Quantitative Monographs
Follow the smart money

Equities

Global
Quantitative

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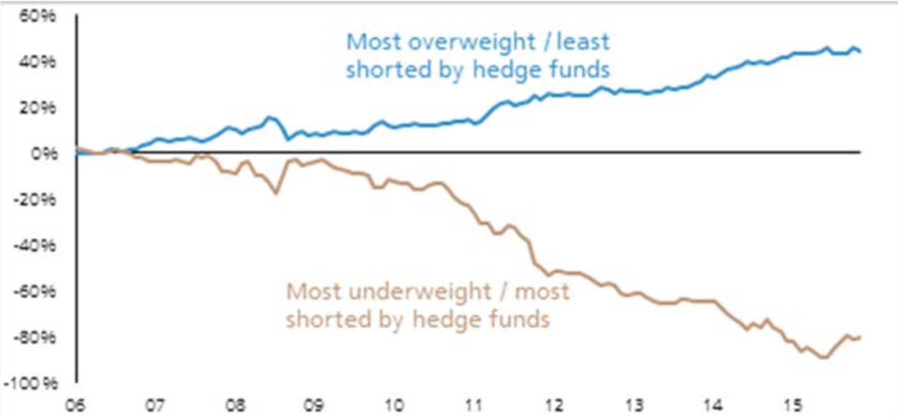
Discover the hidden alpha in hedge fund positions
Long regarded as the smart money, we show that there is indeed prediction power in hedge funds' positioning data. Stocks that are most overweight or least shorted by hedge funds tend to outperform subsequently, while stocks that are most underweight or most shorted by hedge funds tend to underperform subsequently.

Quick mispricing discovery and fast turnover
By comparing the holdings data between hedge funds and long-only funds, we found that hedge funds turn over their positions much faster than long-only funds. What's more, at the aggregate level, long-only funds follow hedge fund trades, while hedge funds trade against long-only funds.

Our alpha model and hedge fund monitor
We have built an alpha model based on the findings. For stocks with strong upside potential, we screen for those that are most overweight and least shorted by hedge funds. For stocks with strong downside potential, we screen for those that are most underweight and most shorted by hedge funds. We will also publish a monthly hedge fund monitor going forward to continue tracking hedge fund positions globally.

Figure 1: Relative performance for most and least favourable stocks by hedge funds



Note: The backtest was run for the MSCI World from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

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Summary

Do hedge funds represent smart money?

Hedge funds have generally been regarded as among the most sophisticated investors, or the smart money. Are they better at discovering investment opportunities based on their research and analysis? Do relatively lighter regulations enable them to spot mispricing and react more quickly?

Our study shows that in aggregate level, hedge funds do have the ability to predict future stock returns

In this report, we try to answer these questions by studying the price predictability of the most overweight/underweight positions of the long-leg of hedge fund holdings, as well as the most/least shorted positions of the short-leg of hedge fund trades. Using FactSet ownership data, we build a measure based on the idea of relative weight to gauge the degree of over/underweight for the long positions. We use active utilisation of stock lending from Equilend to measure the level of short positions. We find that:

- Both the hedge fund holdings data on the long side and the stock lending data for the short side can predict future stock returns.
  - Stocks that are most overweight or least shorted by hedge funds tend to subsequently outperform
  - Stocks that are most underweight or most shorted by hedge funds tend to subsequently underperform
- What's more, the results were not as strong for the long-only funds, especially on the long-side

A further study on the relation between hedge funds and long-only funds' holdings shows that:

- Hedge funds turn over their positions much faster than long-only funds
- Long-only funds generally follow the trades of hedge funds, while hedge funds trade against long-only funds.

We have built a strategy based on these findings. The back-test results suggest both the long and short sides generate fairly good alpha.

Figure 2: Strategy performance summary – MSCI World

	Long: Most overweight & least short	Short: Most underweight & most short	Long-Short
Annualised return	4%	-7%	11%
Risk-adjusted return	0.90	-0.99	1.07
Hit Rate	52%	46%	

Note: Backtest period is from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Capture the alpha in hedge fund trades

Compared to long-only funds, data on hedge fund positioning is much harder to get due to less regulatory reporting requirements. In this report, we try to gauge hedge fund positioning by looking at two different data sources. We measure the long-leg of hedge fund holdings using institutional ownership data provided by the FactSet ownership database. We approximate the short-leg of hedge fund trades using stock lending data from Equilend.

We monitor hedge fund trades using both FactSet ownership data and Equilend stock lending data

Most overweight and underweight positions in the long side

In our report focusing on long-only investors last year, we introduced a stock-level crowding measure, defined as the percentage of buyers among all the buyers and sellers for a single stock[1]. We showed that crowded trades of long-only investors tend to trigger a performance reversal after the momentum in the initial phase (2-3 months). In this report, we want to focus on hedge funds and see whether they tell a different story.

Crowded trades caused by long-only investors tend to trigger a performance reversal. So what about hedge funds?

Measure the hedge fund positioning

The major difficulties with hedge fund holding data are that the numbers of funds that report the holdings are much fewer and the reporting frequency is also lower compared to long-only funds. As a result, the crowding measure that we previously defined for long-only funds is not ideal here, as its differentiability relies on a relatively large number of funds and high reporting frequency. Here we introduce a new measure to identify the stocks that are most over/underweight by fund managers based on the idea of relative weight.

We introduce a new measure for hedge fund positioning, based on the idea of relative weight

For each fund at each time point, we calculate the weights for its holdings, compare this weight to the reference weight, and then further rescale by the reference weight. The reference weight is the weight of stocks in a reference portfolio, which contains exactly the same holdings as the fund and weighs the holdings by their market caps.

Take an example of a fund that holds only two stocks, A and B, and weighs them equally. If the market cap of A is three times that of B, we then have a reference portfolio with 75% of A and 25% of B. So the adjusted relative weight for A based on this fund is -0.33 = (50%-75%)/75%, and the adjusted relative weight for B is 1 = (50%-25%)/25%.

At each time point, we calculated the adjusted relative weights for stocks across all funds, and aggregate the measure for each stock by taking the median value[2].

By construction, this measure avoids the problem of identifying the benchmarks that different funds may use. For hedge funds especially, there might not even be a benchmark. Without comparing to a fixed benchmark, it also avoids the systematic bias that is caused by incomplete reporting, which could be common for hedge funds, or by funds that only invest in a small portion of the benchmark universe (for example, small cap funds or sector funds). Both cases will result in over-estimation of the relative weights.

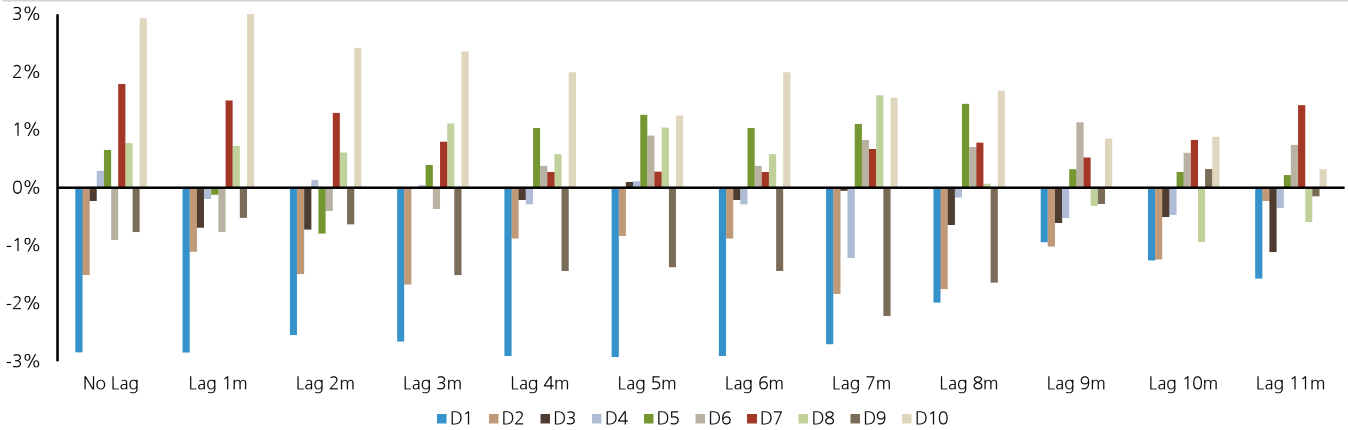
Benefits of a relative weight measure without using any index benchmark

[1] For more details, please see The madness of crowds, Shanle Wu, 15 July 2015.
[2] We also run a backtest using the average. It does not lead to a material difference.

We back-test the measure in the MSCI World universe. The portfolio is rebalanced on a monthly basis. At the end of each month, we divide the universe into deciles and look at the performance in the following month. Returns in each decile are equally weighted. Considering that there is generally a lag before the holding data is available, we also back-test the results using different lagging periods.

There is significant alpha in most overweight/underweight positions by hedge funds and it decays slowly…

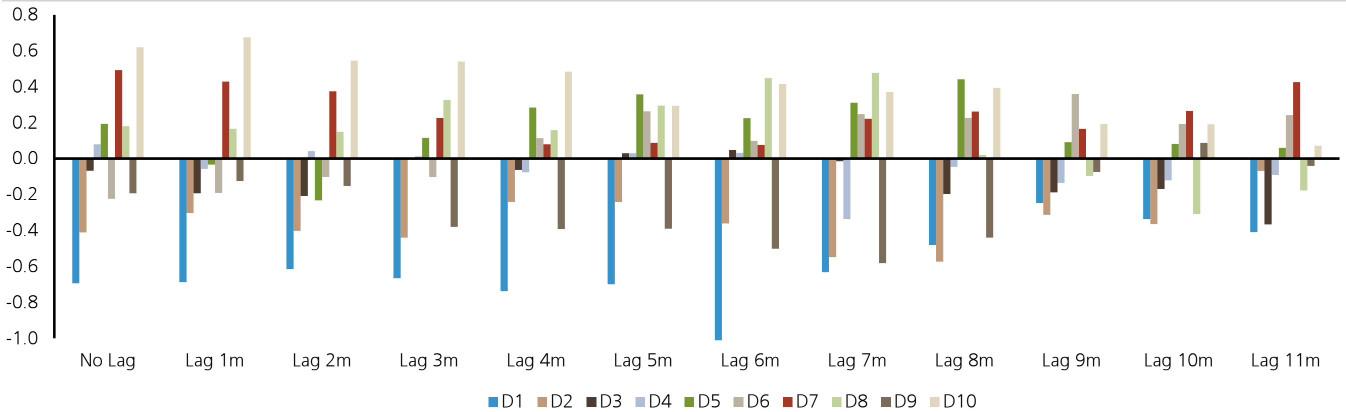
Figure 3: Annualised relative performance (MSCI World)



Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

The back-test results are promising on both the positive and negative sides. Stocks that are most overweight by hedge funds (D10) tend to outperform[3], while stocks that are most underweight (D1) tend to underperform. More importantly, the alpha lasts for quite a few months before it starts to decay (see Figure 3 and Figure 4).

Figure 4: Risk-adjusted relative returns (MSCI World)

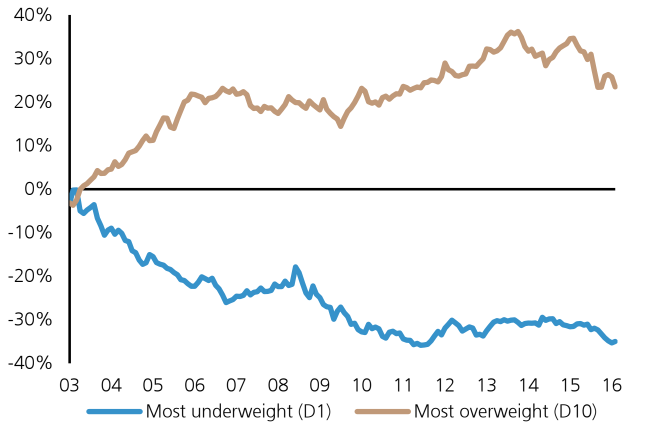


Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

As most of the holding data will be available within a 3-month period, we take the 3m lag version as our final model.

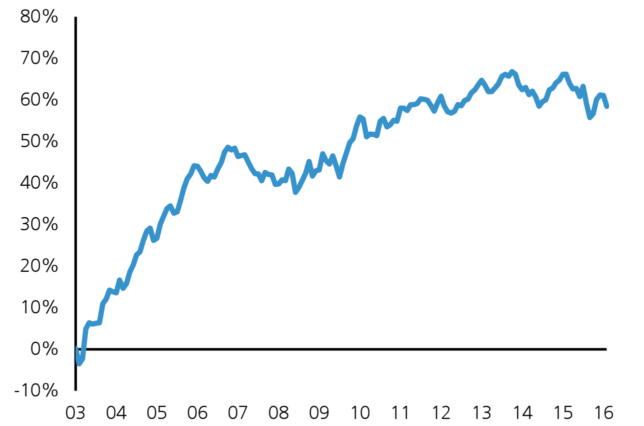
[3] The underperformance of decile 9 is mainly driven by the underperformance during the global financial crisis, during which decile 8 and decile 10 was roughly flat.

Figure 5: Performance of most over/underweight stocks



Note: The backtest was run for the MSCI World from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Figure 6: Long-short performance



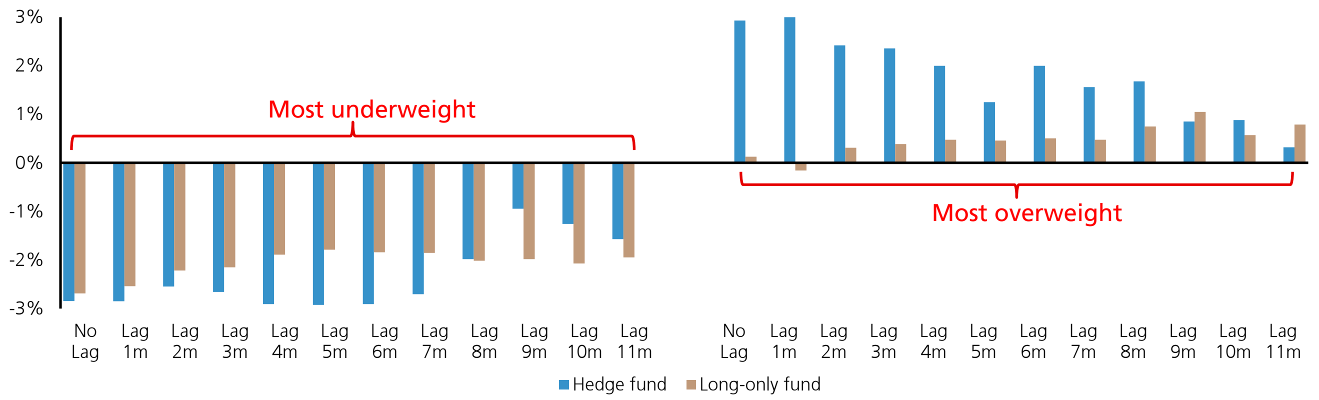
Note: The backtest was run for the MSCI World from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Hedge funds versus long-only funds

In order to do an apples-to-apples comparison, we also apply the same measure to long-only funds. The results suggest that the most overweight positions by long-only funds did not generate significant alpha during our back-test period. The most underweight stocks did underperform, but still not as strongly as the most underweight stocks by hedge funds (see Figure 7 and Figure 8).

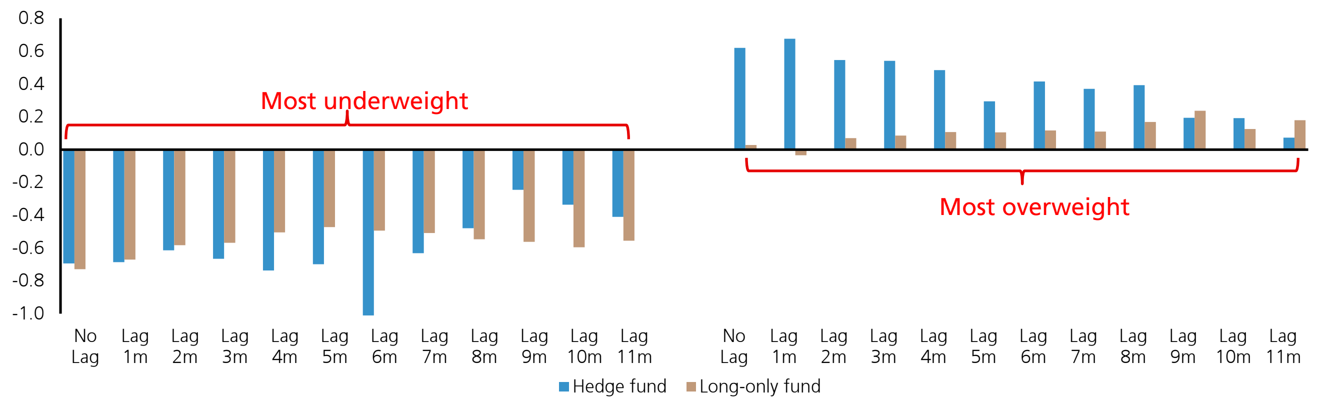
...but this was not the case for long-only funds

Figure 7: : Annualised relative performance—hedge funds versus long-only funds (MSCI World)



Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Figure 8: Risk adjusted-relative performance—hedge funds versus long-only funds return (MSCI World)



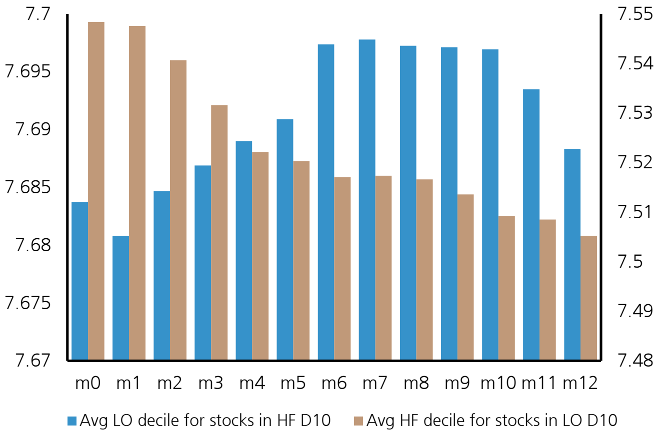
Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

This leads us to further study the relation between hedge fund and the long-only holdings. We first look at how long-only funds position the stocks that are most overweight (D10) and most underweight (D1) by hedge funds, as well as how hedge funds position the stocks that are most over/underweight by long-only funds. The blue bars in Figure 9 and Figure 10 show the average long-only relative weight deciles for stocks in the hedge fund relative weight decile 10 (most overweight) and decile 1 (most underweight) in the subsequent 12 months. The brown bars in Figure 9 and Figure 10 show the average hedge fund relative weight deciles for stocks in the long-only relative weight decile 10 (most overweight) and decile 1 (most underweight) in the subsequent 12 months. We found that:

Hedge funds discover and react to mispricing more quickly

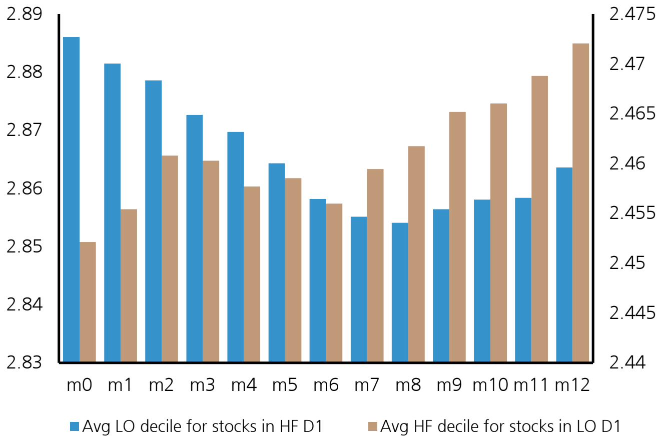
- Long-only funds tend to follow hedge fund trades. Long-only funds typically start to increase (decrease) their positions for the most overweight (underweight) stocks by hedge funds in the subsequent two quarters.
- This is not the case for hedge funds. Hedge funds generally trade against long-only funds. They reduce (increase) their holdings for the most overweight (underweight) stocks by long-only funds.

Figure 9: How long-only (hedge funds) trade stocks when they became the most overweight stocks among hedge funds (long-only)



Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Figure 10: How long-only (hedge funds) trade stocks when they became the most underweight stocks among hedge funds (long-only)

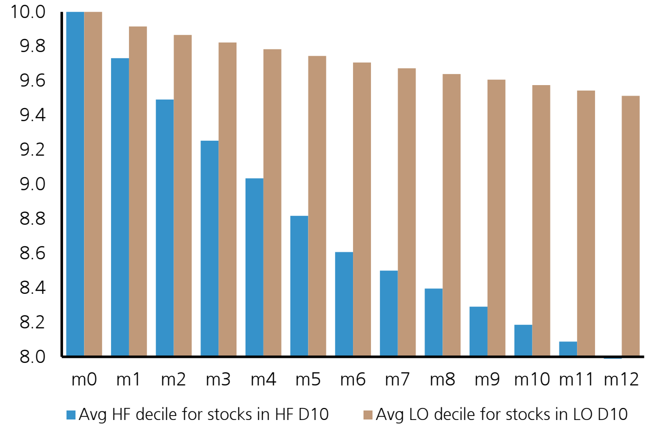


Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Hedge funds turn over their positions much faster than long-only funds

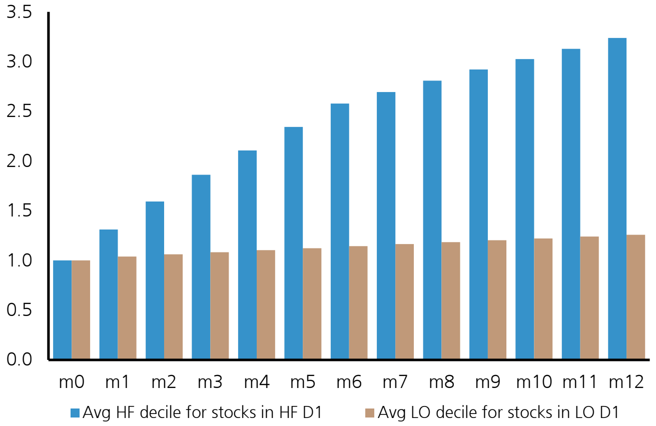
We also look at how fast they turn over their positions by tracking the changes in deciles in the following 12 months after the stocks make it into the top/bottom decile of the holdings (see Figure 11 and Figure 12). We find that hedge funds turn over their positions much faster than long-only funds. The stocks that make it into the top/bottom decile of long-only fund holdings will stay there for long time, while in the case of hedge funds, they will move to other deciles in a short time.

Figure 11: How long-only/hedge funds trade their most overweight stocks



Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Figure 12: How long-only/hedge funds trade their most underweight stocks



Note: Backtest period is from January 2003 to June 2016.
Source: MSCI, FactSet, UBS Quantitative Research

Overlay with other factors

Low correlation with other style factors; further improves the alpha

As a new source of alpha, we would like to know how it correlates with other factors. We look at both the average of cross-sectional rank correlations between the factor values, as well as the time-series correlations of the factor performance (see Figure 13 and Figure 14).

Figure 13: Average cross-sectional rank correlation of the factor values

	Earnings Yield	Hist. Earnings Growth	Fcst Earnings Growth	12m Price Momentum	ROE	Volatility	Hedge fund positions
Book to Price	0.26	-0.29	-0.09	-0.21	-0.75	0.12	0.05
Earnings Yield		0.11	-0.14	-0.12	0.24	-0.06	-0.04
Hist. Earnings Growth			-0.08	0.19	0.35	0.02	0.02
Fcst. Earnings Growth				0.19	0.01	0.20	0.08
12m Price Momentum					0.14	-0.02	0.04
ROE						-0.17	-0.09
Volatility							0.17

Note: The backtest was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Hedge fund positioning data has relatively low rank correlation with other style factors. A similar comment can be made for the performance correlations.

Figure 14: Time-series correlation of factor performance of decile 10 of each factor

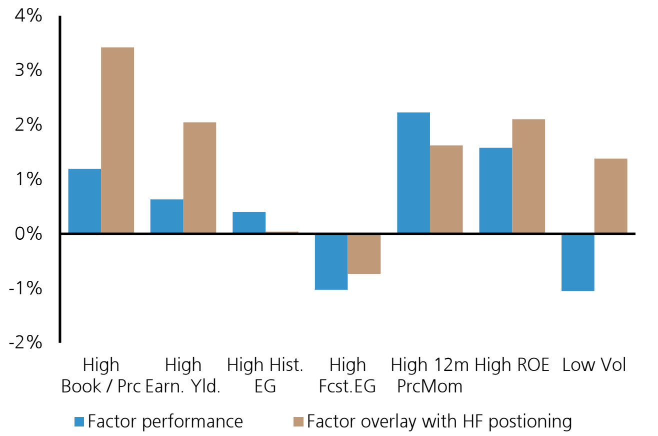
	High Earnings Yield	High Hist. Earnings Growth	High Fcst Earnings Growth	High 12m Price Momentum	High ROE	Low Volatility	Most overweight by hedge funds
High Book to Price	0.70	-0.09	0.53	-0.58	-0.36	-0.70	0.05
High Earnings Yield		0.23	0.48	-0.33	0.15	-0.78	0.04
High Hist. Earnings Growth			0.26	0.35	0.37	-0.29	0.01
High Fcst. Earnings Growth				0.10	-0.10	-0.69	0.13
High 12m Price Momentum					0.25	0.19	0.03
High ROE						0.01	-0.06
Low Volatility							-0.06

Note: This is calculated for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Hedge fund positioning signal brings in additional alpha

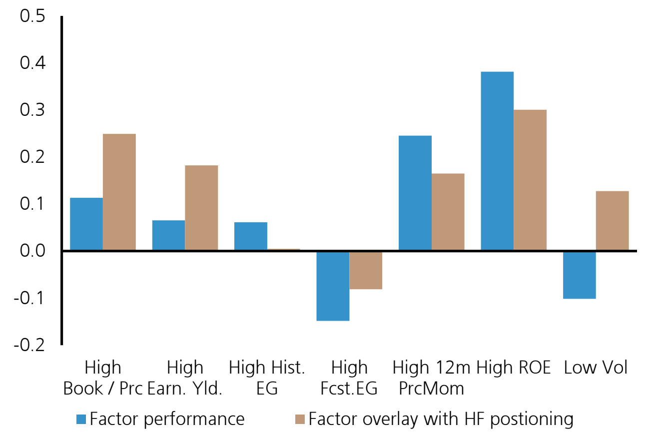
We then overlay the hedge fund positions with other factors by intersecting the decile 10 (decile 1 for volatility) for each factor with stocks in decile 6 to 10 of hedge fund holdings (i.e. the stocks more overweight by hedge funds). This improves the performance of other factors, except for historical earnings growth and price momentum during the back-test period (see Figure 15 and Figure 16).

Figure 15: Annualised relative performance



Note: The backtest was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Figure 16: Risk-adjusted relative performance



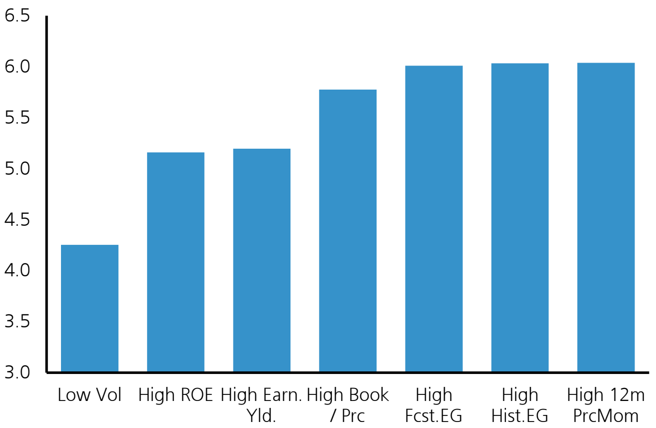
Note: The backtest was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Hedge funds' investment style preference

To explain why adding hedge fund data does not improve the performance of historical earnings growth and price momentum, we look at hedge funds' preference for different investment styles. We calculate the average hedge fund relative weight decile for stocks in decile 10 of each factor (decile 1 for volatility). Figure 17 shows the average decile in the months when the factor baskets are formed. Figure 18 shows the changes in average decile in the 12-month period following the month when the factor baskets are formed. We found that:

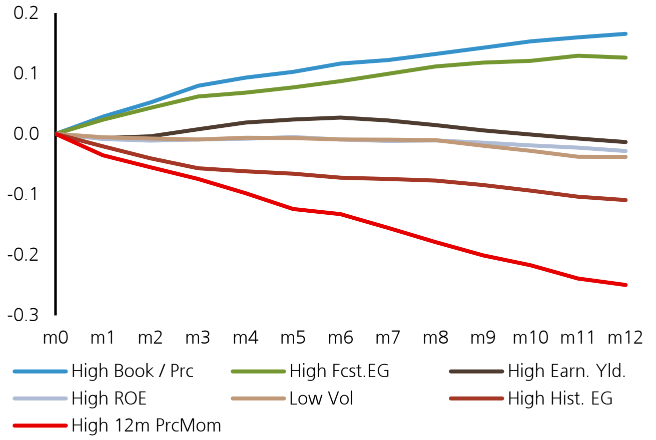
- Stocks with good earnings growth and strong past performance (i.e. high price momentum) are most overweight by hedge funds. On the flip side, hedge funds do not like stocks with low volatility (see Figure 17).
- Stocks that are inexpensive (low P/BV) and with good earnings prospects (high earnings growth forecasts) will continue to attract hedge funds. On the other hand, hedge funds tend to take profit and sell off stocks that have performed in the past, which could explain why the overlaying price momentum with high hedge fund overweight reduces performance. A similar comment can be made for historical earnings growth (see Figure 18).

Figure 17: Hedge funds' preference for different factors



Note: The calculation was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Figure 18: Changes in hedge funds' preference for different factors

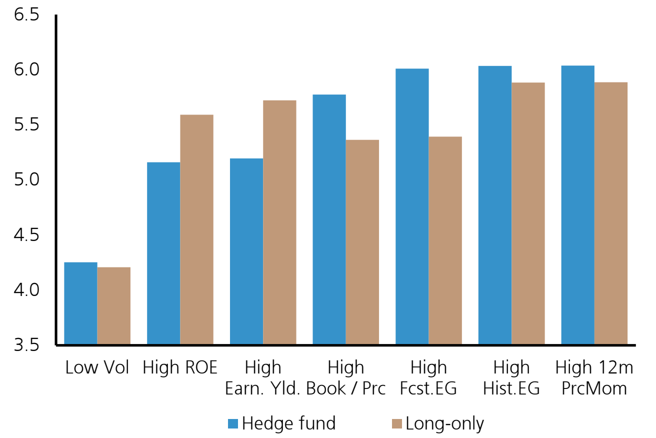


Note: The calculation was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Different style preferences between long-only and hedge funds

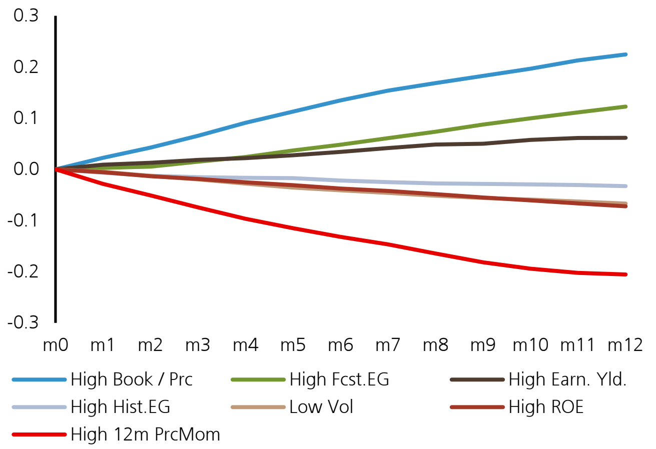
To complete the analysis, we also compare the results with long-only funds. There are some differences in the style preferences between long-only and hedge funds. Long-only investors prefer more defensive styles such as high ROE and high earnings yield, and less prefer the more risky styles such as high book-to-price and high earnings growth forecasts (see Figure 19). The changes in long-only investors' preference for different factors are similar to those of hedge funds (see Figure 20).

Figure 19: Long-only investors' preference for different factors



Note: The calculation was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

Figure 20: Changes in long-only investors' preference for different factors



Note: The calculation was run for the MSCI World universe from January 2003 to June 2016.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

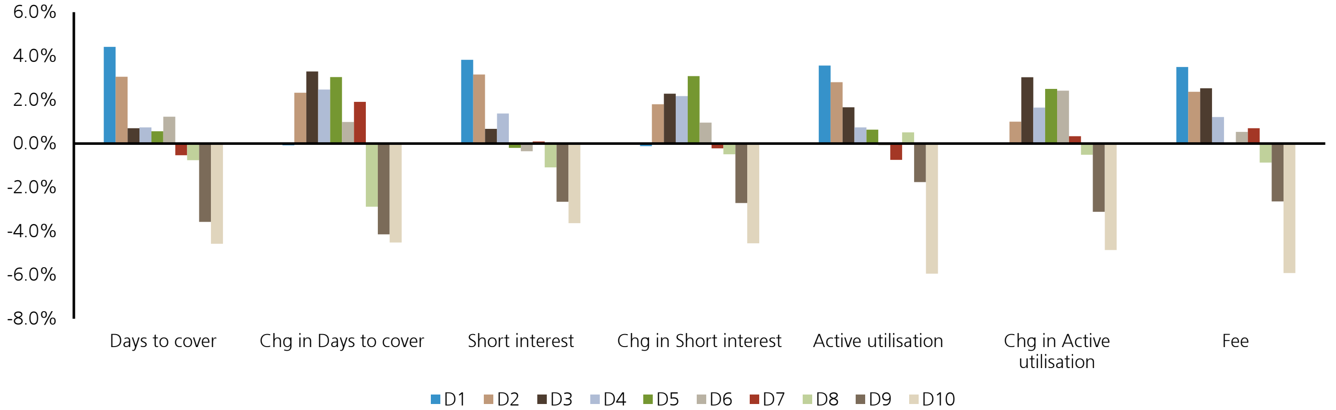
Most and least shorted positions

We use stock lending data from Equilend to approximate the short side of hedge fund trades[4]. We back-tested several factors built from the data including:

- days to cover—calculated as the value on loan divided by the 30-trading day average value traded. This indicates the time required to buy back the total value of securities borrowed.
- short interest—percentage of the free float that is out on loan.
- active utilisation—calculated as the percentage of active lendable securities in lending that are currently out on loan, i.e. value on loan divided by active lendable value.
- month-on-month changes in the above three factors
- fees—volume-weighted average fees

The portfolios are rebalanced on a monthly basis. At the end of each month, we divide the MSCI World index universe into deciles and track the performance in the following month. Returns in each decile are equally weighted. As the stock lending data comes in a very timely fashion, we do not need to include any lag in the back-test.

Figure 21: Annualised relative performance (MSCI World)



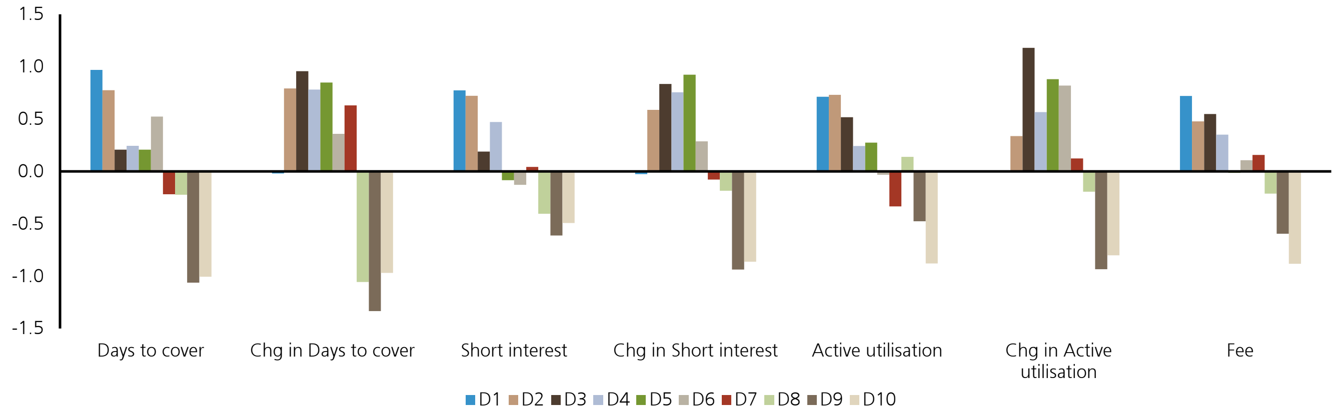
Note: The backtest was run for the period from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

Strong negative correlation between the level of short and subsequent one month performance

The back-test results are quite strong for days to cover, short interest, active utilisation, and fees for the both positive and negative sides. The higher the days to cover, short interest or active utilisation, the worse the subsequent performance, and vice versa. For changes in days to cover, short interest and active utilisation, the results were strong at the negative side, but not the positive side. This is not surprising as small positive changes or large negative changes could indicate that these measures have already reached very high levels (see Figure 21 and Figure 22)

[4] We acknowledge that there are other reasons for stock borrowing aside from true shorting. We also assume that hedge funds account for the majority of short interest in the market.

Figure 22: Risk-adjusted relative performance (MSCI World)



Note: The backtest was run for the period from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

High correlation between the factors based on stock lending data

We then look at how correlated these factors are by measuring both the cross-sectional factor value correlations and time series correlation of performance. Days to cover, short interest and active utilisation are highly correlated as they all indicate high levels of short from different perspectives. Similarly, there is a high correlation between the changes in these three factors (see Figure 23).

Figure 23: Cross-sectional rank correlation for factor values

	Short interest	Active utilisation	Fee	Chg in Days to cover	Chg in Short interest	Chg in Active utilsation
Days to cover	0.79	0.74	0.30	0.21	0.15	0.13
Short interest		0.76	0.12	0.16	0.17	0.14
Active utilisation			0.43	0.15	0.15	0.19
Fee				0.06	0.06	0.07
Chg in Days to cover					0.64	0.52
Chg in Short interest						0.74

Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

In terms of performance, the correlations are generally high. We especially see a high correlation between the performance of high short interest and high active utilisation, high active utilisation and high fees (see Figure 24).

Figure 24: Time-series correlation for performance of decile 10 of each factor

	High Short interest	High Active utilisation	High Fee	High Chg in Days to cover	High Chg in Short interest	High Chg in Active utilisation
High Days to cover	0.52	0.51	0.45	0.70	0.49	0.41
High Short interest		0.83	0.66	0.33	0.78	0.70
High Active utilisation			0.83	0.42	0.73	0.74
High Fee				0.39	0.61	0.68
High Chg in Days to cover					0.47	0.47
High Chg in Short interest						0.85

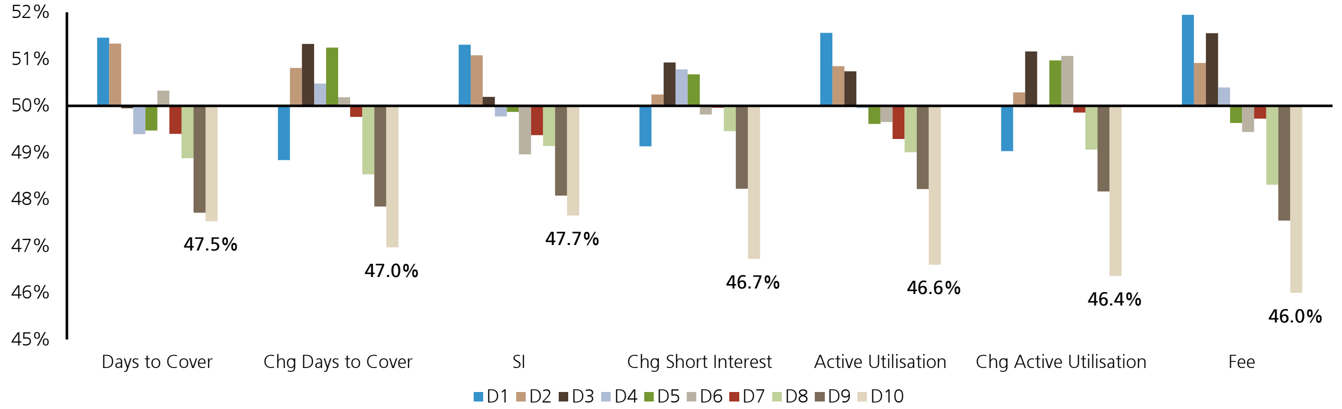
Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

Taking into account both performance and correlation, we will use the active utilisation as our alpha signal.

Short squeeze

We cannot build the model using short data without being aware of the risk of a short squeeze. The billion-dollar question is how to identify stocks with high risk of a short squeeze.

Figure 25: Average cross-sectional hit rates

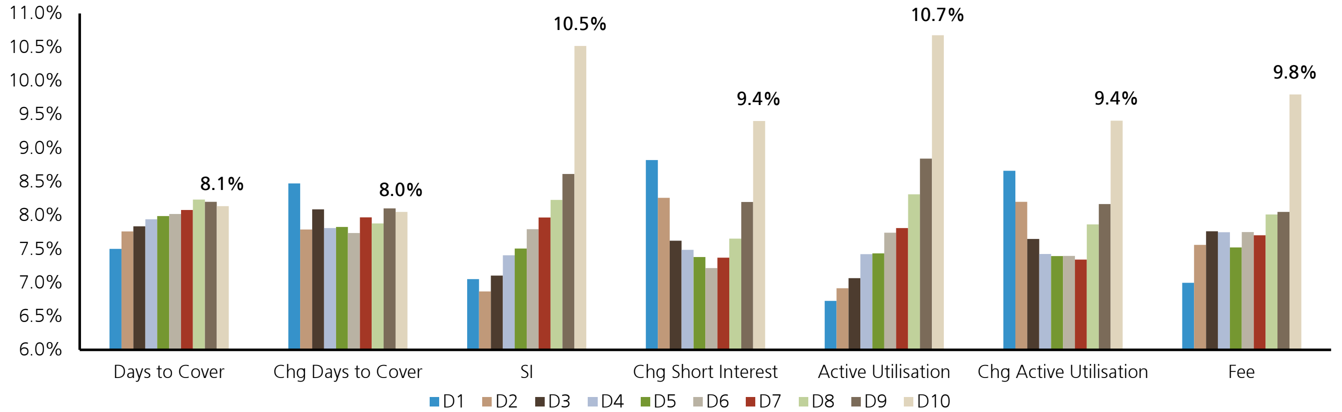


Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

High levels of active utilisation is associated with high risk of a short squeeze

To start, we look at the cross-sectional hit rates and standard deviation of subsequent one-month relative returns for all deciles of each factor. While the hit rates were among the lowest, the standard deviation was the highest for stocks with the highest active utilisation (D10). This means that although the majority of stocks underperform as desired, there are stocks that significantly outperform in the subsequent month, which may be the ones that are affected by a short squeeze (see Figure 25 and Figure 26)

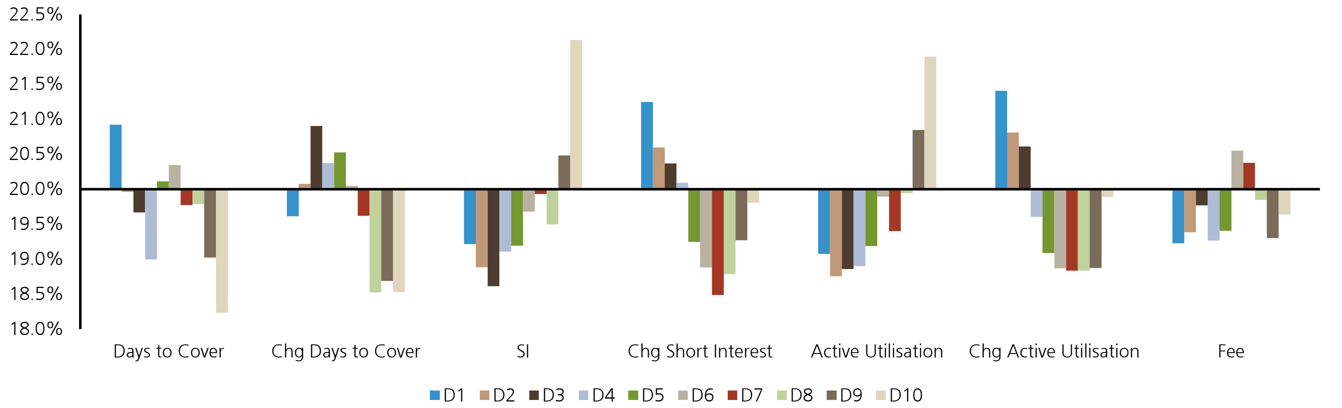
Figure 26: Standard deviation of subsequent one-month relative performance



Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

We also look at the percentage of stocks that become the best 20% performers in the subsequent month for all deciles of each factor. The results also confirm our findings above. The proportion of stocks that would become the top performers in the subsequent month is among the highest for stocks in the highest active utilisation basket (D10) (see Figure 27).

Figure 27: Percentage of stocks that become top quintile performers in the subsequent month

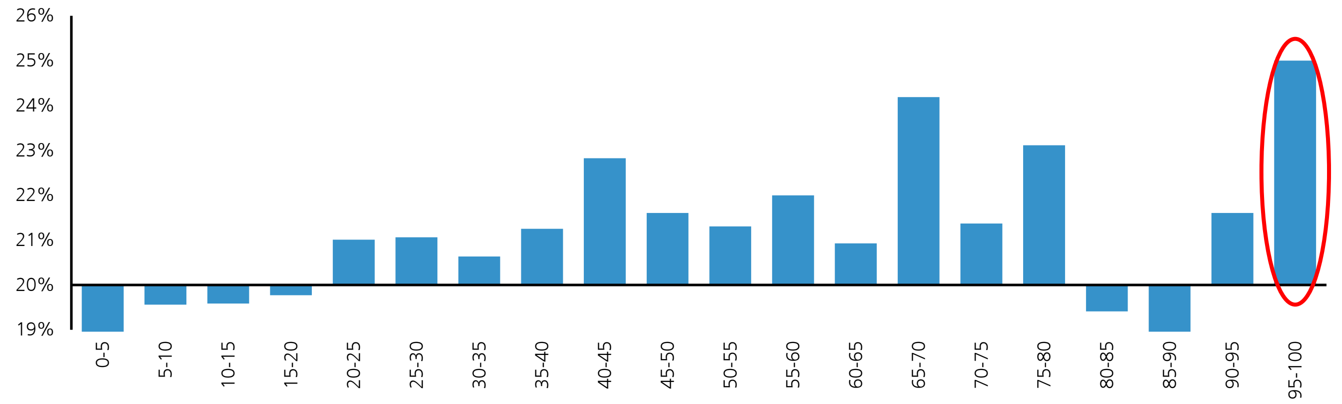


Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

Be aware of stocks with active utilisation greater than 95%...

As a result, we focus on active utilisation as it is also the alpha signal that we want to use. We take a further look at the percentage of stocks that become the best 20% performers in the subsequent month for different levels of active utilisation. The data shows that stocks with active utilisation greater than 95% had the highest chance of getting short squeezed historically (see Figure 28).

Figure 28: Percentage of stocks that become top quintile performers in the subsequent month—active utilisation



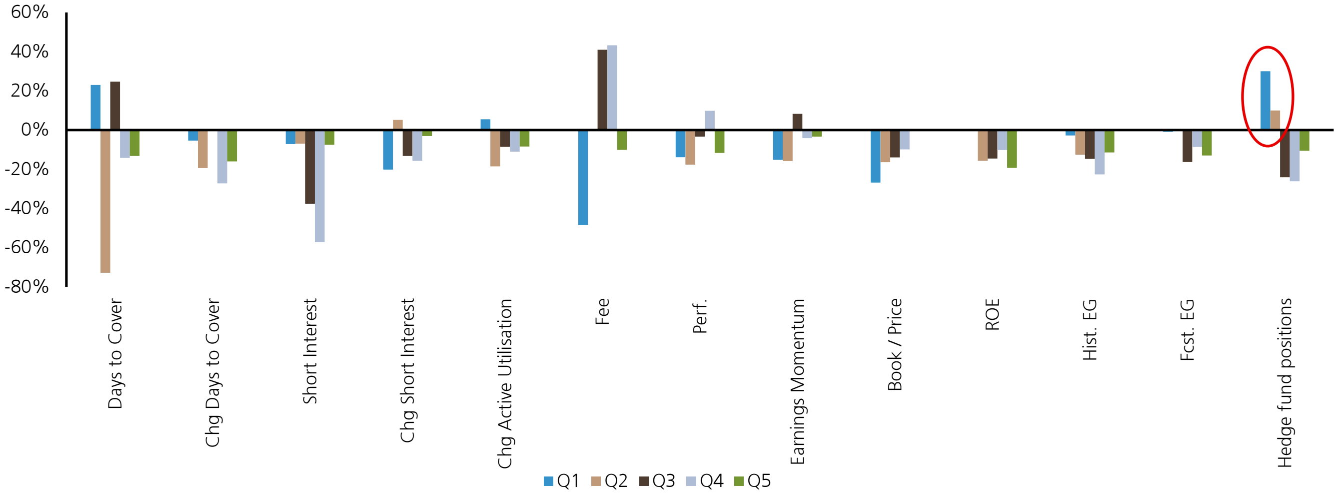
Note: The calculation is done for MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, UBS Quantitative Research

... and low hedge fund ownership

So is there any factor that can be used to further distinguish stocks with high risk of a potential short squeeze among the stocks with active utilisation greater than 95%? We intersect the stocks with active utilisation greater than 95% with the quintile baskets of different factors, and calculate the subsequent one month relative performance (see Figure 29). We found that stocks with low hedge fund holdings (Q1) are exposed to higher risk of a performance rebound in our back-test period.

This is easy to understand as for stocks with high active utilisation and very low hedge fund ownership, once they get a positive shock that triggers the short squeeze, the same positive shocks could also lead to an increase in hedge fund holdings, which will then further push up the price.

Figure 29: Annualised relative performance for stocks with active utilisation greater than 95%



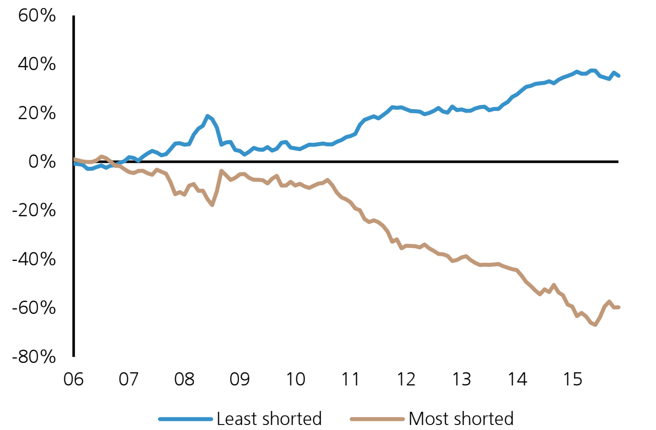
Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, IBES, UBS Quantitative Research

Nevertheless, short squeezes are generally triggered by a positive development of the stock. Neither the high level of active utilisation nor the low level of hedge funds ownership is the cause of it. What the above results show is that when a stock has high level of active utilisation and low level of hedge fund ownership, and when there is a trigger for a short squeeze, the rebound will be very strong. Those are the stocks that investors may want to avoid to include in their short side portfolio given the potential volatility they may introduce.

Alpha model based on stock lending data

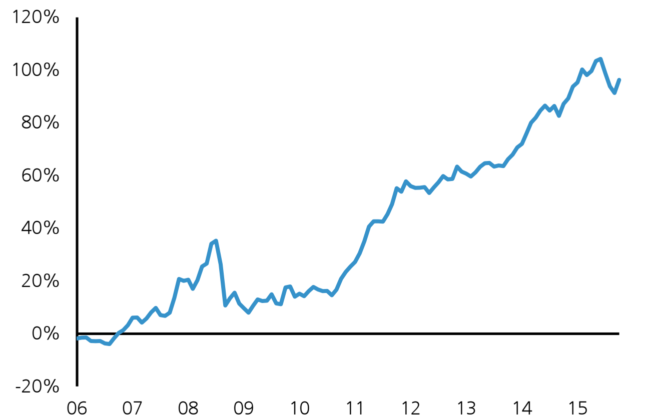
Now we come to our alpha model based on stock lending data, where we use active utilisation as the signal. We long stocks with the lowest active utilisation (decile 1) and short stocks with the highest active unitisation (decile 10), removing the stocks with active utilization greater than 95% and in the lowest quintile of hedge fund holdings (see Figure 30 and Figure 31 for back-test performance).

Figure 30: Performance of most/least shorted stocks



Note: The backtest was run for the period from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 31: Long-short performance



Note: The backtest was run for the period from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Overlay with other factors

We also examine the correlations between active utilisation and other factors. The cross-sectional factor value correlation between active utilisation and other factors have been generally low, although it has a higher performance correlation with other factors. This could also be caused by the relatively short performance history of this factor (see Figure 32 and Figure 33).

Figure 32: Cross-sectional rank correlation of factor values

	Earnings Yield	Hist. Earnings Growth	Fcst. Earnings Growth	12m Price Momentum	ROE	Volatility	Active Utilisation
Book to Price	0.24	-0.33	-0.10	-0.27	-0.75	0.15	0.00
Earnings Yield		0.12	-0.10	-0.14	0.26	0.02	-0.11
Hist. Earnings Growth			-0.07	0.21	0.38	0.01	-0.10
Fcst. Earnings Growth				0.19	0.06	0.16	0.01
12m Price Momentum					0.17	-0.10	-0.16
ROE						-0.13	-0.07
Volatility							0.18

Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, IBES, UBS Quantitative Research

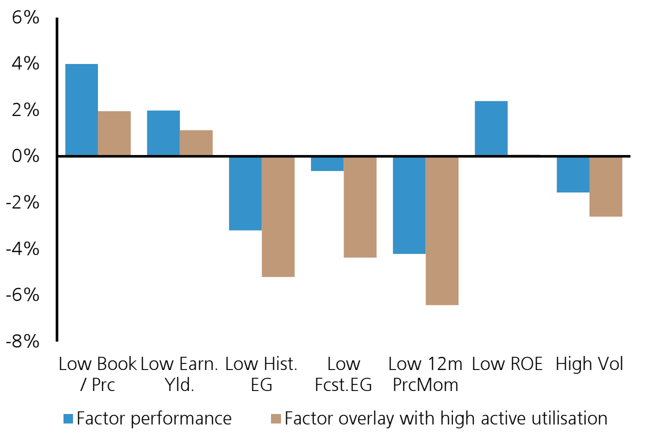
Figure 33: Time-series correlation for performance of decile 1 of each factor

	Low Earnings Yield	Low Hist. Earnings Growth	Low Fcst Earnings Growth	Low 12m Price Momentum	Low ROE	High Volatility	High Active Utilisation
Low Book to Price	-0.25	-0.59	-0.52	-0.61	-0.47	-0.48	-0.51
Low Earnings Yield		0.63	0.67	0.55	0.86	0.42	0.53
Low Hist. Earnings Growth			0.59	0.67	0.81	0.54	0.71
Low Fcst. Earnings Growth				0.80	0.69	0.61	0.66
Low 12m Price Momentum					0.62	0.76	0.73
Low ROE						0.44	0.58
High Volatility							0.67

Note: The calculation was done for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, IBES, UBS Quantitative Research

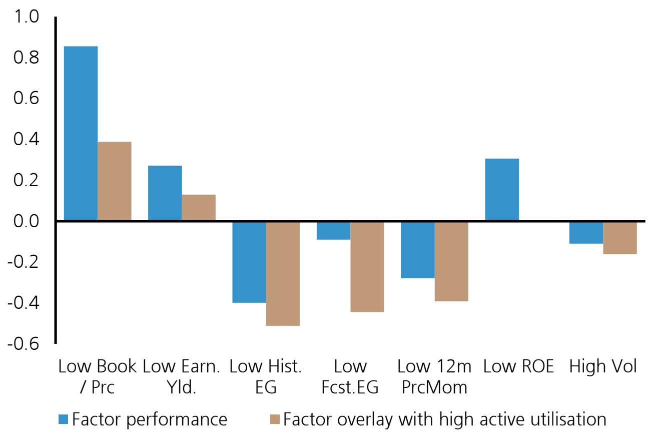
We then overlay the high active utilisation with the "undesired" end of the factor baskets by intersecting the decile 1 for each factor (decile 10 for volatility) with stocks in decile 6 to 10 of active utilisation (i.e. high active utilisation). This further reduced the performance for all factors as expected (see Figure 34 and Figure 35).

Figure 34: Annualised relative performance



Note: The backtest was run for the MSCI World from August 2006 to June 2016.
Source: MSCI, Equilend, IBES, UBS Quantitative Research

Figure 35: Risk-adjusted relative performance



Note: The backtest was run for the MSCI World from Aug 2006 to Jun 2016.
Source: MSCI, Equilend, IBES, UBS Quantitative Research

Alpha model built upon both the long and short side of hedge fund positions

We have now finally reached the stage of putting the two data sources together to form the alpha model based on both the long and short positions of hedge fund trades.

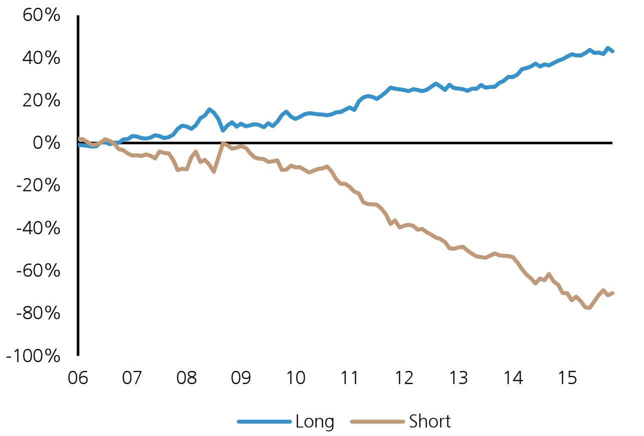
Figure 36: Performance comparison (MSCI World)

		Long	Short	Long-Short
Long position (adjusted relative weight)	Annualised return	0.4%	-2%	2%
	Risk-adj return	0.09	-0.48	0.40
Short position (active utilisation)	Annualised return	4%	-6%	10%
	Risk-adj return	0.71	-0.89	0.91
Combined model	Annualised return	4%	-7%	11%
	Risk-adj return	0.90	-0.99	1.07

Note: The backtest was run for the MSCI World for the period from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, IBES, UBS Quantitative Research

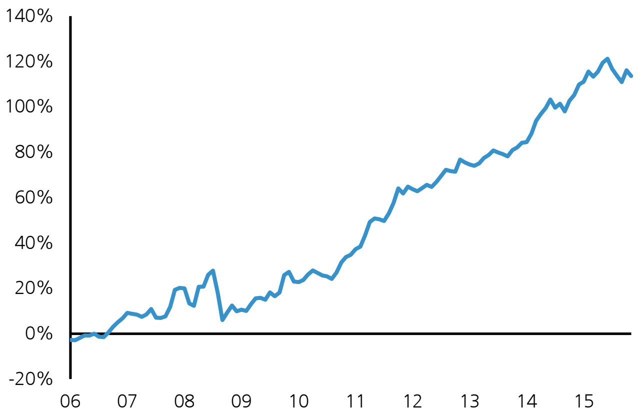
The final combined model achieves an annualised long-short return of 11% and risk-adjusted return of 1.1 in our back-test period (see Figure 36 to Figure 38).

Figure 37: Performance of combined model



Note: The backtest was run for the MSCI World from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, IBES, UBS Quantitative Research

Figure 38: Performance of combined mode—long-short



Note: The backtest was run for the MSCI World from August 2006 to June 2016.
Source: MSCI, FactSet, Equilend, IBES, UBS Quantitative Research

Stock screen

Below is our screen based on active utilisation and hedge fund positions data as of end June 2016. Top of the screen are stocks with lowest active utilisation excluding the ones with low hedge fund ownership; bottom of the screen are stocks with high active utilisation excluding the ones with high hedge fund ownership.

Figure 39: US - Top

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
FTI UN	FMC Technologies, Inc.	0.5	0.7	7.8
GAS UN	AGL Resources, Inc.	0.7	0.4	3.6
BHI UN	Baker Hughes Incorporated	0.7	0.8	2.9
SYF UN	Synchrony Financial	0.2	0.6	2.1
CI UN	Cigna Corporation	0.2	0.9	1.9
CFG UN	Citizens Financial Group, Inc.	1.1	0.9	0.6
PRU UN	Prudential Financial, Inc.	0.9	1.2	0.5
FIS UN	Fidelity National Information Services, Inc.	0.3	0.1	0.1
CE UN	Celanese Corporation Class A	0.1	-	-
EBAY UW	eBay Inc.	0.1	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 40: US - Bottom

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
TWTR UN	Twitter, Inc.	53.7	-0.1	-0.7
ALV UN	Autoliv Inc.	50.9	-0.1	-0.7
HOG UN	Harley-Davidson, Inc.	75.5	-0.1	-0.6
MCHP UW	Microchip Technology Incorporated	62.7	-0.1	-0.6
CMG UN	Chipotle Mexican Grill, Inc.	64.3	-0.1	-0.6
V UN	Visa Inc. Class A	41.8	-1.8	-0.4
KORS UN	Michael Kors Holdings Ltd	45.5	0.0	-0.3
NOV UN	National Oilwell Varco, Inc.	54.2	0.0	-0.1
UA UN	Under Armour, Inc. Class A	94.8	-	-
MAR UW	Marriott International, Inc. Class A	86.3	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 41: Developed Europe - Top

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
RNO FP	Renault SA	1.4	4.5	3.1
SRG IM	Snam S.p.A.	1.0	0.0	2.8
PRY IM	Prysmian S.p.A.	0.3	0.7	2.1
SKY LN	Sky plc	1.5	9.7	2.0
WPP LN	WPP Plc	1.2	0.6	1.5
TITR IM	Telecom Italia Rsp	1.1	0.5	1.2
PNDORA DC	Pandora A/S	1.1	2.3	1.0
LDO IM	Leonardo - Finmeccanica S.p.A.	1.6	1.3	1.0
AGS BB	ageas SA/NV	1.6	1.3	0.9
DELB BB	Delhaize Group SA	0.1	1.0	0.3

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 42: Developed Europe - Bottom

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
ARYN VX	Aryzta AG	46.5	0.0	-0.6
KNEBV FH	Kone Oyj Class B	52.8	-0.2	-0.5
PST IM	Poste Italiane SpA	42.1	-0.5	-0.3
ICA SS	ICA Gruppen AB	74.9	-	-
MRW LN	Wm Morrison Supermarkets plc	73.7	-	-
SBRY LN	J Sainsbury plc	72.7	-	-
GTO NA	Gemalto N.V.	62.9	-	-
OCI NA	OCI NV	58.5	-	-
EDF FP	Electricite de France SA	58.1	-	-
CO FP	Casino, Guichard-Perrachon SA	56.3	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 43: Asia ex-Japan - Top

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
015760 KP	Korea Electric Power Corporation	0.1	0.7	1.2
TLKM IJ	PT Telekomunikasi Indonesia, Tbk Class E	0.8	0.5	1.1
KLK MK	Kuala Lumpur Kepong Bhd.	0.0	-	-
1 HK	CK Hutchison Holdings Ltd	0.1	-	-
2380 HK	China Power International Development L	0.1	-	-
TNB MK	Tenaga Nasional Bhd	0.1	-	-
032640 KP	LG Uplus Corp	0.2	-	-
1339 HK	People's Insurance Co. (Group) of China L	0.2	-	-
000030 KP	Woori Bank	0.2	-	-
2601 HK	China Pacific Insurance (Group) Co., Ltd.	0.2	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 44: Asia ex-Japan - Bottom

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
BABA UN	Alibaba Group Holding Ltd. Sponsored AD	65.3	-2.5	-0.9
BMRI IJ	PT Bank Mandiri (Persero) Tbk	95.0	-	-
ASII IJ	PT Astra International Tbk	92.9	-	-
QUNR UQ	Qunar Cayman Islands Limited ADR Class	91.8	-	-
23 HK	Bank of East Asia Ltd.	91.8	-	-
010140 KP	Samsung Heavy Industries Co., Ltd.	91.7	-	-
NOBL SP	Noble Group Limited	91.6	-	-
010060 KP	OCI Co., Ltd	90.9	-	-
035720 KQ	Kakao Corp.	90.1	-	-
1476 TT	Eclat Textile Co., Ltd.	86.3	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 45: Japan - Top

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
4202 JT	Daicel Corporation	0.4	0.9	1.8
4217 JT	Hitachi Chemical Company, Ltd.	1.4	0.2	1.7
8593 JT	Mitsubishi UFJ Lease & Finance Company	0.4	-	-
7832 JT	BANDAI NAMCO Holdings Inc.	0.7	-	-
3659 JT	NEXON Co., Ltd.	0.7	-	-
9364 JT	Kamigumi Co., Ltd.	0.8	-	-
4716 JT	Oracle Corporation Japan	1.0	-	-
5486 JT	Hitachi Metals, Ltd.	1.3	-	-
6417 JT	Sankyo Co., Ltd.	1.4	-	-
4182 JT	Mitsubishi Gas Chemical Company, Inc.	1.4	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 46: Japan - Bottom

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
7936 JT	Asics Corporation	37.4	0.0	-0.9
6952 JT	Casio Computer Co., Ltd.	68.6	0.0	-0.9
5332 JT	TOTO Ltd	37.9	-0.1	-0.9
6965 JT	Hamamatsu Photonics K.K.	35.8	-0.1	-0.9
7779 JT	CYBERDYNE Inc.	93.4	-	-
9706 JT	Japan Airport Terminal Co., Ltd.	93.2	-	-
7731 JT	Nikon Corp.	66.4	-	-
4506 JT	Sumitomo Dainippon Pharma Co. Ltd.	63.3	-	-
2702 JT	Mcdonalds Holdings Company Japan, Ltd.	63.0	-	-
5101 JT	Yokohama Rubber Co. Ltd.	54.8	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 47: Australia - Top

Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
ALL AT	Aristocrat Leisure Limited	0.1	-	-
CTX AT	Caltex Australia Limited	0.7	-	-
BXB AT	Brambles Limited	0.7	-	-
TCL AT	Transurban Group Ltd.	0.9	-	-
WFD AT	Westfield Corporation	1.0	-	-
FBU NZ	Fletcher Building Limited	1.0	-	-
AMP AT	AMP Limited	1.0	-	-
MPL AT	Medibank Private Ltd.	1.2	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 48: Australia - Bottom

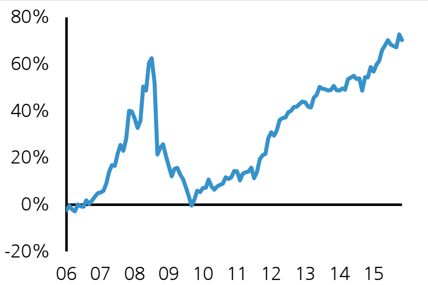
Ticker	Name	Active utilisation (%)	Median rel. wgt (%)	Median adj rel. wgt.
FLT AT	Flight Centre Travel Group Limited	79.3	-	-
FMG AT	Fortescue Metals Group Ltd	50.9	-	-
BEN AT	Bendigo and Adelaide Bank Limited	49.2	-	-
ORI AT	Orica Limited	39.8	-	-
AWC AT	Alumina Limited	38.2	-	-
WOW AT	Woolworths Ltd	36.8	-	-
PTM AT	Platinum Asset Management Ltd	34.2	-	-
OSH AT	Oil Search Limited	32.7	-	-

Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Appendix

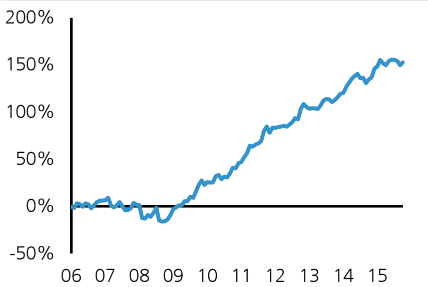
Results for different markets

Figure 49: US – Long short



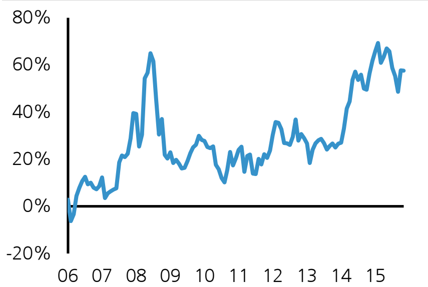
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 50: Developed Europe – Long short



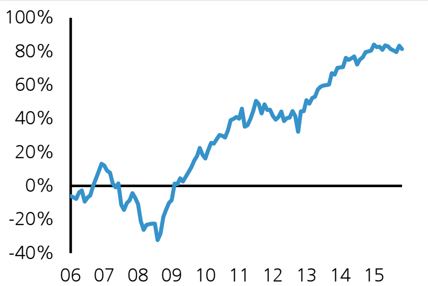
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 51: Australia & New Zealand– Long short



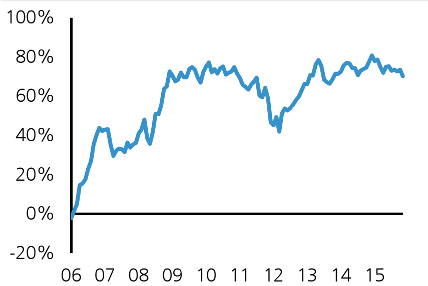
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 52: Japan– Long short



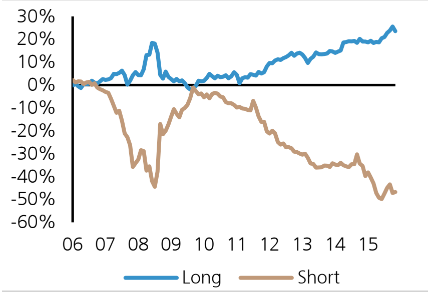
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 53: Asia ex-Japan– Long short



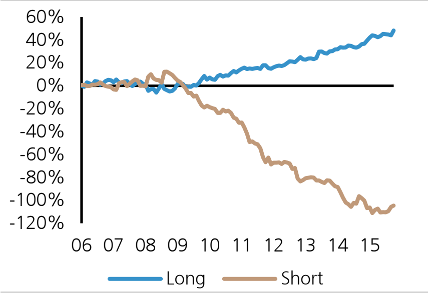
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 54: US



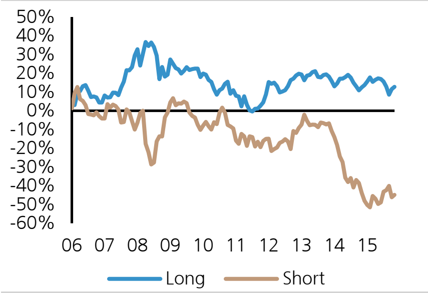
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 55: Developed Europe



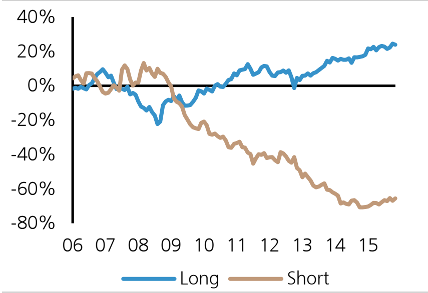
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 56: Australia & New Zealand



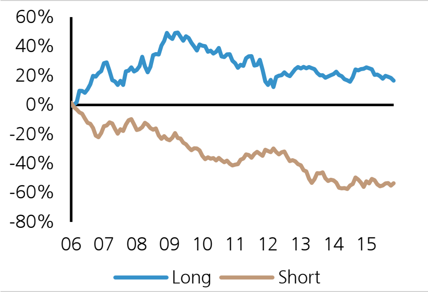
Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 57: Japan



Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Figure 58: Asia ex-Japan

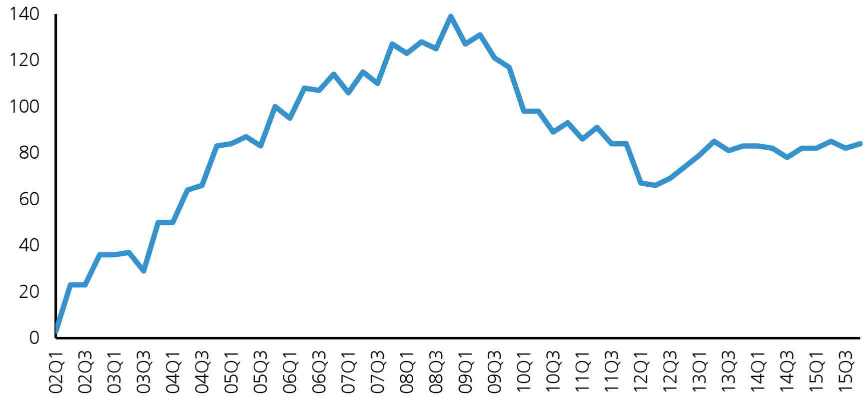


Source: MSCI, FactSet, Equilend, UBS Quantitative Research

Data coverage

The chart below shows the number of hedge funds that are in the FactSet ownership database.

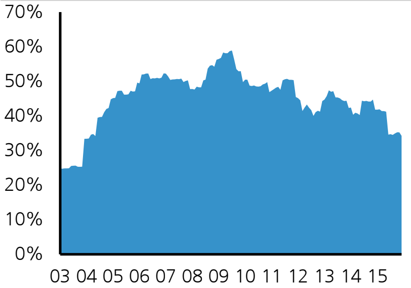
Figure 59: Number of hedge funds reporting



Source: FactSet, UBS Quantitative Research

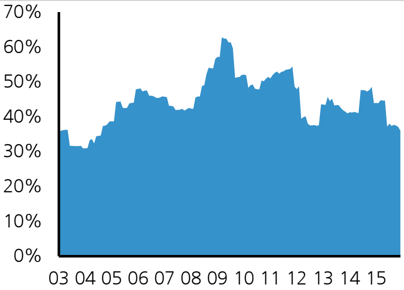
The charts below show the percentage of stocks in the MSCI index universe with the hedge fund holding measure.

Figure 60: Developed world



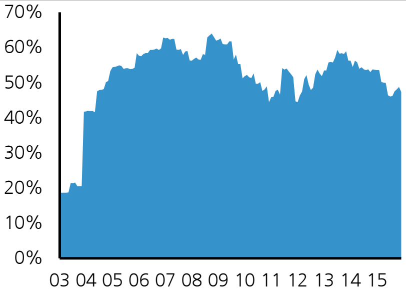
Source: FactSet, UBS Quantitative Research

Figure 61: US



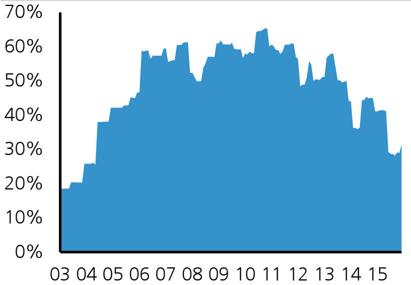
Source: FactSet, UBS Quantitative Research

Figure 62: Developed Europe



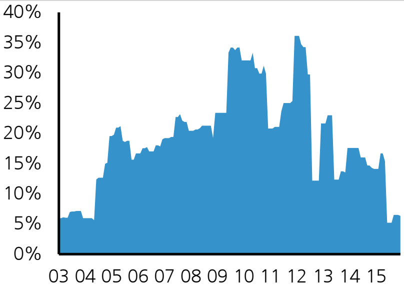
Source: FactSet, UBS Quantitative Research

Figure 63: Japan



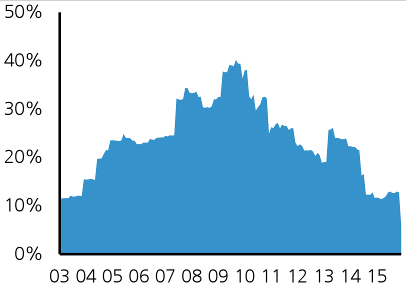
Source: FactSet, UBS Quantitative Research

Figure 64: Australia & New Zealand



Source: FactSet, UBS Quantitative Research

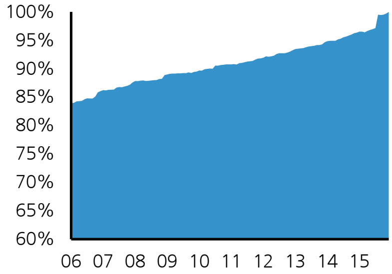
Figure 65: Asia ex-Japan



Source: FactSet, UBS Quantitative Research

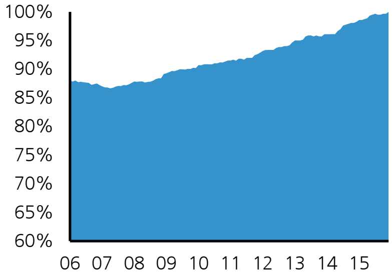
The charts below show the percentage of stocks in the MSCI index universe with the active utilisation data.

Figure 66: Developed world



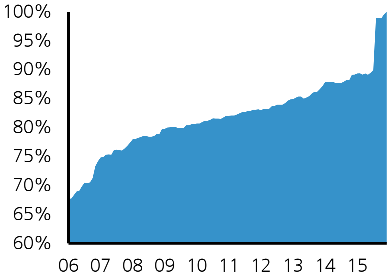
Source: Equilend, UBS Quantitative Research

Figure 67: US



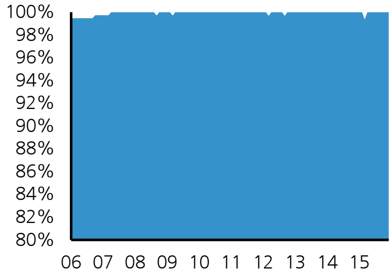
Source: Equilend, UBS Quantitative Research

Figure 68: Developed Europe



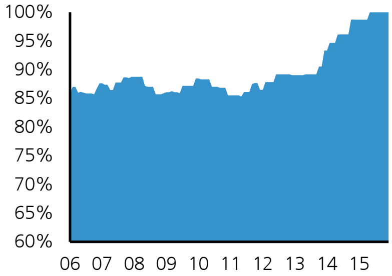
Source: Equilend, UBS Quantitative Research

Figure 69: Japan



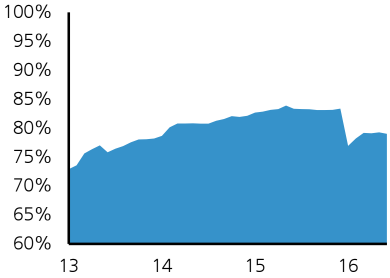
Source: Equilend, UBS Quantitative Research

Figure 70: Australia & New Zealand



Source: Equilend, UBS Quantitative Research

Figure 71: Asia ex-Japan



Source: Equilend, UBS Quantitative Research

Research publications

Monographs, Keys and Q-Series		Academic Research Monitor	
Title	**Date**	**Topic**	**Date**
How can supply chains improve earnings visibility?	Jul-16	UBS Equity Markets Conference 2016	May-16
Where are the attractive dividend paying stocks?	Mar-16	European Quantitative Conference 2015 Highlights	Apr-16
Why does increasing volatility matter?	Feb-16	Does Oil matter for Equity Markets?	Mar-16
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Dynamic Asset Allocation	Nov-15	Equity Risk Premium Forecasting and Market Timing	Sep-15
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Lessons from Behavioural Finance	Jul-15	Index Membership, Investor (in)attention to News & Spurious Correlations	Sep-14
A Closer look at the Trend Factor	Jun-15	Forecasting the Equity Risk Premium	Aug-14
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Three key questions on low volatility	Oct-14		

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Introduction to the UBS Portfolio Analysis System	Jan-15	Risk Models	Nov-11
Long-Short Analysis	Jan-15	UBS Hybrid Risk Model	Dec-10
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Reports	Apr-14	Portfolio Analysis	Jun-10
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Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 31 March 2016.
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2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
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