor-made ALM model or at least a consultant who has access to one. Not all models are equally suitable though. An appropriate model should allow for realistic modeling of the assets and liabilities’ possible evolutionary scenarios. It should also take taxes into account and allow for easy robustness checks. We don’t want to end up with an optimal solution that changes completely when the inputs are changed just a little bit.
**What Does All This Mean in Practice?**

We can learn a number of important lessons from the above, including:

1. Be aware of your own specific situation and goals and evaluate diversifiers only in that specific context. Always think in a portfolio context, as you are unlikely to be a stand-alone investor.
2. Check for and clean errors and biases in reported returns. These are common problems in alternative investment data and may seriously distort your views.
3. Explicitly recognize and price in parameter uncertainty. You should get paid extra to enter into the great unknown.
4. Explicitly recognize and price in illiquidity. Alternative investments tend to be highly illiquid and you deserve to get paid extra for being locked up.
5. Think in terms of after-fee returns. Don’t pay a high fee unless you think it is justified. The long-term damage done by paying unjustifiable fees can be detrimental to your wealth.

Having developed a simple but realistic framework for the evaluation of new diversifiers, the next step is to see how a number of popular diversifiers score. In what follows we consecutively look at (1) funds of hedge funds, (2) commodities and (3) FundCreator-based synthetic funds. Since the answers to question 9 and 10 are heavily dependent on the specific case at hand, we primarily focus on question 1-8.

**A. Funds of Hedge Funds**

Hedge funds have become extremely popular over the past 10 years, with an estimated $1.3 trillion invested in this asset class, of which $500 billion through funds of funds. One might therefore expect funds of hedge funds to score extremely well in our evaluation. Unfortunately, this is not the case, as the answers to question 1-8 show.

**Q 1.** Declining risk premiums worldwide and a huge inflow of money have seriously affected hedge fund risk premiums. Realistic estimates place the (after-fee) risk premium at no more than 2-3% these days.
Q 2. Hedge fund volatility is often severely underestimated due to biases in reported monthly returns, which tend to become even more pronounced when portfolios are formed. As a result, for some strategies true volatility can be 30-40% higher than estimates from uncorrected historical returns. Corrected, average fund of funds volatility is around 12% per annum.

Q 3. A number of hedge fund strategies exhibit significant degrees of negative skewness. Typically these are strategies that take on a high level of credit and/or liquidity risk, such as distressed securities, merger arbitrage and convertible arbitrage for example. Since many funds of funds make substantial allocations to these strategies, their returns exhibit some degree of negative skewness as well.

Q 4. Hedge fund return data go back no more than 10 years and cover a very exceptional period with equity markets going up, down and up again, with interest rates dropping to historically low levels, with commodities booming, and with the hedge fund industry itself growing exponentially. This means we are confronted with a high degree of parameter uncertainty.

Q 5. Funds of hedge funds tend to use less stringent lock-ups and notice periods as the funds in which they invest. Careful not to create too big a mismatch with the funds invested in, however, the redemption policies of most funds of funds are still quite conservative.

Q 6. Funds of funds charge a fee that comes on top of the fee charged by the underlying managers. On average, individual managers charge ‘2+20’ to which funds of funds add another ‘1+10’. This means that pre-fee hedge fund returns are split 40/60 between managers and investors. Obviously, there would be something fundamentally wrong with the efficiency of the global capital markets if such fees were indeed justifiable.

Q 7. The average fund of hedge funds exhibits a correlation with a traditional 50% stocks - 50% bonds portfolio of around 0.45.
Q 8. When the stock market drops significantly, hedge funds tend to suffer as well. This is true for many different strategies, whether they invest in equity or not, since typically when the equity market drops, credit spreads widen, implied volatility spikes up, etc. As a result, many funds of funds exhibit negative co-skewness.

From the above it is clear that the risk-return profile of funds of hedge funds has its good and its bad side. The good part is that correlation with stocks and bonds is low. The bad part is that hedge funds often exhibit negative (co-)skewness, only offer a modest risk premium these days, are highly illiquid and exhibit high parameter uncertainty. Bottom line is that many decisions to invest in hedge funds appear to be based on (marketing induced) misconceptions and herding. Hedge funds do not provide absolute returns, do not provide solid downside protection and do no longer offer superior returns. On a more objective basis, properly correcting for parameter uncertainty and illiquidity, funds of hedge funds do not make a very attractive diversifier.

B. Commodities

Commodities are another diversifier that has become quite popular lately. Over recent years, especially institutions have invested over $100 billion in this asset class, often through commodity-linked swaps and other structures, such as specialized commodity funds, TRAKRS, ETFs, warrants, structured notes, etc. Below are the answers to the questions on our checklist.5

Q 1. With the exception of energy, over time commodities do not appear to have offered a consistent (pre-fee) risk premium. With institutional investors turning to commodities and after several years of hype about the impact of the so-called BRICs (Brazil, Russia, India and China), there is a lot of speculative-investment demand in the commodity markets these days. This makes pinpointing the risk premium quite tricky.

5 See Kat and Oomen (2006a, 2006b) for further details on some of these issues.
Q 2. Contrary to what is often thought, individual commodity volatility is not excessive, but comparable to that of large cap US stocks. Since correlation between commodities tends to be low, the volatility of a well-diversified commodity portfolio works out slightly lower than that of a comparable portfolio of stocks.

Q 3. Large jumps in the prices of copper, oil and other commodities have been well-documented by the media. Detailed statistical analysis, however, has shown that commodity returns do not exhibit significant skewness.

Q 4. With a whole new clientele in the form of institutional investors entering the marketplace in combination with substantial speculative demand, parameter uncertainty is high.

Q 5. Commodity exposure can easily be obtained through the futures market where liquidity is typically not a problem. Many investors, however, choose to access this asset class through structures that tend to be (a lot) less liquid.

Q 6. Futures are cheap. Structured products, however, are not. Most of the currently available commodity-linked products charge substantial fees (incl. sales and redemption fees). Since the majority of these are nothing more than passive GSCI-linked structures, however, these fees are completely unjustified.

Q 7. Correlation between commodities and stocks and bonds is close to zero.

Q 8. There is not much research in this area. Preliminary analysis, however, suggests the absence of significant co-skewness effects.

Q 9. Commodities are positively correlated with unexpected inflation. This is good news for investors, such as pension funds, whose liabilities are linked to inflation in some way.

Overall, the case for commodities does not look bad at all: zero correlation with stocks and bonds, positive correlation with inflation, and without any nasty skewness.
effects. The most worrisome elements are excessive fees and the risk premium. On the assumption that the present mini-bubble does not deflate, commodities make an attractive diversifier. However, if we assume the bubble is about to burst, then the attractive risk profile is not sufficient to make up for the highly negative risk premium.

C. FundCreator-Based Synthetic Funds

Recently, Kat and Palaro (2005) showed how to design futures trading strategies that generate returns with pre-fixed statistical properties. This technique, which is available to investors from the internet website www.FundCreator.com, can be used to replicate existing funds, like (funds of) hedge funds for example, or create completely new ‘synthetic funds’, offering risk-return profiles never seen before in the marketplace. How would such synthetic funds score in our evaluation? The answers are below.

Q 1. The risk premium of a synthetic fund depends on the risk premium on the assets traded and the specific trading strategy followed. Assuming investors hold a well-diversified core portfolio, the fund’s risk premium will be in line with the overall capital market.

Q 2, 3, 7, 8. For a synthetic fund all statistical parameters (with the exception of the risk premium) are fixed in advance by the investor himself. The actual (sample) values may deviate somewhat from the chosen target values, but never by too much or for too long.

Q 4. Since the investor sets the targets for volatility, skewness and all other parameters himself, parameter uncertainty is limited to the risk premium.

Q 5. Synthetic funds only trade in liquid futures markets. Liquidity therefore is very good.

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Detailed examples of such synthetic funds can be found in Kat and Palaro (2006). Alternatively, see www.FundCreator.com.
Q 6. As mentioned on www.FundCreator.com, the price of a licence to the FundCreator software is no more than 3bps per month. Given the simplicity of the FundCreator system, additional management and execution costs are minimal.

Synthetic funds allow investors to specify the statistical properties of the fund returns in advance. As a result, investors are able to create their optimal diversifier and parameter uncertainty is greatly reduced. In addition, synthetic funds are highly efficient; cheap to run and extremely liquid. The risk premium on a synthetic fund derives from the risk premiums on the assets traded and the specific trading strategy followed. As such, it is difficult to pinpoint, but no more difficult than the risk premiums on other asset classes. Overall, this makes synthetic funds highly attractive diversifiers.

**Conclusion**

In this paper we have presented a number of important questions to ask when analysing a new alternative diversifier from either a stand-alone, asset-only or asset-liability point of view. The framework is simple, but highly effective. Apart from the new diversifier’s statistical properties, it emphasizes the importance of properly accounting for parameter uncertainty and illiquidity; two elements very often ignored by investors. It also shows the importance of taking the correct perspective when evaluating a new diversifier. What looks good from a stand-alone perspective need not look good in a portfolio context and vice versa. Application of the above framework to funds of hedge funds, commodities and synthetic funds underlines the advantages and disadvantages of these diversifiers and clearly points at synthetic funds as the most and funds of hedge funds as the least attractive of the three.
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