

10 Years with SEB Asset Selection

- A Comprehensive Performance Evaluation



30 November 2016

Executive Summary in Figures

This white paper studies SEB Asset Selection's realised performance over the last 10 years (31 Oct 2006 – 30 Sept 2016) by using monthly performance data in USD.

Realised Performance versus Stated Performance Targets

	Target	Realised Retail	Diff. Retail	Realised Institutional	Diff. Inst.
Net Excess Return p.a.	5.0%	4.6%	- 0.4%	5.1%	+0.1%
Volatility	10.0%	8.5%	- 1.5%	8.5%	- 1.5%
Sharpe ratio	0.50	0.54	+0.04	0.59	+0.09
Correlation vs MSCI World Eq.	within +/-0.20	- 0.20	OK	- 0.19	OK
Correlation vs JPM Glob Bonds	within +/-0.20	+0.17	OK	+0.17	OK

Performance Contribution to a Traditional Client Portfolio (Equities + Bonds)

	50% EQ + 50% BO	33% EQ + 33% BO + 33% SAS	Change*
Net Excess Return p.a.	3.9%	4.3%	+0.3%
Volatility	9.7%	6.7%	-3.0%
Worst Drawdown	30.2%	15.7%	-14.5%
Sharpe ratio	0.40	0.64	+0.24

Performance Contribution to a Fund-of-Funds Portfolio

	100% Four Funds + 0% SAS	80% Four Funds + 20% SAS	Change*
Net Excess Return p.a.	4.0%	4.2%	+0.3%
Volatility	4.7%	4.4%	-0.3%
Worst Drawdown	11.6%	7.9%	-3.8%
Sharpe ratio	0.85	0.96	+0.12

Risk-Adjusted Return Ranking among the 14 Largest Managed Futures / CTA Funds

	On a Stand-Alone Basis	In an Equity-Portfolio	In an Equity-Bond Portfolio	In a Fund-of-Funds Portfolio
SEB Asset Selection's Ranking	1 st	1 st	1 st	1 st

Period = 31 October 2006 – 30 Sept 2016; **Retail Fees** = 1.10% mgmt. fee + 20% perf fee; **Institutional Fees** = 0.55% mgmt. fee + 20% perf fee; **Four Funds** = Equally-weighted fund-of-funds with Standard Life GARS, Carmignac Patrimoine, Ethna Aktiv and Nordea Stable Return; **SAS** = SEB Asset Selection; **MSCI World Eq = EQ** = MSCI World Equities Total Return USD; **JPM Glob Bonds = BO** = JPM Global Aggregate Bond Index USD; * = Rounding effects may make the numbers look incorrect; **Source**: Bloomberg and SEB Investment Management

Over the last decade, SEB Asset Selection has fulfilled almost all of its performance targets. The fund's uncorrelated returns have boosted the risk-adjusted return of both traditional and modern client portfolios. Within the managed futures/CTA segment, SEB Asset Selection has delivered the highest risk-adjusted return among 14 of its largest competitors, not only on a stand-alone basis, but also in the context of different client portfolios. The most important conclusions of the paper are found in the "Executive Summary" on the next page.

Important Information: Unless otherwise stated, all numbers and graphs are shown net of fees and with SEB Investment Management AB as the information source. The fund is registered in Luxembourg and supervised by the CSSF. More detailed information can be found in the prospectus, simplified prospectus / the Key Investor Information Document (KIID), the fact sheet of the fund and/or through your SEB sales contact. There are no guarantees associated with an investment in the fund. No assurance can be given that target returns, target risks and/or currency hedges will be achieved. The value of your investment may rise as well as fall. Past performance is not necessarily indicative of future results. Given the risk level of the fund, your investment horizon should at least be 3–5 years. **Please see the Disclaimer at the end of this document.**

Fund

SEB Fund 1 SEB Asset Selection RC SEK
ISIN: LU0256625632
Bloomberg: SEBASEK LX Equity
Legal form: UCITS-FCP, Luxembourg

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10 Years with SEB Asset Selection

Executive Summary

When combining different investments into a client portfolio, there are two important effects that need to be taken into account:

- a) Sharpe ratio improvements (of the overall client portfolio) which are related to the level of diversification benefits between a particular investment and the client portfolio, and
- b) Sharpe ratio improvements (of the overall client portfolio) which are related to the level of each investment's stand-alone Sharpe ratio.

As we show in this white paper, diversification benefits may indeed deliver very large improvements to the Sharpe ratio of a client portfolio. In fact, diversification benefits may boost the client portfolio's Sharpe ratio by substantially more than can be achieved by allocating more capital to investments with higher stand-alone Sharpe ratios.

In the case of an equally balanced bond-equity portfolio, an optimal allocation to SEB Asset Selection would have boosted the Sharpe ratio of the portfolio by a whopping 0.40 Sharpe units over the last decade. As much as 70% of this improvement, or 0.28 units, were attributable to SEB Asset Selection's diversification benefits. The remaining 30% of the Sharpe ratio increase, or 0.12 units, were related to the fact that SEB Asset Selection's stand-alone Sharpe ratio was higher than that of the bond-equity portfolio.

Trend-following managed futures funds are not only appreciated for their ability to generate excess returns over time and positive returns during extended bear markets, but also – and increasingly so – for their ability to generate huge diversification benefits to almost any type of client portfolio.

Over the last 10 years, SEB Asset Selection has delivered excess returns of 4.6%/5.1% per annum after retail/institutional fees. The fund has demonstrated very low correlations to both equities and bonds (both within +/-0.20) over time. In combination with the trend-following nature of the strategy, these features have boosted the Sharpe ratio of many client portfolios by as much as 0.20-0.25 over the last 10 years.

When compared to the 14 largest managed futures funds in the world, SEB Asset Selection has delivered No. 1 rankings for its risk-adjusted returns over the last 10 years, not only when measured on a stand-alone basis, but also – and more importantly – when measured in the context of different kinds of client portfolios.

A key take-away from this white paper is the following: If an investor is aiming to achieve high risk-adjusted returns in his/her portfolio, each potential investment must be evaluated in the context of / as a part of the overall client portfolio. By simulating the inclusion/exclusion of a particular investment into/from the portfolio, investors can get a very good understanding of how much value each potential investment is likely to add to the overall client portfolio.

Stand-alone analysis should never be used for final fund selection decisions. Stand-alone analysis may, however, be used as a first step in the portfolio construction process to identify investments which *may* add value to the client portfolio. Two statistics are of great interest in this initial screening process:

- i) the investment's long term correlation to the client portfolio (should be as low as possible, ideally negative), and
- ii) the investment's stand-alone Sharpe ratio (should be as high as possible).

Via simple portfolio simulations the client can then quantitatively determine which investments are truly adding value to the client portfolio (great investments).

Investors should also try to gauge the consistency of the investment process over time, the continued presence of key individuals in the investment team and, thus, the ability to continue to deliver as solid uncorrelated excess returns as the fund has delivered historically. The investment team behind SEB Asset Selection scores highly on this measure (100% systematic process + 100% team stability since Oct 2003).

The final characteristic of a great investment is liquidity. This implies that investors should make sure that they are able to unwind their investments on any day and without a major market impact, especially in distressed environments. The SEB Asset Selection fund has offered daily liquidity since inception in October 2006 and has never gated any clients.

To sum up, SEB Asset Selection's overriding purpose and objective is to deliver uncorrelated excess returns and to be a great complement to a client portfolio. We try to accomplish this by applying a fully systematic and quantitative approach and by adopting a pure trend-following strategy in the world's most liquid futures markets. This is the strategy we have applied over the last 10 years and this is the strategy that we will continue to apply going forward.

Last but not least, we would like to thank you for the trust you are showing in us. We can assure you that we will continue to do our very best to deliver uncorrelated excess returns for your portfolio during the coming 10 years.

*Hans-Olov Bornemann
Portfolio Manager and Head of SEB's Global Quant Team*



Purpose of the White Paper

The purpose of this white paper is to evaluate SEB Asset Selection's performance over the last 10 years. This will be done from four different angles:

- *Realised performance versus stated targets*
- *Performance contribution to a traditional client portfolio (equities + bonds)*
- *Performance contribution to a fund-of-funds portfolio*
- *Realised performance versus the 14 largest managed futures / CTA¹ funds in the world*

We will conclude the paper by giving some conceptual and practical advice on how to put together a great client portfolio. In this process we will specify the two features that characterise a great portfolio and the three features that characterise a great investment.

Background on SEB Asset Selection and the Global Quant Team

The SEB Asset Selection funds are managed by SEB's Global Quant Team, a team that was founded in October 2003 by team head & portfolio manager Hans-Olov Bornemann, a former managing director of Deutsche Bank. The investment team² has five principals. In addition to Hans-Olov Bornemann, the team consists of deputy team head and portfolio manager Jan Hillerström as well as the three senior quant researchers Adam Ahlström-Montille, Mikael Däckfors and Matthias Eriksson. The team has been 100% stable since inception in October 2003 (no defections, no redundancies).

Prior to launching SEB Asset Selection, the Global Quant Team was managing a number of global equity mandates and making the tactical asset allocation decisions in balanced funds. In March 2005, the Stockholm-based team went on a conference trip to a Swedish skiing resort, Åre. During the seven hour train ride, they asked themselves two questions: 'What's important when investing money?' and 'What would the ultimate fund look like?'

The team answered the first question by saying that there are two types of investment decisions that investors tend to make: asset allocation decisions and security selection decisions. At the time, the team estimated that 90% of the

returns of any portfolio could be explained by allocation decisions (i.e. by the exposure to equities, bonds and other asset classes) and that only 10% could be explained by security selection decisions (investments in single securities). Later on, they conducted a research study and found that 80-95% of the returns of almost all portfolios could be explained by the allocation decisions and 5-20% by the security selection decisions.

Given that allocation decisions were the most important decisions that could be made by a fund manager, the team drew the conclusion that 'the ultimate fund' – the fund which everybody would like to have an investment in – should be focusing on asset allocation decisions. Active allocation decisions could only be pursued in liquid asset classes with minimum transaction costs. Private equity and real estate were thus excluded. After seven hours, the team had specified a fund that would be aiming for absolute returns when taking long/short positions in equity index futures, government bond futures, currency futures, short-interest rate futures and, to the extent possible, in commodity futures (no commodity exposures have been taken since the end of 2013). A fully systematic quant-model would make the daily investment decisions. Amid the more flexible fund legislation, the team decided to make the fund UCITS-compliant and to offer daily liquidity. On 3 October 2006, SEB Asset Selection was launched.

One and a half years later, the team discovered that they were not alone with their 'ultimate fund' concept. It became apparent to the team that they unknowingly had re-invented the managed futures / CTA product!

At the end of October 2016, SEB Asset Selection (10% volatility target) had grown to EUR 1.28bn in assets under management. The fund is the largest³ UCITS-compliant managed futures fund in the world. A sister-fund, SEB Asset Selection Opportunistic (20% volatility target) was launched in 2009. This fund has EUR 330m in AUM. The Global Quant Team and/or the funds they are managing have received short-listings or awards each year since 2008 by one or several industry magazines such as CTA Intelligence, Hedge Funds Review, HFM Week, EURO Magazine, Hedge Nordic, Fondmarknaden, World Finance and Prequin/Thomson Reuters. For the current 2016 CTA Intelligence awards, SEB Asset Selection has been shortlisted in as many as five different categories (CTA long term performance over USD 500m in AUM, Managed Futures UCITS Fund, Diversified CTA over USD 500m in AUM, Risk-Adjusted Return over USD 500m in AUM, Trend-Follower over USD 500m in AUM).

Before we take a look at SEB Asset Selection's track record over the last decade, let us briefly touch on the fund's purpose.

¹ In this document, the expression 'commodity trading advisor' and/or the abbreviation 'CTA' are used only as a general description of a) the type of investment strategy pursued in the management of the SEB Asset Selection fund and/or similar funds, or b) fund managers pursuing such strategies. Accordingly, the term shall not be understood to indicate any regulatory or legal characteristic of SEB Asset Selection, its fund management company or any of their affiliates or corresponding entities of other funds pursuing similar strategies.

² The five-headed investment team is supported by a centralised execution team, risk control team, operations team, legal-, IT- and sales team.

³ Winton Futures Fund has turned into a multi-strategy hedge fund.



Purpose of SEB Asset Selection

A few years after launch, the concept of 'the ultimate fund' was defined in more detail. The team had two possibilities: i) to maximise the stand-alone risk-adjusted return of the fund (making it 'the ultimate stand-alone fund') or ii) to help clients maximise the risk-adjusted return of their portfolios (delivering 'the ultimate Sharpe-booster'). We chose the latter.

SEB Asset Selection's overriding purpose is to deliver uncorrelated excess returns and be a **great complement to a client portfolio**. This means that the fund is optimised to deliver the greatest enhancement in risk-adjusted return to a client portfolio over time. In an ideal case, SEB Asset Selection should:

- improve the long term returns of the client portfolio,
- reduce the volatility of the client portfolio and
- reduce the drawdowns of the client portfolio.

When optimising our fund's strategy to be a great complement to a client portfolio, we face the problem that client portfolios tend to differ in their asset allocations, geographical exposures, risk levels and the strategies they pursue. However, in reality, these differences are much smaller than they initially seem to be. The vast majority of client portfolios have a larger or smaller exposure to the equity market and the bond market. In addition, credit, currencies and other investments or strategies can often be seen as a hybrid between equities and bonds. Some types of investments tend to have a high correlation to equities. Others have a high correlation to bonds. Generally speaking, it does not matter that much if the client has a traditional investment approach and aims to harvest the longer term risk premiums of the equity-, credit- and/or bond market, or if the client aims to generate excess returns by using different hedge fund strategies. Many hedge fund strategies tend to have a rather high correlation to the equity- and/or bond market.

With the exception of some rather unusual client portfolios which are truly uncorrelated and truly market neutral, almost all client portfolios can be approximated by a combination of equities and bonds.

We tend to use a 50/50 portfolio of equities and bonds to approximate a typical client portfolio. This is fairly close to the asset allocation that the largest pension funds in the world tend to have on average. However, we realise that many client portfolios may have clearly different allocations. Therefore, our evaluation of SEB Asset Selection's 10 year performance will be done with regard to a range of client portfolios.

First, however, we will analyse whether the fund has delivered on its stated stand-alone performance targets or not.

Realised Performance versus Stated Targets

When the SEB Asset Selection fund was launched 10 years ago, we published some performance targets for the fund. All targets shall be seen as longer term averages.

Table 1: Long Term Targets for SEB Asset Selection (after fees)

	Target
Net Return p.a.	Risk-free + 5.0%
Net Excess Return p.a.	5.0%
Volatility	10.0%
Sharpe ratio (net)	0.50
Correlation to Equities	Within +/-0.20
Correlation to Bonds	Within +/-0.20

Source: SEB Investment Management

By generating excess returns over time, by achieving a low average correlation to equities and bonds over time and by applying a pure trend-following strategy, our research shows that we should have a great chance of delivering on the overall goal of the SEB Asset Selection fund – to be a great complement to a client portfolio.

We will be using both a retail share class and an institutional share class in the evaluation. As the fund did not have any institutional share classes from the very beginning, we need to construct a pro forma institutional share class using a retail share class. The institutional management fee amounts to half the retail management fee. The institutional performance fee is the same as the retail performance fee.

To achieve consistency when comparing different managed futures funds to each other and when constructing portfolios using funds and indices, we need to make sure that all funds and market indices are denominated in a common currency. We have chosen to do this in US dollars.

If a fund has not had any USD share class over the last 10 years (or if we could not find such a share class on Bloomberg), a USD time series has been constructed with the help of another share class. For example, EUR share classes have been converted into USD share classes by subtracting the EUR risk free rate of return and adding the USD risk free rate of return. This type of conversion is appropriate for absolute return oriented funds with currency-hedged share classes.

When it comes to indices representing the global equity market or the global bond market, we will use USD-variants of such indices (the constituents of such indices tend not to be currency-hedged). With regard to SEB Asset Selection, we have converted the performance of the fund's largest share class (retail SEK) into a USD time series.



From a retail perspective, SEB Asset Selection has delivered the following performance over the last 10 years:

Table 2: Performance versus Targets (Retail Fees)

	Target	Realised	Difference
Net Excess Return p.a.	5.0%	4.6%	-0.4%
Volatility	10.0%	8.5%	-1.5%
Sharpe ⁴ ratio (net)	0.50	0.54	+0.04
Correlation to Equities	+/-0.20	-0.20	OK
Correlation to Bonds	+/-0.20	0.17	OK

Period: 31 Oct 2006 – 30 Sept 2016

Share class: SEB Asset Selection RC SEK converted into RC USD

Retail Fees = 1.10% management fee + 20% performance fee

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Net Excess Return = Net Return p.a. – annualised return on the 3-month T-bill index

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

Source: Bloomberg, Datastream and SEB Investment Management

After deduction of full retail fees, SEB Asset Selection has delivered 4.6% in net excess return per annum over the last decade (target of 5.0%). Although we are falling a bit short on our target, we are still quite happy about the performance. The market environment over the last decade has not offered as many trend-following opportunities as in previous decades. The realised volatility has therefore been coming out a bit lower than expected (8.5% versus the target of 10%). This means that we at least have delivered on our stand-alone Sharpe-ratio target (0.54 versus target of 0.50). Finally, the correlations versus global equities and global bonds over the last 10 years have been within our targeted range of +/-0.20.

Table 3: Performance versus Targets (Institutional Fees)

	Realised	Target	Difference
Net Excess Return p.a.	5.0%	5.1%	+0.1%
Volatility	10.0%	8.5%	-1.5%
Sharpe ratio (net)	0.50	0.59	0.09
Correlation to Equities	+/-0.20	-0.19	OK
Correlation to Bonds	+/-0.20	0.17	OK

Period: 31 Oct 2006 – 30 Sept 2016

Share class: SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% management fee + 20% perf. Fee)

Institutional Fees = 0.55% management fee + 20% performance fee

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Net Excess Return = Return after fees in excess of the 3-month T-bill return; **Sharpe ratio (net)** = Net Excess Return p.a. / Volatility

Source: Bloomberg, Datastream and SEB Investment Management

From an institutional perspective, the volatility and the correlations have been the same as for the retail class. However, due to the lower management fee, the realised net

excess return is a touch higher and is therefore able to match the net excess return target (5.1% versus target of 5.0%). As a consequence, the Sharpe ratio is also a bit higher (0.59 versus target of 0.50).

In summary, from a retail investor's perspective we have come fairly close to delivering on the targets we set up when we launched SEB Asset Selection 10 years ago. From an institutional perspective, we have matched or exceeded our targets.

Next, we will look at the performance contribution that SEB Asset Selection has delivered to a traditional client portfolio and to a fund-of-funds portfolio, respectively. For these two evaluations, we will be using the retail version of SEB Asset Selection. After that, we will be comparing SEB Asset Selection to some of the largest managed futures funds in the world. Since the competing funds are all non-UCITS with institutional pricing, we will be using the institutional variant of SEB Asset Selection for that evaluation.

As regards data sources, two risk-free indices have been sourced from Datastream (3 month US-Treasury return index as well as 3 month Swedish T-bill return index), while all other data has been retrieved from Bloomberg.

It is time to evaluate SEB Asset Selection in the context of a traditional portfolio.

⁴ We use a geometric version of the Sharpe ratio: (Annualised Net Return of the Asset – Annualised Risk Free Return) / Volatility of the Asset. The original Sharpe ratio uses the arithmetic average return. Arithmetic averages tend to overestimate the true long term return.



Performance Contribution to a Traditional Client Portfolio (Equities + Bonds)

In the below table, we have calculated performance statistics for global bonds (JPM Global Aggregate Bond Index in USD), global equities (MSCI World Equities Total Return USD) and SEB Asset Selection over the last 10 years. The two market indices are gross of fees. SEB Asset Selection is reported net of retail fees.

Table 4: Stand-Alone Performance Last 10 Years

	Bonds	Equities	SEB Asset Selection
Net Return p.a.	4.5%	4.1%	5.3%
- Risk Free Return p.a.	-0.8%	-0.8%	-0.8%
Net Excess Return p.a.	3.7%	3.4%	4.6%
Volatility	5.7%	16.6%	8.5%
Worst Drawdown	9.4%	54.0%	10.0%
Sharpe ratio (net)	0.65	0.20	0.54
ERWD ratio (net)	0.39	0.06	0.46
Correlation to Equities	0.35	1.00	-0.20
Correlation to Bonds	1.00	0.35	0.17

Period: 31 Oct 2006 – 30 Sept 2016

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Risk Free Return = Return on 3-month T-bill USD index

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management

We will now construct three traditional portfolios: a low risk portfolio (75% bonds + 25% equities), a medium risk portfolio (50% bonds + 50% equities) and a high risk portfolio (25% bonds + 75% equities). These portfolios will be called “traditional portfolios”. Each of the traditional portfolios will be compared to a portfolio that – in addition to bonds and equities – also has an allocation to SEB Asset Selection. We will call these portfolios “modern portfolios”. Each of the modern portfolios will have a 33% allocation to SEB Asset Selection. The allocations to bonds and equities are reduced in a proportionate manner.

As we can see in Table 5, a traditional low risk portfolio generated a net return of 4.6% per annum and had a volatility of 6.9%. The Sharpe ratio amounted to 0.56 and the ERWD ratio (Excess Return / Worst Drawdown) was 0.22.

The modern portfolio (including SEB Asset Selection) was clearly better than the traditional portfolio. In fact, the modern portfolio outperformed the traditional one on each parameter over the last 10 years. The portfolio return was higher, the volatility lower, the worst drawdown clearly

smaller and both risk-adjusted return ratios, i.e. the Sharpe ratio and ERWD ratio, were substantially higher in the modern portfolio. The Sharpe ratio improved by 0.23 units (from 0.56 to 0.78) and the ERWD ratio improved by 0.28 units (from 0.22 to 0.50). We can thus conclude that SEB Asset Selection over the last 10 years has been able to contribute quite nicely to the performance characteristics of a low risk portfolio containing bonds and equities.

Table 5: Traditional and Modern Low Risk Portfolios

	Traditional Portfolio Low Risk	Modern Portfolio Low Risk	Difference
Net Return p.a.	4.6%	5.0%	+0.4%
- Risk Free Return p.a.	-0.8%	-0.8%	0.0%
Net Excess Return p.a.	3.9%	4.2%	+0.4%
Volatility	6.9%	5.4%	-1.5%
Worst Drawdown	17.3%	8.5%	-8.9%
Sharpe ratio (net)	0.56	0.78	+0.23
ERWD ratio (net)	0.22	0.50	+0.28
Correlation to Equities	0.82	0.61	-0.21
Correlation to Bonds	0.83	0.80	-0.03

Period: 31 Oct 2006 – 30 Sept 2016

Traditional Portfolio Low Risk = 75% Bonds + 25% Equities

Modern Portfolio Low Risk = 50% Bonds + 17% Equities + 33% SEB Asset Selection

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Risk Free Return = Return on 3-month T-bill USD index

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management

It is now time to find out whether the performance improvements from an investment in SEB Asset Selection were specific to a bond-heavy portfolio, or whether the fund can also improve a medium risk and a high risk traditional portfolio.

As can be seen in Table 6 on the next page, the performance contribution from including SEB Asset Selection into a medium risk equity-bond portfolio is basically as substantial as it was for the low risk portfolio. The portfolio return improved by 0.3 percentage points at the same time as the portfolio volatility declined by 3.0 percentage points. The Sharpe ratio improved by 0.24 units (from 0.40 to 0.64). The worst drawdown was reduced by 14-15 percentage points (from 30.2% to 15.7%) and the ERWD ratio improved by 0.14 units (from 0.13 to 0.27).

**Table 6: Traditional and Modern Medium Risk Portfolios**

	Traditional Portfolio Medium Risk	Modern Portfolio Medium Risk	Difference
Net Return p.a.	4.6%	5.0%	+0.3%
- Risk Free Return p.a.	<u>-0.8%</u>	<u>-0.8%</u>	<u>0.0%</u>
Net Excess Return p.a.	3.9%	4.3%	+0.3%
Volatility	9.7%	6.7%	-3.0%
Worst Drawdown	30.2%	15.7%	-14.5%
Sharpe ratio (net)	0.40	0.64	+0.24
ERWD ratio (net)	0.13	0.27	+0.14
Correlation to Equities	0.96	0.84	-0.12
Correlation to Bonds	0.60	0.64	+0.05

Period: 31 Oct 2006 – 30 Sept 2016

Traditional Portfolio Medium Risk = 50% Bonds + 50% Equities

Modern Portfolio Medium Risk = 33% Bonds + 33% Equities + 33% SEB Asset Selection

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Risk Free Return = Return on 3-month T-bill USD index

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management

Table 7: Traditional and Modern High Risk Portfolios

	Traditional Portfolio High Risk	Modern Portfolio High Risk	Difference
Net Return p.a.	4.5%	5.1%	+0.6%
- Risk Free Return p.a.	<u>-0.8%</u>	<u>-0.8%</u>	<u>0.0%</u>
Net Excess Return p.a.	3.7%	4.3%	+0.6%
Volatility	13.0%	8.7%	-4.3%
Worst Drawdown	43.2%	26.3%	-16.9%
Sharpe ratio (net)	0.29	0.50	+0.21
ERWD ratio (net)	0.09	0.16	+0.08
Correlation to Equities	0.99	0.93	-0.06
Correlation to Bonds	0.45	0.50	+0.06

Period: 31 Oct 2006 – 30 Sept 2016

Traditional Portfolio High Risk = 25% Bonds + 75% Equities

Modern Portfolio High Risk = 17% Bonds + 50% Equities + 33% SEB Asset Selection

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Equities = MSCI World Equities Total Return in USD

Bonds = JPM Global Aggregate Bonds Index in USD

Risk Free Return = Return on 3-month T-bill USD index

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management

Finally, we evaluate SEB Asset Selection's ability to add value to a high risk equity-bond portfolio (Table 7). Again, the inclusion of our fund improved the return of the high risk equity-bond portfolio, reduced the volatility and the worst drawdown of the portfolio and improved the risk-adjusted return of the portfolio. The Sharpe ratio increased by 0.21 units (from 0.29 to 0.50) over the 10 year period.

In summary, we can conclude that SEB Asset Selection over the last decade has been able to contribute quite positively to the performance characteristics of both a low risk-, medium risk- and a high risk equity-bond portfolio.

The Underlying Reasons for the Positive Contribution

There are basically three reasons for SEB Asset Selection's positive performance contribution:

First, over the last decade, SEB Asset Selection has been able to generate a fair amount of excess returns. After fees, the net excess returns have amounted to 4.6% per annum (after retail fees). This excess return is not only higher than the excess return that the QE-stimulated global bond market managed to deliver (3.7%), but also higher than the global equity market was capable of delivering (3.4%). Thus, the inclusion of SEB Asset Selection helped to *increase the returns of the client portfolios*.

Second, during these 10 years, SEB Asset Selection delivered a very low correlation to both the equity market (-0.20) and the bond market (+0.17). In fact, the correlations were even lower than the correlation observed between the equity market and the bond market during the same period (0.35). By allocating some capital to SEB Asset Selection, the *volatilities of the client portfolios were reduced*.

Third, SEB Asset Selection's strategy of catching market trends and taking directional positions (long/short) in equity index futures, government bond futures, currency futures and short term interest rate futures has had the positive effect of being able to generate a good return during 2008 (+25%) when the severe equity bear market pulled down all traditional client portfolios. The possibility to generate positive returns during bear markets is a rather unique and highly appreciated characteristic of managed futures funds. By having been invested in SEB Asset Selection over the last 10 years, *the worst drawdowns of the client portfolios have been significantly reduced*.

We will now move on and raise the bar a little bit. Let us assume that an extraordinary fund-of-funds investor in October 2006 had the unusual ability to look 10 years into the future and to pick some of the best performing and most popular diversified growth / multi-strategy / multi-asset absolute return funds in the world. Would it have made sense for the extraordinary fund-of-funds investor to include SEB Asset Selection into his super-portfolio? Let us find out.



Performance Contribution to a Fund-of-Funds Portfolio

In our process of selecting some of the best performing & most popular diversified growth / multi-strategy / multi-asset absolute return funds over the last decade, we have scanned quite a few funds. In the end, we decided to include the following five funds in the study:

- Standard Life GARS
- Carmignac Patrimoine
- Ethna Aktiv
- Nordea Stable Return
- SEB Asset Selection

The first four funds have not only been able to deliver great risk-adjusted returns, but they have also received a lot of appreciation and huge inflows from their clients over the last 10 years. The fifth fund, SEB Asset Selection, had neither achieved the highest Sharpe ratio, nor the largest inflows. We still chose to include the fund because: i) we are ourselves managing the fund (admittedly a questionable reason) and ii) we think that a lot of readers will appreciate us including the fund in the study.

We cannot guarantee that we have been able to find the absolutely best and most popular funds in the world (with performance data publicly available on Bloomberg), but they should at least be promising candidates.

In Table 8 below, you can find the stand-alone performance numbers for the five funds. All NAV/share time series have been converted into USD time series before calculating the different statistics. We have used the previously described

methodology for converting a currency hedged share class from one share class currency into another by subtracting the risk free rate of return of one currency (the currency of the existing share class) and by adding the risk free rate of return of another currency (USD). That way, we arrive at a USD time series that could have been achieved via currency hedging.

Over the last 10 years, the return of a risk-free GBP investment amounted to 1.78% per annum, 1.26% p.a. for a risk free EUR investment, 1.30% p.a. for a risk free SEK investment and 0.75% per annum for a risk free USD investment. The conversion into a USD time series reduced the net return for each fund, since the risk free USD rate has been lower than the risk free return in the other currencies. However, the excess return (after deduction of the risk free rate) is still the same. The Sharpe ratio is also the same as in the original share class. The performance data in the table is shown net of retail fees.

All funds have generated a substantial amount of excess returns. The annualised net excess return for the five funds ranged between 2.9% (Ethna Aktiv) and 4.6% (SEB Asset Selection). The volatilities were within a range of 4.6% (Ethna Aktiv) and 8.5% (SEB Asset Selection). Four of the funds managed to keep their worst drawdown to about 10%-12%. One fund suffered a drawdown of 18%.

Standard Life GARS had the highest Sharpe ratio, 0.70, over the last decade. However, Nordea Stable Return, Ethna Aktiv and Carmignac Patrimoine were not too far behind with Sharpe ratios of 0.65, 0.62 and 0.59, respectively. SEB Asset Selection had the lowest Sharpe ratio, 0.54.

Table 8: Stand-Alone Performance Last 10 Years

	Standard Life GARS	Carmignac Patrimoine	Ethna Aktiv	Nordea Stable Return	SEB Asset Selection
Net Return p.a.	4.6%	5.0%	3.6%	4.2%	5.3%
- Risk Free Return p.a.	<u>-0.8%</u>	<u>-0.8%</u>	<u>-0.8%</u>	<u>-0.8%</u>	<u>-0.8%</u>
Net Excess Return p.a.	3.8%	4.2%	2.9%	3.4%	4.6%
Volatility	5.4%	7.1%	4.6%	5.2%	8.5%
Worst Drawdown	10.7%	12.3%	11.0%	18.0%	10.0%
Sharpe ratio (net)	0.70	0.59	0.62	0.65	0.54
ERWD ratio (net)	0.36	0.34	0.26	0.19	0.46
Correlation to Equities	0.50	0.14	0.59	0.79	-0.20
Correlation to Bonds	0.11	-0.04	0.18	0.28	0.17

Period: 31 Oct 2006 – 30 Sept 2016

Standard Life GARS has been converted from GBP to USD, SEB Asset Selection from SEK to USD and the remaining three funds from EUR to USD.

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management



Let us return to our extraordinary investor who 10 years ago was able to look into the future. He would have had access to Table 8 ahead of time and would only have had to pick the funds he liked best.

If the extraordinary investor applied the same portfolio construction methodology as many investors do (i.e. to select funds on the basis of their stand-alone Sharpe ratio) then the extraordinary investor would have picked Standard Life GARS first, then Nordea Stable Return, Ethna Aktiv, Carmignac Patrimoine and finally SEB Asset Selection. To make it more interesting, let us assume that he would only be allowed to pick four out of the five funds. If he followed the most commonly applied methodology for picking investments, he would have chosen Standard Life GARS, Nordea Stable Return, Ethna Aktiv and Carmignac Patrimoine.

With a 25% capital weight in each of the four selected funds (i.e. Standard Life GARS, Nordea Stable Return, Ethna Aktiv and Carmignac Patrimoine), our clairvoyant investor would have received a portfolio that he would have been quite happy about:

Net Excess Return p.a.:	4.0%
Volatility	4.7%
Worst Drawdown:	11.6%
Sharpe ratio:	0.85

However, let us assume that our extraordinary investor had a colleague who had taken a course in investment- and portfolio theory. Instead of advising him to do a full-blown mean-variance optimisation (which she feared would not be appreciated by her colleague), she suggested that they should do some simple portfolio simulations in a spreadsheet programme.

Within an hour, she had simulated the performance of six different portfolios (Table 9).

The first five columns describe portfolios of four funds with a 25% capital allocation to each fund. For example, the first portfolio, "Portfolio excl. Standard Life GARS" excluded Standard Life GARS and had a 25% weight in each of the other four funds, i.e. Carmignac Patrimoine, Ethna Aktiv, Nordea Stable Return and SEB Asset Selection. The portfolio was rebalanced to equal weights on a monthly basis.

She also simulated the performance of a portfolio that included all five funds with a 20% capital allocation each. The performance of this portfolio is seen in the last column of Table 9.

As will become evident when analysing Table 9, the two colleagues had some very valuable talents. One of them was great at forecasting the stand-alone performance of different funds and the other understood the importance of proper portfolio construction.

The initial portfolio that the clairvoyant investor put together by himself can be found in Table 9 with the heading "Portfolio excl. SEB Asset Selection". By comparing the performance of this portfolio with the performance of the other portfolios in the same table, it becomes clear that the naïve way of picking funds on the basis of the stand-alone Sharpe ratio is rather sub-optimal.

All other combinations of four-fund portfolios generated a clearly higher Sharpe ratio (0.91-0.98) than the naïve four-fund portfolio. The five-fund portfolio was also clearly better with a Sharpe ratio of 0.96.

Table 9: Simulation of different Fund-of-Funds Portfolios over Last 10 Years

	Portfolio excl. Standard Life GARS	Portfolio excl. Carmignac Patrimoine	Portfolio excl. Ethna Aktiv	Portfolio excl. Nordea Stable Return	Portfolio excl. SEB Asset Selection	Portfolio incl. All Five Funds
Net Return p.a.	5.0%	4.9%	5.2%	4.7%	4.7%	4.9%
- Risk Free Return p.a.	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%
Net Excess Return p.a.	4.2%	4.1%	4.5%	4.0%	4.0%	4.2%
Volatility	4.6%	4.2%	4.7%	4.4%	4.7%	4.4%
Worst Drawdown	7.3%	7.6%	7.3%	7.9%	11.6%	7.9%
Sharpe ratio (net)	0.92	0.98	0.96	0.91	0.85	0.96
ERWD ratio (net)	0.58	0.55	0.61	0.50	0.34	0.53
Correlation to Equities	0.33	0.46	0.32	0.27	0.55	0.40
Correlation to Bonds	0.18	0.25	0.16	0.14	0.13	0.18

Period: 31 Oct 2006 – 30 Sept 2016

Standard Life GARS has been converted from GBP to USD, SEB Asset Selection from SEK to USD and the remaining three funds from EUR to USD.

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management



Compared to the initial portfolio that excluded SEB Asset Selection, all portfolios that *included* SEB Asset Selection had:

- an equal or higher return
- an equal or lower volatility
- a substantially smaller worst drawdown
- a substantially higher Sharpe ratio
- a substantially higher ERWD ratio
- a lower correlation to the equity market
- a higher, but still low correlation to the bond market

Another way to analyse how much value each fund is contributing to the overall fund-of-funds portfolio, is to calculate the difference in performance when going from a four-fund portfolio to a five-fund portfolio. The results of this exercise can be seen in Table 10.

Although Standard Life GARS had the highest stand-alone Sharpe ratio, the fund did not increase the return of the fund-of-funds portfolio. It did however have a positive impact in terms of reducing the volatility and therefore increasing the Sharpe ratio by 0.05 units. On the other hand, it also caused the worst drawdown to become a bit larger and the ERWD to decline by 0.07. What looked like a stellar investment on a stand-alone basis was not as stellar in the context of this high quality fund-of-funds portfolio.

Carmignac Patrimoine added to the returns of the portfolio, but also increased the volatility and the worst drawdown of the overall portfolio. The net effect was that the fund had a slightly negative impact on the Sharpe ratio and the ERWD ratio of the client portfolio.

Ethna Aktiv lowered the return as well as the volatility of the

portfolio, but increased the worst drawdown. The Sharpe ratio was unchanged and the ERWD ratio declined.

Nordea Stable Return lowered the return of the fund-of-funds portfolio, but also lowered the volatility and the worst drawdown of the portfolio. The net effect was that both the Sharpe ratio and the ERWD ratio increased.

SEB Asset Selection had the lowest stand-alone Sharpe ratio among the five funds. In spite of this, the fund had the largest positive impact on the overall client portfolio. In fact, it had the largest positive impact on any and all performance statistics. The portfolio return improved by 0.3 percentage points, the portfolio volatility was reduced by 0.3 percentage points and the worst drawdown was 3.8 percentage points smaller when SEB Asset Selection had been included into the fund-of-funds portfolio. The Sharpe ratio of the portfolio increased by as much as 0.12 units and the ERWD ratio by 0.21 units, substantially larger improvements than for any of the other funds.

To sum up: In the context of a fund-of-funds portfolio including some of the best performing and most popular diversified growth / multi-strategy / multi-asset absolute return funds over the last 10 years, we conclude that the fund with the lowest stand-alone Sharpe ratio, SEB Asset Selection, had the largest positive impact on the overall fund-of-funds portfolio.

This may be a bit surprising at first glance, but when taking a closer look at the stand-alone statistics, one could have noticed some important differences between the funds. Let us return to Table 8. First, we know from portfolio theory that the return of a portfolio equals the sum of the weighted

Table 10: Impact of Adding a Specific Fund to the Fund-of-Funds

	Impact of Adding Standard Life GARS	Impact of Adding Carmignac Patrimoine	Impact of Adding Ethna Aktiv	Impact of Adding Nordea Stable Return	Impact of Adding SEB Asset Selection
Net Return p.a.	0.0%	0.1%	-0.2%	-0.1%	0.3%
- Risk Free Return p.a.	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>
Net Excess Return p.a.	0.0%	0.1%	-0.2%	-0.1%	0.3%
Volatility	-0.2%	0.2%	-0.3%	-0.3%	-0.3%
Worst Drawdown	0.8%	0.5%	0.8%	-0.7%	-3.8%
Sharpe ratio (net)	0.05	-0.02	0.00	0.04	0.12
ERWD ratio (net)	-0.07	-0.02	-0.10	0.04	0.21
Correlation to Equities	0.08	-0.07	0.08	0.16	-0.17
Correlation to Bonds	0.00	-0.08	0.01	0.05	0.05

Period: 31 Oct 2006 – 30 Sept 2016

Standard Life GARS has been converted from GBP to USD, SEB Asset Selection from SEK to USD and the remaining three funds from EUR to USD.

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

ERWD ratio (net) = Net Excess Return p.a. / Worst Drawdown

Source: Bloomberg, Datastream and SEB Investment Management



returns of the investments included in the portfolio. SEB Asset Selection had the highest return among the five funds – thus, it should not come as a surprise that the SEB Asset Selection had the largest contribution to the return of the fund-of-funds portfolio.

Second, we recall that the volatility of a portfolio does *not* equal the sum of the weighted volatilities of the investments included in the portfolio, but rather the square root of the sum of each investment’s co-variance with the other investments (and itself) when it has been multiplied by its own weight and the weight of the other investment. In other words, the formula for the portfolio volatility looks like this:

Volatility of a Portfolio

$$\sigma_p = \left[\sum_{i=1}^n \sum_{j=1}^n w_i * w_j * \sigma_{ij} \right]^{0.5}$$

where

- σ_p = portfolio volatility
- i or j = a specific investment in the portfolio
- w_i = investment i 's weight in the portfolio
- σ_{ij} = the co-variance between investment i and j
- n = number of investments in the portfolio
- σ_{ij} = $\sigma_i * \sigma_j * \text{Correlation}_{ij}$

Source: SEB Investment Management

The portfolio volatility is not only dependent on the level of the stand-alone volatility of each investment, but also on the correlation between the investments. A correlation of less than 1.00 will help to make sure that the portfolio volatility will be less than the weighted sum of the volatilities of the investments in the portfolio. An investment with a negative correlation to other portfolio investments will bring down the portfolio volatility by a substantial amount.

In Table 9 we show the co-variances between the five funds over the last decade. In Table 10 we have calculated the correlations between the funds.

The low correlation between SEB Asset Selection and the other funds, especially between SEB Asset Selection and Standard Life GARS, Ethna Aktiv and Nordea Stable Return, respectively, has the consequence that the co-variances that are added to the overall portfolio are very low (very close to zero).

SEB Asset Selection’s correlation to Carmignac Patrimoine is a bit higher at 0.36, but still at the low end of the range when compared to the pairwise correlations between the other funds. Although SEB Asset Selection brings along a bit of its own variance (20%*20%*0.73%) to the fund-of-funds portfolio’s variance, it adds very little risk, if any, to the portfolio via the combination effects (co-variances with other

portfolio investments). This feature of having low correlation to other portfolio investments makes SEB Asset Selection a unique and very attractive investment proposition.

Table 9: Co-Variances between the Five Funds

	StdLife	Carm.	Ethna	Nordea	SEB
StdLife	0.30%	0.16%	0.16%	0.17%	-0.02%
Carm.	0.16%	0.50%	0.13%	0.12%	0.22%
Ethna	0.16%	0.13%	0.22%	0.14%	0.03%
Nordea	0.17%	0.12%	0.14%	0.28%	-0.01%
SEB	-0.02%	0.22%	0.03%	-0.01%	0.73%

Period: 31 Oct 2006 – 30 Sept 2016
StdLife = Standard Life GARS; **Carm.** = Carmignac Patrimoine
Ethna = Ethna Aktiv; **Nordea** = Nordea Stable Return
SEB = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)
Source: Bloomberg, Datastream and SEB Investment Management

Table 10: Correlation between the Five Funds

	StdLife	Carm.	Ethna	Nordea	SEB
StdLife	1.00	0.41	0.63	0.58	-0.05
Carm.	0.41	1.00	0.40	0.31	0.36
Ethna	0.63	0.40	1.00	0.57	0.08
Nordea	0.58	0.31	0.57	1.00	-0.02
SEB	-0.05	0.36	0.08	-0.02	1.00

Period: 31 Oct 2006 – 30 Sept 2016
StdLife = Standard Life GARS; **Carm.** = Carmignac Patrimoine
Ethna = Ethna Aktiv; **Nordea** = Nordea Stable Return
SEB = SEB Asset Selection RC SEK converted into SEB Asset Selection RC USD (1.10% management fee + 20% performance fee)
Source: Bloomberg, Datastream and SEB Investment Management

By now it should be clear that the process of selecting funds based on their stand-alone Sharpe ratios is a flawed process. That methodology totally ignores the fact that investments have very different correlations to each other.

Portfolio managers who would like to maximise the risk-adjusted return of their overall portfolio, should make sure they evaluate each investment – not on a stand-alone basis – but *in the context of and as a part of the overall client portfolio*. We strongly recommend investors to do portfolio simulations to measure how much each investment improves the risk-adjusted return of the overall client portfolio.

The ideal complement to a portfolio would be an investment that has a high excess return and a negative correlation to the other investments in the portfolio. Such investments tend however to be quite hard to find. The investment strategy that comes closest to this description is managed futures / CTA, i.e. the category that SEB Asset Selection belongs to.

Does that mean that you could have included *any* managed futures fund and achieved an equally beneficial impact on the client portfolio?



Realised Performance versus Competitors

It is now time to find out how SEB Asset Selection's performance during the last decade compares to the performance of other managed futures funds.

We had four criteria for including different managed futures / CTA funds in our comparison: a) the price series had to be publicly available on Bloomberg, b) the track record had to be at least 10 years long and c) the fund had to be among the largest / most established managed futures / CTA funds in the world and d) we have excluded macro funds, multi-strategy funds, risk-parity funds, currency-only funds and other funds that would diverge from the classical group of managed futures / CTA funds.

One fund has been *included* into the study in spite of the fact that the fund no longer can be viewed as a managed futures / CTA fund. This is Fund 2. As far as we understand, the management company of Fund 2 has communicated for a number of years that the fund does not belong to the group of managed futures funds any more. Instead, the fund has transformed into a multi-strategy hedge fund. The change is also confirmed by the fact that the fund has been excluded from managed futures / CTA indices.

Two managed futures funds could not be included into the study since they do not offer public access to their performance on Bloomberg: Systematica BlueTrend and Graham Futures fund.

The following funds had a shorter track record than 10 years and were therefore excluded from the comparison: AQR Managed Futures, AlphaSimplex Managed Futures and ISAM Systematic Trend.

Thus, we ended up with 14 of the world's largest managed futures / CTA funds plus 1 multi-strategy hedge fund.

Since SEB Asset Selection did not have any institutional share classes from the very beginning, we have constructed a pro forma institutional share class from a retail share class. The institutional management fee amounts to half the retail management fee. The institutional performance fee is the same as the retail performance fee. While this is the standard fee structure for our institutional clients, more attractive fees may be received for larger institutional investments.⁵

So, what is the best way of evaluating managed futures / CTA funds? As concluded in the previous section, the best way to evaluate any investment is to do it in the context of the client

portfolio. But, in order to see the difference between stand-alone analysis and the proper client portfolio analysis, we will start with the stand-alone results (Table 11).

Table 11: Stand-Alone Risk-Adjusted Return

	Sharpe Ratio	ERWD Ratio	Mixed Ratio (50% Sharpe + 50% ERWD)
Fund 2	0.72	0.73	0.72
SEB Asset Selection	0.59	0.51	0.55
Fund 3	0.54	0.43	0.49
Fund 4	0.51	0.47	0.49
Fund 6	0.44	0.35	0.40
Fund 5	0.46	0.24	0.35
Fund 10	0.33	0.24	0.28
Fund 9	0.32	0.21	0.27
Fund 8	0.35	0.18	0.26
Fund 7	0.31	0.16	0.23
Fund 11	0.25	0.17	0.21
Fund 12	0.20	0.13	0.17
Fund 15	0.21	0.13	0.17
Fund 13	0.08	0.03	0.06
Fund 14	0.05	0.02	0.04

Period: 31 Oct 2006 – 30 Sept 2016.

Included funds: The following managed futures / CTA funds are included in the comparison: Altis Global Futures (USD), Aspect Diversified Fund (EUR->USD), SEB Asset Selection (SEK->USD), Boronia Diversified (USD), Campbell Managed Futures Program (USD), Cantab Quantitative Fund (USD), Dunn WMA (USD), FTC Futures Fund (EUR->USD), Brummer & Partners Lynx (SEK->USD), MAN AHL Diversified (USD), Millburn Diversified (USD), Transtrend Fund (EUR->USD), Rivoli International (EUR->USD), SMN Diversified Futures (EUR->USD) and Winton Futures fund (USD).

(EUR->USD) = A conversion has taken place from a EUR share class into a USD share class by subtracting the risk free EUR rate and adding the risk free USD rate for each monthly observation.

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% mgmt. fee + 20% perf. fee)

Missing funds: Systematica BlueTrend and Graham Futures Fund are missing, since they do not make their performance data publicly available on Bloomberg.

Sharpe Ratio = Annualised Excess Return after Fees / Volatility

ERWD Ratio = Annualised Excess Return / Worst Drawdown

Mixed Ratio = 50% Sharpe Ratio + 50% ERWD Ratio

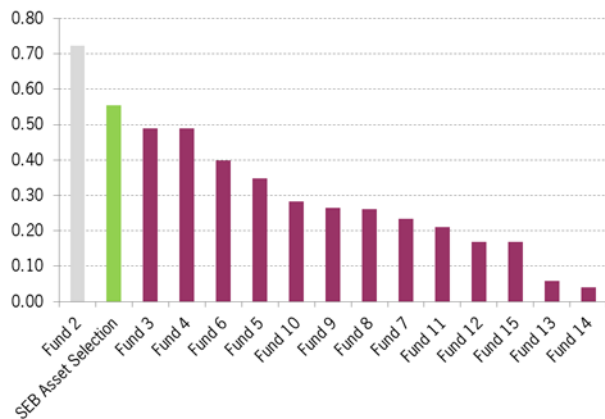
Source: Bloomberg and SEB Investment Management

Over the last 10 years, the multi-strategy hedge fund, Fund 2, had the clearly highest stand-alone Sharpe ratio, ERWD ratio and Mixed ratio (50% Sharpe ratio + 50% ERWD ratio). SEB Asset Selection had the highest risk-adjusted return among all the managed futures / CTA funds, just ahead of Fund 3 and Fund 4, which also had good risk-adjusted returns. As can be seen in Figure 12 on the next page, there was a fairly large dispersion in risk-adjusted returns among the largest managed futures funds.

⁵ The institutional pricing applied in the pro forma price series is valid for minimum subscriptions of USD 10m (minimum subscription level is currently under review). The fees for super-institutional investors are lower. Please contact GlobalQuantTeam@seb.se or your SEB sales representative for more information on super-institutional fees.



Figure 12: Stand-Alone Risk-Adjusted Returns (Mixed Ratio)



Period: 31 Oct 2006 – 30 Sept 2016.
Other information: Please see footnote of Table 11.
Source: Bloomberg and SEB Investment Management

Let us now evaluate the different funds in the context of a client portfolio. We will look at three variants of client portfolios: i) equity + managed futures portfolio, ii) equity + bond + managed futures portfolio and iii) a fund-of-funds portfolio with an allocation to managed futures.

In the first case, we look at a client portfolio that has 50% of the capital invested in the equity market (the MSCI World Equities Total Return in USD) and 50% invested into a managed futures fund. Since different managed futures funds run with different levels of volatility, we need to normalise the performance time series so that the volatility of each managed futures fund is the same. We have chosen to normalise each fund to an average volatility of 15%.⁶

In Table 13, we show the risk-adjusted return of 15 simulated portfolios, each containing 50% equities and 50% in the respective managed futures fund. The risk-adjusted return referred to as the Mixed Ratio ranges from 0.26 to 0.58. This measure is also depicted in Figure 13.

We notice two things: First, the range of risk-adjusted return has narrowed considerably compared to the stand-alone study in Figure 12 above. Second, the multi-strategy fund, Fund 2, has lost its lead. Fund 2's shift from managed futures into multi-strategy has improved the fund's stand-alone numbers, but deteriorated its ability to diversify an equity portfolio. In the context of a client portfolio containing 50% equities and 50% managed futures, SEB Asset Selection has delivered the highest risk-adjusted return over the last 10 years.

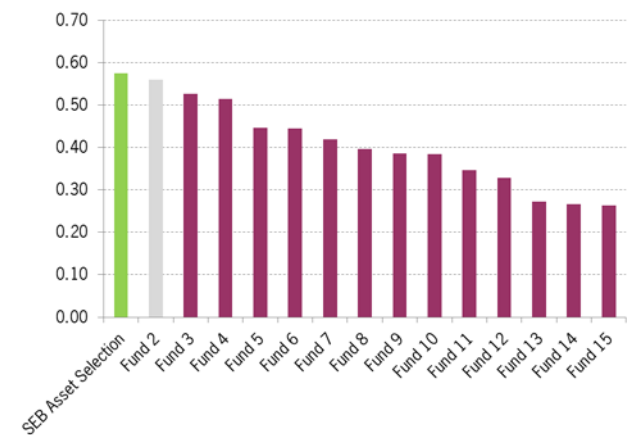
⁶ We normalised each net return series by first deducting the risk free rate of return and then by multiplying the net excess return by 15% and dividing by the fund's average volatility. Finally, the risk free rate was added back.

Table 13: Risk-Adjusted Returns for a Portfolio with 50% in Equities and 50% in a Managed Futures / CTA Fund

	Sharpe Ratio	ERWD Ratio	Mixed Ratio (50% Sharpe + 50% ERWD)
SEB Asset Selection	0.75	0.40	0.58
Fund 2	0.77	0.35	0.56
Fund 3	0.74	0.31	0.53
Fund 4	0.69	0.34	0.51
Fund 5	0.58	0.31	0.45
Fund 6	0.58	0.31	0.45
Fund 7	0.54	0.30	0.42
Fund 8	0.57	0.22	0.40
Fund 9	0.53	0.24	0.39
Fund 10	0.54	0.23	0.38
Fund 11	0.52	0.17	0.35
Fund 12	0.45	0.20	0.33
Fund 13	0.35	0.19	0.27
Fund 14	0.35	0.18	0.27
Fund 15	0.39	0.14	0.26

Period: 31 Oct 2006 – 30 Sept 2016.
Included funds: The following managed futures / CTA funds are included in the comparison: Altis Global Futures (USD), Aspect Diversified Fund (EUR->USD), SEB Asset Selection (SEK->USD), Boronia Diversified (USD), Campbell Managed Futures Program (USD), Cantab Quantitative Fund (USD), Dunn WMA (USD), FTC Futures Fund (EUR->USD), Brummer & Partners Lynx (SEK->USD), MAN AHL Diversified (USD), Millburn Diversified (USD), Transtrend Fund (EUR->USD), Rivoli International (EUR->USD), SMN Diversified Futures (EUR->USD) and Winton Futures fund (USD). (EUR->USD) = A conversion has taken place from a EUR share class into a USD share class by subtracting the risk free EUR rate and adding the risk free USD rate for each monthly observation.
SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% mgmt. fee + 20% perf. fee)
Missing funds: Systematica BlueTrend and Graham Futures Fund are missing, since they do not make their performance data publicly available on Bloomberg.
Sharpe Ratio = Annualised Excess Return after Fees / Volatility
ERWD Ratio = Annualised Excess Return / Worst Drawdown
Mixed Ratio = 50% Sharpe Ratio + 50% ERWD Ratio
Equities = MSCI World Total Return Net in USD
Source: Bloomberg and SEB Investment Management

Figure 13: Risk-Adjusted Return (Mixed Ratio) for a Portfolio with 50% in Equities & 50% in a Managed Futures / CTA Fund



Period: 31 Oct 2006 – 30 Sept 2016.
Other information: Please see footnote of Table 13.
Source: Bloomberg and SEB Investment Management



It is also interesting to see that managed futures funds with a low stand-alone risk-adjusted return are still able to add good value purely from a diversification point of view.

The second type of client portfolio that we are going to test is a portfolio that has allocated 33% of its capital to equities (MSCI World Equities Total Return USD), 33% to bonds (JPM Global Aggregate Bond Index in USD) and 33% to a managed futures fund (with normalised volatility of 15%).

Table 14 and Figure 14 show the results of these calculations. The ranking of the different managed futures funds is identical to the ranking where the client portfolio consisted of equities and managed futures only. The risk-adjusted returns are generally on a higher level, but the range is equally wide (from 0.38 to 0.70). Over the last 10 years, SEB Asset Selection has been adding most value to a portfolio that includes equities and bonds. SEB Asset Selection has increased its lead versus the multi-strategy hedge fund, Fund 2. This indicates that SEB Asset Selection has not only been better than Fund 2 at diversifying equity investments but also at diversifying bond investments.

This should not come as a surprise. SEB Asset Selection and Fund 2 have different purposes. The former aims to be a great complement to a client portfolio, while the latter aims to be a great stand-alone product. For a multi-strategy hedge fund it makes perfect sense to include direct or indirect exposures to risk premiums (e.g. equities and bonds) when maximising the fund's stand-alone risk-adjusted return. Correlations versus equities and bonds increase, but that is acceptable if the overriding goal is to maximise the fund's stand-alone risk-adjusted return.

In SEB Asset Selection's case, however, low average correlations versus equities and bonds are important for reaching its objective, i.e. the objective of being a great complement to a client portfolio. This self-imposed restriction may make the fund look somewhat less attractive on a stand-alone basis, but it will contribute a lot to making SEB Asset Selection a very attractive complement to a client portfolio.

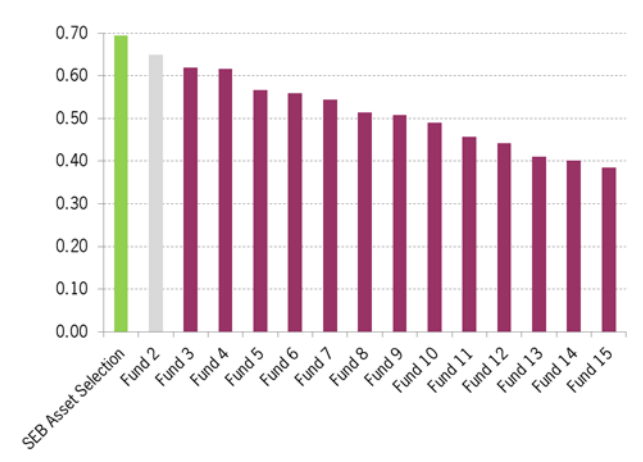
Finally, let us revisit the fund-of-funds portfolio and see which managed futures fund would have added the most value to that portfolio. In the previous fund-of-funds analysis, a retail share class of SEB Asset Selection was used, since the performance of the other funds in the fund-of-funds portfolio also had been shown after retail fees. To get a fair comparison between the different managed futures funds, however, we will use institutional pricing across the managed futures funds. The results from this simulation can be found on the next page.

Table 14: Risk-Adjusted Return for a Portfolio with 33% Equities, 33% Bonds & 33% Managed Futures/CTA Fund

	Sharpe Ratio	ERWD Ratio	Mixed Ratio (50% Sharpe + 50% ERWD)
SEB Asset Selection	0.86	0.53	0.70
Fund 2	0.87	0.42	0.65
Fund 3	0.87	0.37	0.62
Fund 4	0.81	0.42	0.62
Fund 5	0.72	0.41	0.57
Fund 6	0.72	0.39	0.56
Fund 7	0.69	0.39	0.54
Fund 8	0.73	0.29	0.51
Fund 9	0.68	0.33	0.51
Fund 10	0.67	0.31	0.49
Fund 11	0.68	0.23	0.46
Fund 12	0.60	0.28	0.44
Fund 13	0.52	0.30	0.41
Fund 14	0.53	0.28	0.40
Fund 15	0.55	0.22	0.38

Period: 31 Oct 2006 – 30 Sept 2016.
Included funds: The following managed futures / CTA funds are included in the comparison: Altis Global Futures (USD), Aspect Diversified Fund (EUR->USD), SEB Asset Selection (SEK->USD), Boronia Diversified (USD), Campbell Managed Futures Program (USD), Cantab Quantitative Fund (USD), Dunn WMA (USD), FTC Futures Fund (EUR->USD), Brummer & Partners Lynx (SEK->USD), MAN AHL Diversified (USD), Millburn Diversified (USD), Transtrend Fund (EUR->USD), Rivoli International (EUR->USD), SMN Diversified Futures (EUR->USD) and Winton Futures fund (USD). (EUR->USD) = A conversion has taken place from a EUR share class into a USD share class by subtracting the risk free EUR rate and adding the risk free USD rate for each monthly observation.
SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% mgmt. fee + 20% perf. fee)
Missing: Systematica BlueTrend and Graham Futures Fund are missing. They do not make their performance data publicly available on Bloomberg.
Sharpe Ratio = Annualised Excess Return after Fees / Volatility
ERWD Ratio = Annualised Excess Return / Worst Drawdown
Mixed Ratio = 50% Sharpe Ratio + 50% ERWD Ratio
Equities = MSCI World Total Return Net in USD
Bonds = JPM Global Aggregate Bond Index in USD
Source: Bloomberg and SEB Investment Management

Figure 14: Risk-Adjusted Return (Mixed Ratio) for a Portfolio with 33% Equities, 33% Bonds & 33% Managed Futures Fund



Period: 31 Oct 2006 – 30 Sept 2016.
Other information: Please see footnote of Table 14.
Source: Bloomberg and SEB Investment Management



In the context of the fund-of-funds portfolio, SEB Asset Selection ranked first among all managed futures funds, but was overtaken by the multi-strategy hedge fund, Fund 2, as can be seen in Table 15 and Figures 15-16. It is also interesting to note that the ranking between the managed futures funds has shifted around a little bit. For example, Fund 7 and Fund 12 has advanced while Fund 6 has dropped in the ranking. What is the reason for this?

Table 15: Risk-Adjusted Return for a Fund-of-Funds Portfolio with 20% invested in each of the following funds: Standard Life GARS, Carmignac Patrimoine, Ethna Aktiv, Nordea Stable Return and a Managed Futures/CTA Fund

	Sharpe Ratio	ERWD Ratio	Mixed Ratio (50% Sharpe + 50% ERWD)
Fund 2	0.98	0.82	0.90
SEB Asset Selection	0.98	0.69	0.83
Fund 7	0.86	0.71	0.78
Fund 3	0.95	0.59	0.77
Fund 4	0.91	0.61	0.76
Fund 5	0.86	0.65	0.75
Fund 12	0.82	0.67	0.74
Fund 10	0.79	0.59	0.69
Fund 9	0.81	0.56	0.68
Fund 8	0.75	0.49	0.62
Fund 11	0.77	0.44	0.60
Fund 6	0.74	0.43	0.58
Fund 13	0.66	0.48	0.57
Fund 14	0.65	0.44	0.54
Fund 15	0.67	0.36	0.51

Period: 31 Oct 2006 – 30 Sept 2016.

Included funds: The following managed futures / CTA funds are included in the comparison: Altis Global Futures (USD), Aspect Diversified Fund (EUR->USD), SEB Asset Selection (SEK->USD), Boronia Diversified (USD), Campbell Managed Futures Program (USD), Cantab Quantitative Fund (USD), Dunn WMA (USD), FTC Futures Fund (EUR->USD), Brummer & Partners Lynx (SEK->USD), MAN AHL Diversified (USD), Millburn Diversified (USD), Transtrend Fund (EUR->USD), Rivoli International (EUR->USD), SMN Diversified Futures (EUR->USD) and Winton Futures fund (USD). (EUR->USD) = A conversion has taken place from a EUR share class into a USD share class by subtracting the risk free EUR rate and adding the risk free USD rate for each monthly observation.

SEB Asset Selection = SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% mgmt. fee + 20% perf. fee)

Missing: Systematica BlueTrend and Graham Futures Fund are missing. They do not make their performance data publicly available on Bloomberg.

Sharpe Ratio = Annualised Excess Return after Fees / Volatility

ERWD Ratio = Annualised Excess Return / Worst Drawdown

Mixed Ratio = 50% Sharpe Ratio + 50% ERWD Ratio

Equities = MSCI World Total Return Net in USD

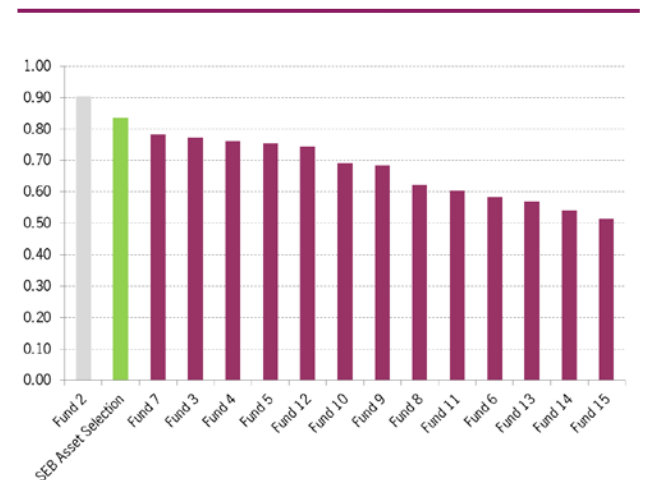
Bonds = JPM Global Aggregate Bond Index in USD

Source: Bloomberg and SEB Investment Management

The answer cannot be found in stand-alone return or stand-alone volatility of the different managed futures funds, since they did not change from one portfolio simulation to another. The explanation can only be found in the interaction between a particular managed futures fund and the other portfolio investments. Clearly, each managed futures fund has a different correlation to equities, bonds and to each of the multi-asset funds in the fund-of-funds portfolio.

Some of the managed futures funds do a better job in a client portfolio that contains a lot of equity risk and bond risk. Other managed futures funds contribute with more value in the context of absolute return oriented fund-of-funds. Then again, some of the funds (SEB Asset Selection, Fund 2, Fund 3 and Fund 4) have over the last 10 years proven to be very good complements to both traditional portfolios (with equities and bonds) and to fund-of-funds.

Figure 15: Risk-Adjusted Return (Mixed Ratio) for a Fund-of-Funds Portfolio with 20% invested in each of the following funds: Standard Life GARS, Carmignac Patrimoine, Ethna Aktiv, Nordea Stable Return and a Managed Futures/CTA Fund



Period: 31 Oct 2006 – 30 Sept 2016.

Other information: Please see footnote of Table 15.

Source: Bloomberg and SEB Investment Management

Figure 16: Sharpe Ratio for a Fund-of-Funds Portfolio with 20% invested in each of the following funds: Standard Life GARS, Carmignac Patrimoine, Ethna Aktiv, Nordea Stable Return and a Managed Futures/CTA Fund



Period: 31 Oct 2006 – 30 Sept 2016.

Other information: Please see footnote of Table 15.

Source: Bloomberg and SEB Investment Management



Optimal Allocation to SEB Asset Selection

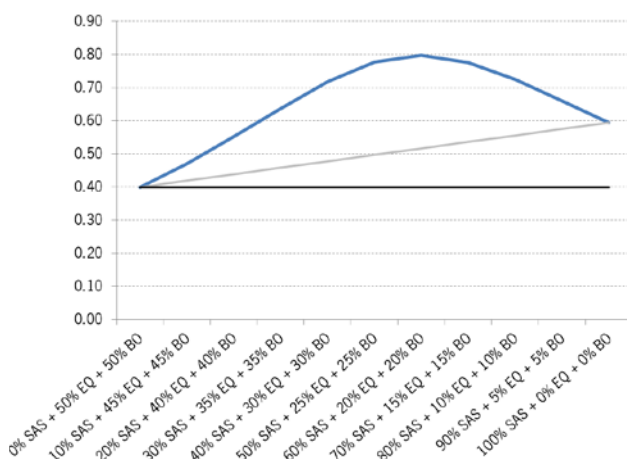
The conclusion from the above analysis is that SEB Asset Selection over the last 10 years has fulfilled its objective of being a great complement to a client portfolio. Whether the client portfolio had exposures to equities & bonds or a group of absolute return multi-asset funds, SEB Asset Selection boosted the client portfolio's risk-adjusted returns by increasing the return of the client portfolio and by reducing the volatility and the drawdowns of the client portfolio.

Let us study how different allocations to SEB Asset Selection affect the risk-adjusted return of the overall portfolio. Since most client portfolios tend to have exposures to equities and bonds, let us focus our analysis on traditional portfolios. A corresponding analysis can of course be done with regard to a fund-of-funds portfolio, but the optimal allocation to SEB Asset Selection in one fund-of-funds portfolio is not necessarily the same as in another fund-of-funds portfolio. Thus, in such cases, the analysis needs to be done for each specific portfolio.

In Figure 17, we have simulated different allocations to SEB Asset Selection while keeping the remainder of the client portfolio equally balanced between equities and bonds.

The blue line shows the Sharpe ratio for different mixes of SEB Asset Selection, MSCI World Equities and JPM Global Aggregate Bonds over the last 10 years.

Figure 17: Sharpe Ratio for a Client Portfolio with Different Allocations to Equities, Bonds and SEB Asset Selection



Blue line = true Sharpe ratio over the last 10 years
Grey line = theoretical Sharpe ratio assuming no diversification benefits
Black line = Sharpe ratio of the traditional portfolio with 50% EQ + 50% BO
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
SAS = SEB Asset Selection RC SEK converted into SEB Asset Selection pro forma IC USD (0.55% mgmt. fee + 20% perf. fee)
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

The grey line pictures the Sharpe ratio that would have existed, if the correlation between SEB Asset Selection and the equity-bond portfolio had been 1.00 (zero diversification benefits). The black line shows the Sharpe ratio of the traditional portfolio. This portfolio is found on the far left and has a 50% allocation to equities and 50% to bonds. The portfolio on the far right of the blue line is 100% SEB Asset Selection.

Over the last 10 years, the optimal client portfolio (resulting in the highest Sharpe ratio of the overall portfolio) was a portfolio that consisted of 60% SEB Asset Selection, 20% equities and 20% bonds. This portfolio had a Sharpe ratio of 0.80, i.e. twice the 0.40 Sharpe ratio of the traditional balanced portfolio (50% equities and 50% bonds).

The value created by adding SEB Asset Selection to a traditional client portfolio can be broken down into two parts:

- the improvement in the Sharpe ratio that is related to SEB Asset Selection's higher stand-alone Sharpe ratio and
- the improvement in the Sharpe ratio that is related to SEB Asset Selection's favourable diversification effects.

In fact, it is possible to measure how much of the added value, i.e. the improvement in the Sharpe ratio, that came from each of these two sources over the last decade.

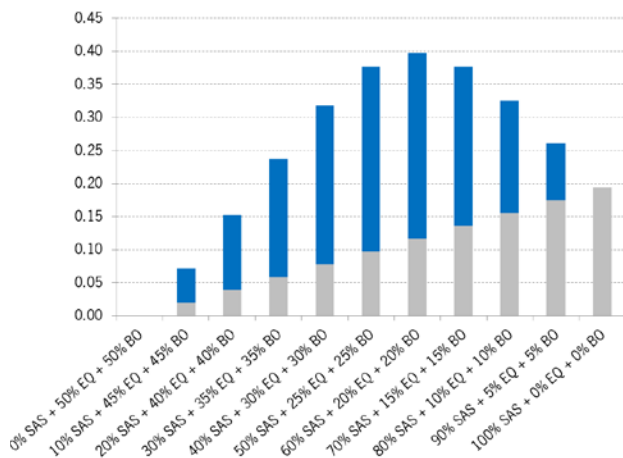
In Figure 17, the difference between the grey line and black line shows how much the Sharpe ratio improved just because SEB Asset Selection had a higher stand-alone Sharpe ratio than the traditional portfolio (0% SEB Asset Selection + 50% equity + 50% bond). The improvement in the Sharpe ratio that is related to SEB Asset Selection's ability to diversify the traditional equity-bond portfolio can be measured as the difference between the blue line and the grey line.

Figure 18 takes a closer look at this phenomenon. When going from the traditional portfolio (50% equities + 50% bonds) to the portfolio that proved to be optimal over the last decade (60% SEB Asset Selection, 20% equities and 20% bonds), 0.12 units of the Sharpe ratio improvement came from SEB Asset Selection's higher stand-alone Sharpe ratio. As much as 0.28 units of the Sharpe ratio improvement came from SEB Asset Selection's diversification benefits.

Any investor who picks funds on the basis of the stand-alone Sharpe ratios is not constructing a particularly good portfolio. As the above example shows, certain funds may be able to boost the client portfolio Sharpe ratio substantially more via their diversification effects than via their stand-alone Sharpe ratio. This also explains why it makes sense to invest in uncorrelated funds even if their stand-alone Sharpe ratio is not as high as the stand-alone Sharpe ratio of some other funds.

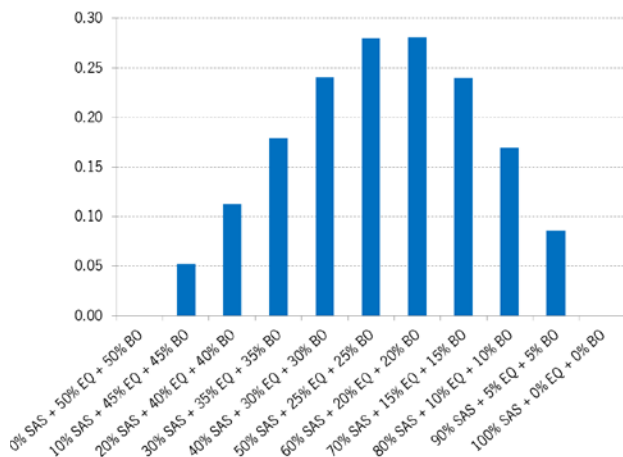


Figure 18: Sharpe Ratio Improvement from SEB Asset Selection's Higher Stand-Alone Sharpe ratio (grey) and from SEB Asset Selection's Diversification Benefits (blue)



Blue = Improvement in the Sharpe ratio related to SEB Asset Selection's diversification benefits.
Grey = Improvement in the Sharpe ratio related to SEB Asset Selection's higher stand-alone Sharpe ratio.
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

Figure 19: Improvement in Sharpe Ratio from SEB Asset Selection's Diversification Benefits



Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

Figure 19 shows the Sharpe ratio improvement related to SEB Asset Selection's diversification benefits only. If the traditional portfolio (50% equities + 50% bonds) over the last 10 years had generated an equally high Sharpe ratio as SEB Asset Selection, this would be the potential for Sharpe ratio improvement. In such a case, the optimal portfolio mix would have been 55% SEB Asset Selection, 22.5% equities

and 22.5% bonds. Had the traditional portfolio generated a higher stand-alone Sharpe ratio than SEB Asset Selection, the optimal allocation to SEB Asset Selection would have been smaller. Let us find out where the optimal allocation to SEB Asset Selection would be in different kinds of scenarios.

In Figures 20-23, we simulate the scenario when the traditional portfolio (50% equities and 50% bonds) has a stand-alone Sharpe ratio that is 0.20 Sharpe units higher (Scenario A), 0.40 Sharpe units higher (Scenario B), 0.60 Sharpe units higher (Scenario C) and 0.80 Sharpe units higher (Scenario D) than SEB Asset Selection's Sharpe ratio.

Assuming that SEB Asset Selection's stand-alone Sharpe ratio remains the same at 0.59, this means that we simulate scenarios where the Sharpe ratio of the traditional equity-bond portfolio (50/50) is as high as 0.79, 0.99, 1.19 and 1.39, respectively, in Scenarios A-D. We also make the assumption that the correlation between SEB Asset Selection and the traditional portfolio remains the same as it has been over the last 10 years and is independent of the level of the traditional portfolio's Sharpe ratio.

Figure 20 shows scenario A in which the traditional portfolio has a 0.20 higher Sharpe ratio than SEB Asset Selection. In this scenario, the optimal allocation to SEB Asset Selection would be 50%.

In Figure 21, Scenario B, the traditional portfolio has a 0.40 higher Sharpe ratio than SEB Asset Selection. The optimal allocation to SEB Asset Selection moves down to 45%.

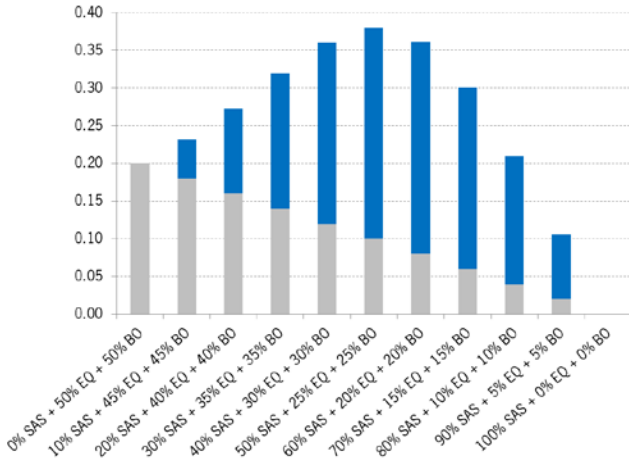
In Scenario C, Figure 22, the difference in stand-alone Sharpe ratio is as high as 0.60 Sharpe units. In this situation, when the traditional portfolio has a stand-alone Sharpe ratio of 1.19 (0.59 + 0.60), the optimal allocation to SEB Asset Selection is either 0% or 30-40%. Basically any portfolio with a 0-40% allocation to SEB Asset Selection would be very close to the optimal portfolio.

Finally, in Figure 23, we have Scenario D where the difference in Sharpe ratio is a whopping 0.80 units. This implies that the traditional portfolio would have a stand-alone Sharpe ratio of 1.39 (0.59 + 0.80). In this situation, SEB Asset Selection would not be able to improve the client portfolio's Sharpe ratio. A zero percent allocation to SEB Asset Selection would be optimal in this extreme scenario.

Both the historical study and the scenario analysis with varying Sharpe ratios for the traditional portfolio demonstrate very clearly how SEB Asset Selection over the last 10 years has contributed to increasing the Sharpe ratio of a traditional client portfolio. Even in scenarios where the traditional portfolio would have a Sharpe ratio that is up to 0.60 units higher than the Sharpe ratio of SEB Asset Selection (1.19 vs 0.59), it would still make sense to have a substantial allocation to SEB Asset Selection.

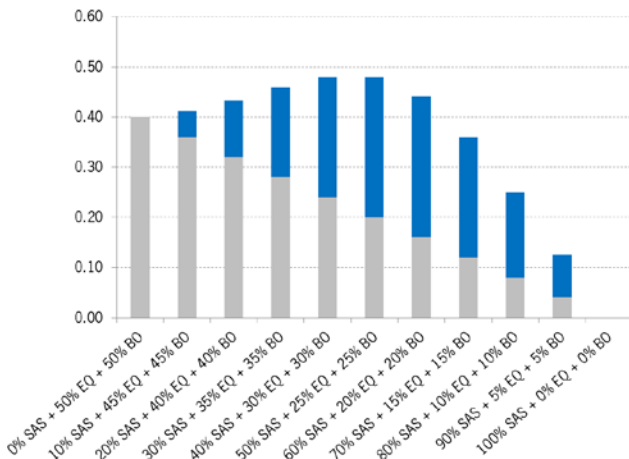


Figure 20: Scenario A (Difference in Sharpe Ratio = 0.20)
Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to SEB Asset Selection (blue)



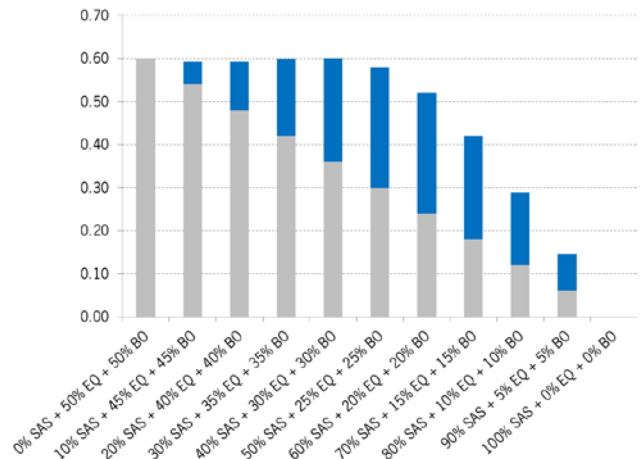
Scenario A = Sharpe Ratio 0.20 units higher for Traditional Portfolio (50% EQ + 50% BO) than for SEB Asset Selection
Blue = Improvement in the Sharpe ratio related to SEB Asset Selection's diversification benefit. **Grey** = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

Figure 21: Scenario B (Difference in Sharpe Ratio = 0.40)
Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to SEB Asset Selection (blue)



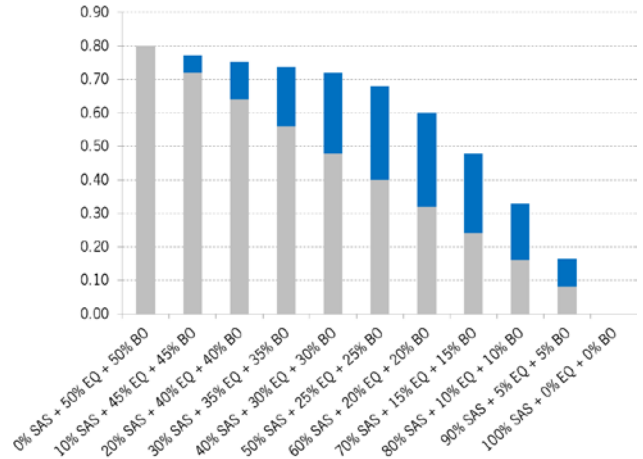
Scenario B = Sharpe Ratio 0.40 units higher for Traditional Portfolio (50% EQ + 50% BO) than for SEB Asset Selection
Blue = Improvement in the Sharpe ratio related to SEB Asset Selection's diversification benefits. **Grey** = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

Figure 22: Scenario C (Difference in Sharpe Ratio = 0.60)
Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to SEB Asset Selection (blue)



Scenario C = Sharpe Ratio 0.60 units higher for Traditional Portfolio (50% EQ + 50% BO) than for SEB Asset Selection
Blue = Improvement in the Sharpe ratio related to SEB Asset Selection's diversification benefits. **Grey** = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management

Figure 23: Scenario D (Difference in Sharpe Ratio = 0.80)
Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to SEB Asset Selection (blue)



Scenario D = Sharpe Ratio 0.80 units higher for Traditional Portfolio (50% EQ + 50% BO) than for SEB Asset Selection
Blue = Improvement in the Sharpe ratio related to SEB Asset Selection's diversification benefits. **Grey** = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Period: 31 Oct 2006 – 30 Sept 2016.
Equities = MSCI World Equities Total Return in USD
Bonds = JPM Global Aggregate Bonds Index in USD
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: Bloomberg and SEB Investment Management



Double-Checking our Findings

Is it really true that a diversifying investment such as SEB Asset Selection can have such a huge impact on the Sharpe ratio of a traditional client portfolio?

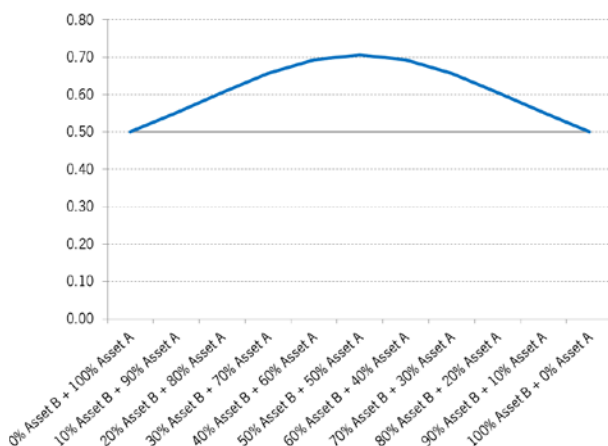
Let us step back and use two theoretical examples to check the reasonability of our empirical findings. Let us assume that we have two assets, asset A and asset B. In Example I, both assets deliver a return of 5% per annum and have a volatility of 10% each. Asset A and asset B are totally uncorrelated (zero correlation). Let us assume that the risk free rate of return is 0%.

We construct portfolios with varying allocations to the two assets. The portfolio return is the weighted average return of the two assets and the portfolio volatility is calculated using the formula provided on page 10.

Since both asset A and asset B have the same 5% return, the return of the portfolio will also be 5%, irrespective of the asset mix. As regards the portfolio volatility, we know that it would be 10% if asset A received a 100% allocation. That portfolio would have a Sharpe ratio of 0.50. The same thing would be true if asset B received a 100% allocation. For asset mixes between those to extremes, the volatility of the portfolio should be lower than 10% (correlation < 1) and the portfolio Sharpe ratio should be higher than 0.50.

Figure 24: Theoretical Example I

Sharpe Ratio of Theoretical Portfolio with Different Allocations to Asset A and Asset B

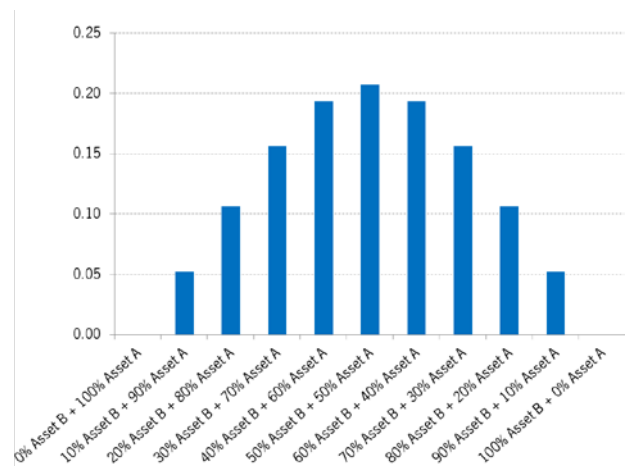


Blue line = Sharpe ratio of Theoretical Portfolio
Grey line = theoretical Sharpe ratio assuming no diversification benefits, i.e. a correlation of 1.00 between Asset A and Asset B.
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: SEB Investment Management

For example, the 10/90 portfolio (10% asset A, + 90% asset B) would have a return of 5% (10%*5% + 90%*5%), a volatility of 9.1%⁷ and a Sharpe ratio of 0.55. Figure 24 shows the Sharpe ratio line for Theoretical Example I for different asset mixes.

Figure 25: Theoretical Example I

Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to Asset B (blue)



Blue = Improvement in the Sharpe ratio related to diversification benefits.
Grey = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Source: SEB Investment Management

Theoretical Example I shows that a 50/50 portfolio of two uncorrelated assets (correlation of 0.00) generates a substantially higher Sharpe ratio (0.70) than a portfolio of highly correlated assets. For example, two perfectly correlated assets (correlation of 1.00) would generate the same portfolio Sharpe ratio (0.50) irrespective of the asset mix.

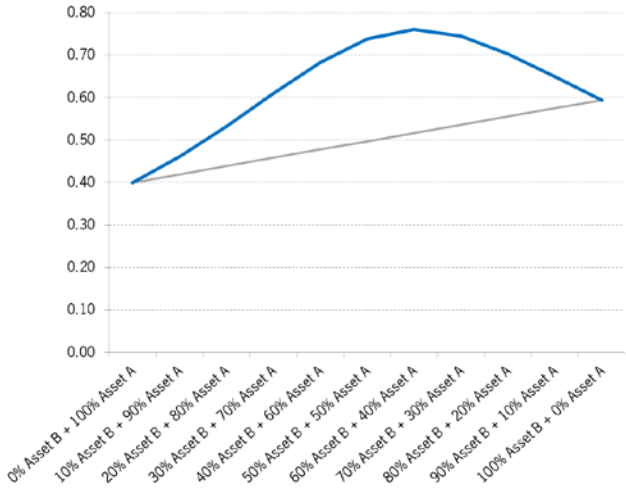
It is time for a second theoretical example. Let us assume that the average return of asset A is 4.6% and the average return of asset B is 5.8%. Asset A is assumed to have a volatility of 9.7% and asset B a volatility of 8.5%. The risk-free rate is assumed to be 0.75% and the correlation between the two assets is assumed to be -0.12.

The results of this case, Theoretical Example II, are shown on the next page in Figures 26-28.

⁷ Portfolio volatility (10% A + 90% B) = $\sqrt{0.10 \cdot 0.10 \cdot 10\% \cdot 10\% \cdot 1.00 + 0.10 \cdot 0.90 \cdot 10\% \cdot 10\% \cdot 0.00 + 0.90 \cdot 0.10 \cdot 10\% \cdot 10\% \cdot 0.00 + 0.90 \cdot 0.90 \cdot 10\% \cdot 10\% \cdot 1.00}^{0.5} = 9.1\%$

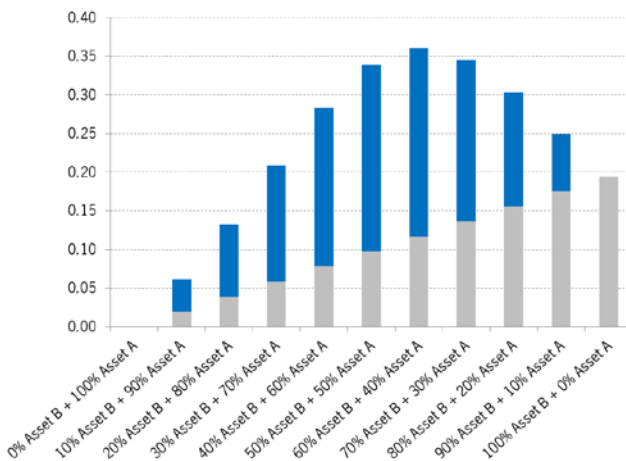


Figure 26: Theoretical Example II
Sharpe Ratio of Theoretical Portfolio with Different Allocations to Asset A and Asset B



Blue line = Sharpe ratio of Theoretical Portfolio
Grey line = theoretical Sharpe ratio assuming no diversification benefits, i.e. a correlation of 1.00 between Asset A and Asset B.
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: SEB Investment Management

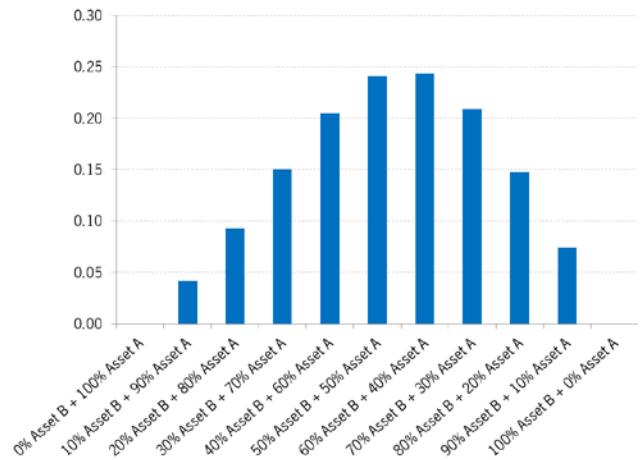
Figure 27: Theoretical Example II
Sharpe Ratio Improvement related to: a) the Relative Level of Stand-Alone Sharpe ratios (grey) and b) Diversification Benefits from Allocating to Asset B (blue)



Blue = Improvement in the Sharpe ratio related to diversification benefits.
Grey = Improvement in the Sharpe ratio related to the relative level of the stand-alone Sharpe ratios.
Source: SEB Investment Management

Readers with a good memory recognise the shape of these graphs. They are quite similar to the ones in Figure 17-19.

Figure 28: Theoretical Example II
Sharpe Ratio Improvement related to Diversification Benefits



Blue = Improvement in the Sharpe ratio related to diversification benefits.
Source: SEB Investment Management

In our Theoretical Example II, we simply used the returns, volatilities and correlations that we had obtained for the traditional portfolio (50% equities + 50% bonds) and for SEB Asset Selection over the last 10 years.

Any assets that have such performance characteristics (i.e. a decent stand-alone Sharpe ratio and a low correlation to each other) are very attractive to mix from a portfolio construction perspective. They make it possible for an investor to create a well-diversified portfolio and to aim for a high risk-adjusted return.

Taking a closer look at the two sets of graphs, we can see that the Sharpe ratio line from the empirical return series over the last 10 years is somewhat higher than the one seen in Theoretical Example II.

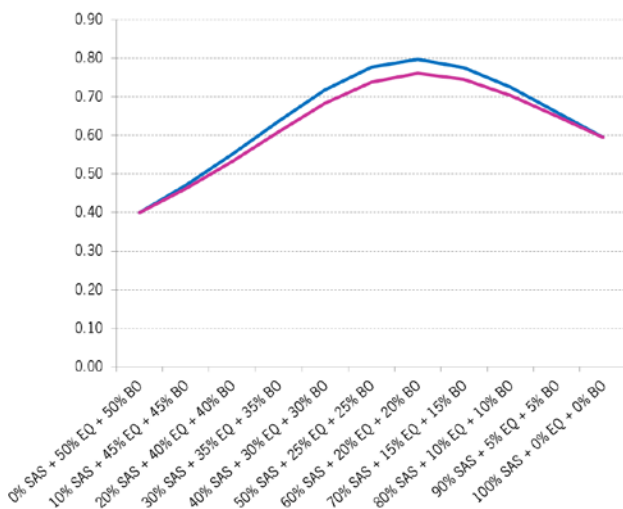
Figure 29 compares the two Sharpe ratio lines to each other. The blue line shows Sharpe ratios that take each observation of the historical performance series into account. The cerise line, on the other hand, shows Sharpe ratios that have been calculated on the basis of five parameters only, i.e. the averages returns, the average volatilities and the average correlation). Parameter-based approaches tend to assume that the returns are normally distributed and independent of each other. However, these two assumptions tend not to be fulfilled in reality.

The reason for SEB Asset Selection (and other trend-following managed futures funds) delivering larger diversification benefits than parameter-based estimations would indicate, is that trend-following strategies historically have proven to be able to generate positive returns during periods when traditional portfolios have suffered from negative returns. In other words, when traditional portfolios



really were in need of diversification (e.g. during the 2008 equity bear market), SEB Asset Selection did a very good job delivering the desired diversification (via positive returns). This kind of phenomenon helps to explain why trend-following managed futures funds over time are able to deliver larger diversification benefits than a parameter based approach would indicate.

Figure 29: Sharpe Ratios based on a) Realised Historical Performance Data (blue) and b) Parametric-Based Theoretical Example II (cerise) for SEB Asset Selection (10% Target Volatility)



Blue line = Sharpe ratio derived from mixing a Traditional Portfolio (50% equities + 50% Bonds) with SEB Asset Selection over the period 31 Oct 2006 – 30 Sept 2016.

Cerise line = theoretical Sharpe ratio from mixing Asset A and Asset B, where Asset A / Asset B had same return, volatility and correlation as the Traditional Portfolio (50% EQ + 50% BO) / SEB Asset Selection during the period 31 Oct 2006 – 30 Sept 2016.

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

Source: SEB Investment Management

In a corresponding manner, it is probably fair to say that strategies such as credit, short-volatility and illiquidity tend to deliver less favourable diversification effects in reality than what their parameters indicate.⁸

After having double-checked our empirical findings with the help of some theoretical examples, it is now time to study how the optimal allocation to SEB Asset Selection changes when the same strategy is coming as a higher volatility investment. We will use SEB Asset Selection Opportunistic (20% target volatility) for this.

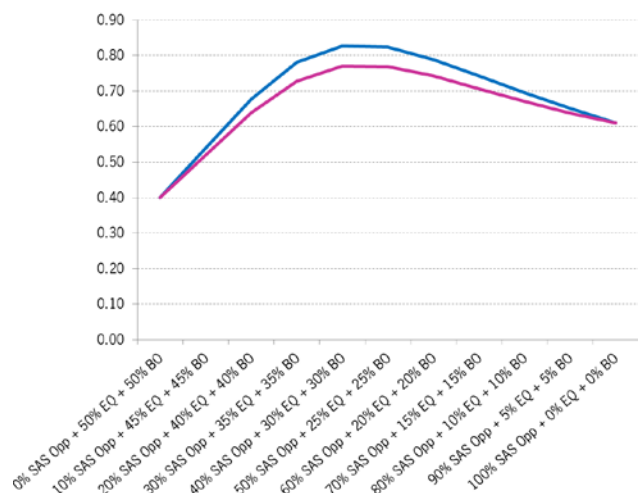
⁸ Such strategies tend to have a relatively low correlation to traditional portfolios during good market environments (when diversification is less important), but a high correlation during poor market environments (when diversification is highly desired).

Optimal Allocation to SEB Asset Selection Opportunistic (20% target volatility)

In Figure 30, we have done the corresponding calculations for SEB Asset Selection Opportunistic IC USD (target volatility 20%, management fee 0.75% and performance fee of 20%) as we did in Figure 29 for SEB Asset Selection IC USD (10% target volatility, 0.55% management fee and 20% performance fee).

The optimal allocation changes from 60% in the case of SEB Asset Selection (8.5% realised volatility) to approximately 45% in the case of SEB Asset Selection Opportunistic (16.8% realised volatility).

Figure 30: Sharpe Ratios based on a) Realised Historical Performance Data (blue) and b) Parametric-Based Theoretical Example (cerise) for SEB Asset Selection Opportunistic (20% Target Volatility)



Blue line = Sharpe ratio derived from mixing a Traditional Portfolio (50% equities + 50% Bonds) with pro forma SEB Asset Selection Opportunistic IC USD over the period 31 Oct 2006 – 30 Sept 2016.

Cerise line = theoretical Sharpe ratio from mixing Asset A and Asset B, where Asset A / Asset B had same return, volatility and correlation as the Traditional Portfolio (50% EQ + 50% BO) / SEB Asset Selection Opportunistic during the period 31 Oct 2006 – 30 Sept 2016.

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

Source: SEB Investment Management

If an investment in the SEB Asset Selection strategy had been considered on a stand-alone basis, it would have been natural to think that you only needed to invest half the amount of capital into a 20% volatility product as into a 10% volatility product (identical strategy) in order to achieve the same financial outcome. On a stand-alone basis this would have been correct.

If this reasoning was applied in the context of a portfolio, one could have believed that the allocation to the SEB Asset Selection strategy would go from 60% to 30% when using SEB Asset Selection Opportunistic with twice the volatility level.



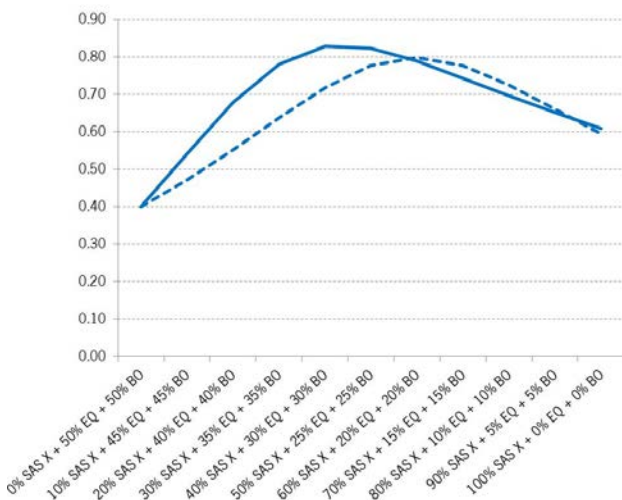
However, as we have seen before, an investment's Sharpe ratio contribution to the overall portfolio can only be evaluated in the context of that portfolio. The golden rule applies not only to investments with different kinds of strategies, but also to investments based on the same strategy with different volatility levels.

Since portfolio volatility is a non-linear phenomenon, it is hard to guess what the optimal allocation to an investment should be. Simulations (or portfolio optimisations) need to be pursued to find a reasonable answer.

When comparing Figure 30 to Figure 29, we can also see that the gap between the empirical Sharpe ratio line (blue) and the theoretical parameter-based Sharpe ratio line (cerise) is a bit larger in the case of SEB Asset Selection Opportunistic than in the case of SEB Asset Selection.

Let us try to find out where this effect is coming from. In Figure 31 we compare the empirical Sharpe ratio lines of the two investments. In Figure 32 we do the same thing with the theoretical Sharpe ratio lines.

Figure 31: Sharpe Ratios based on Realised Historical Performance Data for SEB Asset Selection Opportunistic (solid line) and for SEB Asset Selection (dashed line)

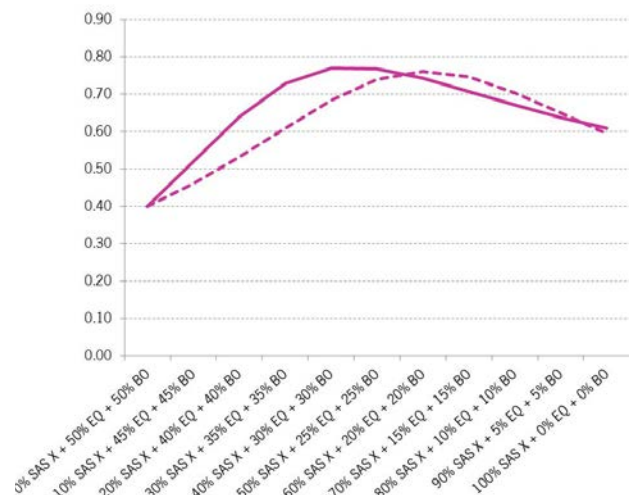


Blue solid line = Sharpe ratio derived from mixing a Traditional Portfolio (50% equities + 50% Bonds) with pro forma SEB Asset Selection Opportunistic IC USD over the period 31 Oct 2006 – 30 Sept 2016.
Blue dashed line = Sharpe ratio derived from mixing a Traditional Portfolio (50% equities + 50% Bonds) with pro forma SEB Asset Selection IC USD over the period 31 Oct 2006 – 30 Sept 2016.
SAS X = SEB Asset Selection or SEB Asset Selection Opportunistic
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
Source: SEB Investment Management

At the far right in both figures, we can see that the stand-alone Sharpe ratio for SEB Asset Selection Opportunistic is somewhat higher than for SEB Asset Selection. This is due to the fact that the management fee per unit of volatility is lower in SEB Asset Selection Opportunistic than for SEB Asset

Selection. This difference contributes to making the peak Sharpe ratio in Figure 32 somewhat higher for the portfolios containing SEB Asset Selection Opportunistic than for the portfolios containing SEB Asset Selection. Otherwise, the two Sharpe ratio lines in Figure 32 seem to peak at approximately the same level.

Figure 32: Sharpe Ratios based on Theoretical Parameter-Based Performance for SEB Asset Selection Opportunistic (solid line) and for SEB Asset Selection (dashed line)



Cerise solid line = theoretical Sharpe ratio from mixing Asset A and Asset B, where Asset A and Asset B had same return, volatility and correlation as the Traditional Portfolio (50% EQ + 50% BO) and SEB Asset Selection Opportunistic IC USD, respectively, during the period 31 Oct 2006 – 30 Sept 2016.
Cerise dashed line = theoretical Sharpe ratio from mixing Asset A and Asset B, where Asset A and Asset B had same return, volatility and correlation as the Traditional Portfolio (50% EQ + 50% BO) and SEB Asset Selection IC USD, respectively, during the period 31 Oct 2006 – 30 Sept 2016.
Sharpe ratio (net) = Net Excess Return p.a. / Volatility
SAS X = SEB Asset Selection or SEB Asset Selection Opportunistic
Source: SEB Investment Management

In fact, if we ignore the lower management fee, the theoretical Sharpe ratio curves should be peaking at basically the same Sharpe ratio.

The reason for this is the following: If we wanted, we could replace e.g. a 60% allocation to SEB Asset Selection by a 30% allocation to SEB Asset Selection Opportunistic and 30% allocation to a risk free investment. The two alternatives should basically generate the same outcome. Since a risk free asset by definition generates a zero excess return and has a zero correlation to all other assets in the portfolio, the risk free investment neither contributes to the excess return of the overall portfolio, nor to the volatility of the portfolio. The peak Sharpe ratio of the two portfolios in Figure 32 should thus be the same, irrespective of the allocation to the risk free investment (as long as it is smaller than 100%). The larger the allocation to the risk free asset, the smaller the excess returns and the lower the volatility of the portfolio. However, the peak Sharpe ratio should stay the same (ceteris paribus).



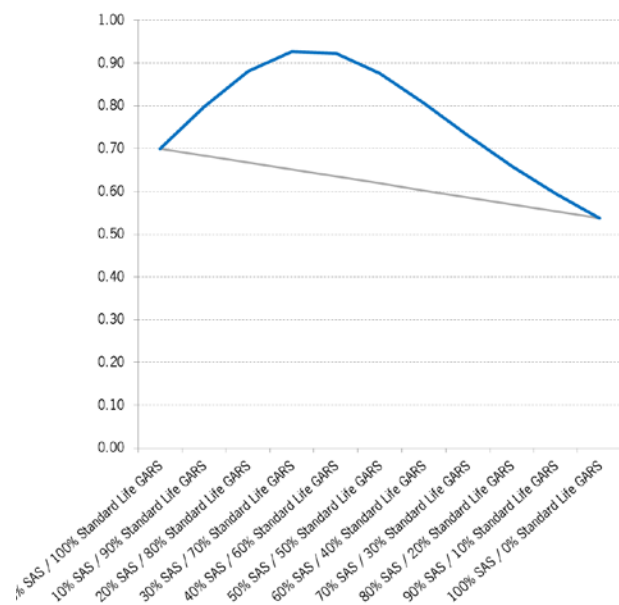
Taking a look at Figure 31, however, we can see that the peak in the empirical Sharpe ratio line for portfolios containing SEB Asset Selection Opportunistic is higher than the corresponding Sharpe ratio peak for portfolios containing the lower risk investment, SEB Asset Selection. The difference can partly be explained by the lower management fee (per unit of volatility). The remaining Sharpe ratio improvement is related to SEB Asset Selection Opportunistic's even better ability to counterbalance the traditional portfolio's worst drawdown periods.

As a last exercise in determining optimal allocations and in quantifying the value added of SEB Asset Selection, let us study what happens when we replace a single investment in Standard Life GARS with a combination of Standard Life GARS and SEB Asset Selection.

Optimal Mix between Standard Life GARS and SEB Asset Selection

In Table 8, we had the stand-alone performance statistics for five funds. Standard Life GARS had the highest stand-alone Sharpe ratio (0.70) and SEB Asset Selection had the lowest (0.54). What would happen, if we were to mix these funds instead of just investing in one of them? Figure 33 gives the answer.

Figure 33: Sharpe Ratio of a Combo-Investment Consisting of Standard Life GARS and SEB Asset Selection (Retail Fees)



Blue line = Sharpe ratio of two-fund portfolio consisting of Standard Life GARS USD and SEB Asset Selection RC USD (1.10% mgmt. fee + 20% performance fee)

Grey line = theoretical Sharpe ratio assuming no diversification benefits, i.e. a correlation of 1.00 between Standard Life GARS USD and SEB Asset Selection RC USD.

SAS = SEB Asset Selection RC USD

Sharpe ratio (net) = Net Excess Return p.a. / Volatility

Source: Bloomberg, SEB Investment Management

Over the last 10 years, the optimal mix was found at an allocation of approximately 70% to Standard Life GARS and 30% to SEB Asset Selection.

Instead of investing 100% of the money in Standard Life GARS, a 30% allocation to SEB Asset Selection would have improved the client's portfolio quite considerably.

The first effect of the re-allocation is a slightly negative one. The investor loses 0.05 Sharpe ratio units when he/she is 'sliding down the grey line' to the 30% SEB Asset Selection allocation, i.e. when the investor is accepting a somewhat inferior mix of stand-alone Sharpe ratios.

The second effect of the re-allocation is hugely positive, however. The 30% allocation to SEB Asset Selection enables the investor to benefit from substantial diversification benefits (an improvement of a whopping 0.28 Sharpe ratio units).

Thus, any investor who over the last 10 years chose to be invested in a combination of Standard Life GARS and SEB Asset Selection on a 70/30 basis rather than in Standard Life GARS only, experienced a pick-up in the Sharpe ratio from 0.70 to a level of 0.93 (+0.70 – 0.05 + 0.28).

This example shows very clearly how important the diversification benefits are (0.28) in relation to the stand-alone Sharpe ratio mix-effects (-0.05).

In other words, an investor who is really trying to achieve a high risk-adjusted return should not only pay attention to investments that have a high stand-alone Sharpe ratio, but also – and even more so – to investments which have a low correlation to the client portfolio. If such uncorrelated investments have an acceptable stand-alone Sharpe ratio, they will probably turn out to be some of the most value-adding investments that the client can have in his/her portfolio.

Before we conclude this paper, we will spend a few words on our definition of i) a great portfolio and ii) a great investment.



Great Portfolio versus Great Investment

For any investor aiming to achieve investment success, it is crucial to understand the difference between a great portfolio and a great investment. We define a 'great portfolio' as follows:

Definition of a Great Portfolio

A 'great portfolio' is a portfolio that:

- a) delivers high risk-adjusted returns over time, and
- b) has a risk- and liquidity profile that matches the preferences of the end client

Source: SEB Investment Management

The risk-adjusted return can be measured as the Sharpe ratio, the ERWD-ratio (Excess Return to Worst Drawdown ratio) or any other suitable statistic that takes excess returns and a risk measure into account.

The risk preference of the end client can be expressed as an average portfolio volatility or as a maximum acceptable portfolio volatility, alternatively as an average portfolio drawdown or as a maximum acceptable portfolio drawdown.

When it comes to the definition of a 'great investment', a lot of investors seem to define a 'great investment' in the same way as a great portfolio, i.e. like this: 'A great investment is an investment that has a high risk-adjusted return.'

This is also supported by their behaviour when it comes to fund selection. After having put together various performance statistics on the funds that they like, most investors tend to pick the funds that have the highest stand-alone Sharpe ratios. We often get the feedback that the stand-alone Sharpe ratio of SEB Asset Selection (and other managed futures funds) is too low, or at least not as high as for some other absolute return strategies.

Constructing a portfolio by picking funds with the highest Sharpe ratios is clearly sub-optimal. The investor basically tries to improve the portfolio Sharpe ratio by "climbing grey lines", i.e. by shifting the capital allocation from investments with low stand-alone Sharpe ratios into investments with higher stand-alone Sharpe ratios (moving from left to right on the grey line in Figure 26, for example).

However, as we have discussed in the previous section, this is only one of the two ways of improving the Sharpe ratio of a portfolio. The second and more important way to boost the Sharpe ratio of the client portfolio is to find investments that: i) have a decent stand-alone Sharpe ratio, and ii) contribute with substantial diversification benefits.

Our definition of a 'great investment' looks as follows:

Definition of a Great Investment

A 'great investment' is an investment that:

- a) increases the risk-adjusted return of the client portfolio
- b) maintains its performance characteristics over time
- c) is very liquid, i.e. can be bought and sold without delay and with minimal market impact.'

Source: SEB Investment Management

The first bullet point (a) can be broken down into three sub-criteria. If all three are fulfilled simultaneously, the investment can be said to be a 'fantastic investment':

Definition of a Fantastic Investment

A 'fantastic investment' is an investment that:

- a) increases the risk-adjusted return of the client portfolio by simultaneously:
 - (i) increasing the return of the client portfolio,
 - (ii) reducing the volatility of the client portfolio and
 - (iii) reducing the drawdowns of the client portfolio.
- b) maintains its performance characteristics over time
- c) is very liquid, i.e. can be bought and sold without delay and with minimal market impact.'

Source: SEB Investment Management

The above definition of a 'great investment' implies that an investment can never be evaluated on a stand-alone basis. The evaluation of each potential investment must be made in the context of and as a part of the overall client portfolio.

Fund selection and portfolio construction is all about identifying the investments that can be expected to generate the largest boost to the risk-adjusted return of the client portfolio.

It is time to sum up and conclude.



Executive Summary

When combining different investments into a client portfolio, there are two important effects that need to be taken into account:

- c) Sharpe ratio improvements (of the overall client portfolio) which are related to the level of diversification benefits between a particular investment and the client portfolio, and
- d) Sharpe ratio improvements (of the overall client portfolio) which are related to the level of each investment's stand-alone Sharpe ratio.

As we show in this white paper, diversification benefits may indeed deliver very large improvements to the Sharpe ratio of a client portfolio. In fact, diversification benefits may boost the client portfolio's Sharpe ratio by substantially more than can be achieved by allocating more capital to investments with higher stand-alone Sharpe ratios.

In the case of an equally balanced bond-equity portfolio, an optimal allocation to SEB Asset Selection would have boosted the Sharpe ratio of the portfolio by a whopping 0.40 Sharpe units over the last decade. As much as 70% of this improvement, or 0.28 units, were attributable to SEB Asset Selection's diversification benefits. The remaining 30% of the Sharpe ratio increase, or 0.12 units, were related to the fact that SEB Asset Selection's stand-alone Sharpe ratio was higher than that of the bond-equity portfolio.

Trend-following managed futures funds are not only appreciated for their ability to generate excess returns over time and positive returns during extended bear markets, but also – and increasingly so – for their ability to generate huge diversification benefits to almost any type of client portfolio.

Over the last 10 years, SEB Asset Selection has delivered excess returns of 4.6%/5.1% per annum after retail/institutional fees. The fund has demonstrated very low correlations to both equities and bonds (both within +/-0.20) over time. In combination with the trend-following nature of the strategy, these features have boosted the Sharpe ratio of many client portfolios by as much as 0.20-0.25 over the last 10 years.

When compared to the 14 largest managed futures funds in the world, SEB Asset Selection has delivered No. 1 rankings for its risk-adjusted returns over the last 10 years, not only when measured on a stand-alone basis, but also – and more importantly – when measured in the context of different kinds of client portfolios.

A key take-away from this white paper is the following: If an investor is aiming to achieve high risk-adjusted returns in his/her portfolio, each potential investment must be evaluated in the context of / as a part of the overall client

portfolio. By simulating the inclusion/exclusion of a particular investment into/from the portfolio, investors can get a very good understanding of how much value each potential investment is likely to add to the overall client portfolio.

Stand-alone analysis should never be used for final fund selection decisions. Stand-alone analysis may, however, be used as a first step in the portfolio construction process to identify investments which *may* add value to the client portfolio. Two statistics are of great interest in this initial screening process:

- iii) the investment's long term correlation to the client portfolio (should be as low as possible, ideally negative), and
- iv) the investment's stand-alone Sharpe ratio (should be as high as possible).

Via simple portfolio simulations the client can then quantitatively determine which investments are truly adding value to the client portfolio (great investments).

Investors should also try to gauge the consistency of the investment process over time, the continued presence of key individuals in the investment team and, thus, the ability to continue to deliver as solid uncorrelated excess returns as the fund has delivered historically. The investment team behind SEB Asset Selection scores highly on this measure (100% systematic process + 100% team stability since Oct 2003).

The final characteristic of a great investment is liquidity. This implies that investors should make sure that they are able to unwind their investments on any day and without a major market impact, especially in distressed environments. The SEB Asset Selection fund has offered daily liquidity since inception in October 2006 and has never gated any clients.

To sum up, SEB Asset Selection's overriding purpose and objective is to deliver uncorrelated excess returns and to be a great complement to a client portfolio. We try to accomplish this by applying a fully systematic and quantitative approach and by adopting a pure trend-following strategy in the world's most liquid futures markets. This is the strategy we have applied over the last 10 years and this is the strategy that we will continue to apply going forward.

Last but not least, we would like to thank you for the trust you are showing in us. We can assure you that we will continue to do our very best to deliver uncorrelated excess returns for your portfolio during the coming 10 years.

Hans-Olov Bornemann
Portfolio Manager and Head of SEB's Global Quant Team



Publications by SEB's Global Quant Team

"10 Years with SEB Asset Selection", November 2016

"10 Reasons to Invest in CTA Funds", September 2014

"10 Fallacies to Avoid when Selecting CTA Funds", February 2014

"Questions & Answers regarding CTA Performance and SEB Asset Selection", October 2012



Disclaimer

General

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Information, opinions and estimates expressed in this document must be considered as exclusively related to the moment of publishing of the current document and are subject to revocation or change without notice.

The Fund faces the same risks as those normally associated with investments in equities, currencies, commodity indices and bonds. Since the assets of the Fund are risk exposed to one, several or all of the above asset types, the risk will be varying from low to high. The Fund may take long positions (when forecasting upward moving markets and/or securities prices) and/or short positions (when forecasting downward moving markets and/or securities prices). The Fund is managed with greater flexibility when it comes to the usage of derivatives instruments. If the fund invests in financial instruments denominated in a foreign currency, changes in currency exchange rates may affect the return on the investment. For funds with share classes which aim at hedging the returns from changes in currency exchange rates of the fund's base currency, SEB makes no representation or warranty as to achieving the currency exchange rate hedge.

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individual unit holder and in order for an individual unit holder to understand the tax treatment of an investment the unit holder should obtain tax advice. Prospective investors should also inform themselves as to any applicable legal requirements and exchange control regulations in the countries of their citizenship, residence or domicile which might be relevant.

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The strategy includes use of derivatives. Derivatives often involve a high degree of financial risk because a relatively small movement in the price of the underlying security or benchmark may result in a disproportionately large movement in the price of the derivative and are not suitable for all investors. No representation regarding the suitability of these instruments and strategies for a particular investor is made.

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This information may not be current and SEB has no obligation to provide any updates or changes. The unit holder is fully responsible for any decision to invest in the fund, and this material should not be deemed to be investment advice nor any form of recommendation to the recipient to invest in the Fund. For more detailed information regarding the fund, please refer to its fact sheet, Key Investor Information Document ("KIID"), management regulations and prospectus, which materials can be obtained from www.sebgroup.lu.

For investment advice tailored to individual circumstances, you are kindly requested to contact your investment adviser within SEB or your local investment advisor.



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This document is not intended to be used as a substitute for SEB’s legal documentation, nor for information that Investors may obtain from their professional advisors.

Additional important information relevant to certain jurisdictions is included below.

For investors in Switzerland:

SEB Asset Selection Fund is domiciled in Luxembourg and regulated by the Commission de Surveillance du Secteur Financier. BNP PARIBAS SECURITIES SERVICES, Paris, succursale de Zurich, Selnaustrasse 16, 8002 Zurich, acts as Swiss representative and as Swiss paying agent of the Fund. The prospectus and the key investor information documents for Switzerland, the management regulations, the annual and semi-annual reports can be obtained, free of charge, at the offices of the Swiss representative.

For investors in The Netherlands:

Do not take any unnecessary risks. Read the Key Investor Information Document. Past performance is not necessarily indicative of future results. The value of your investment may rise as well as fall. You may not get your initial investment back. Your investment horizon should be at least 3-5 years.

Please also refer to www.afm.nl/ebi



For investors in Spain:

SEB Fund 1 has been registered with the Securities Market Commission (Comisión Nacional del Mercado de Valores) under no. 819. A copy of the prospectus and key investor information document, the fund rules or instrument of incorporation as well as the annual and semi-annual reports of SEB Fund 1 may also be obtained from the Spanish distributors of units in the Fund. A complete list of the Spanish distributors of the Fund is available on the website of the Securities Market Commission (Comisión Nacional del Mercado de Valores) at www.cnmv.es.

Units in the Fund are sold in Spain in accordance with the marketing memorandum (*memoria de comercialización*), a copy of which should be provided by the relevant distributor to the investor prior to a purchase of units in the Fund.

For investors in Italy:

Further information is provided in the Prospectus in English and in the Key Investor Information Document (KIID) in Italian, which have been published with Consob. The offering documentation is available, free of charge, from the Distributors and on the website www.sebgroup.lu. The updated list of distribution agents in Italy is available from the distributors themselves, at the Italian paying agents and on the website www.sebgroup.lu.

Read the Prospectus before subscribing. Potential investors are also encouraged to read the most recent annual financial statement in order to be better informed about the investment policy of the Fund.

Past performances are not indicative of future results. Past yields are shown gross of taxation.

For investors in France:

The Prospectus and the Key Investor Information Document (“KIID”) for the Fund is available at the centralizing correspondent BNP Paribas Securities Services, 66, rue de la Victoire, 75009 Paris, telephone +33- 1 42 98 10 00.



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Important: *Countries which are not listed on this page may be covered by authorised representatives. Please see the next page "SEB's Representatives in International Markets".*



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