Deutsche Bank
Research

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Quantitative Strategy

The Quant View

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Why Do ETF Flows Move Prices?

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Decomposing ETF Flows

Previous research by Chao et al (2018a, 2018b) suggests that ETF flows defined as the difference in total dollar amount owned by ETFs scaled by firm market capitalization are negatively related to expected returns. This research delves deeper by breaking the ETF flow measures into three components: (i) allocation, (ii) weight reconstitution and (iii) index reconstitution.

What Drives ETF Flows?

As we show, allocation flows are frequent, small and affect many stocks. Weight reconstitution flows are periodic, different-sized and affect many stocks. Index reconstitution flows are periodic, vary in size and affect few stocks.

Why Should ETF Flows Affect Prices?

The return attribution to different types of flows suggests that the "ETF Contraflow effect" associated with positioning against ETF flows is largely driven by index reconstitution, and to a more minor extent driven by weight reconstitution particularly in more recent years. Our evidence is less consistent with the idea that allocation flows have a meaningful impact on stock prices.

Deutsche Bank Securities Inc.

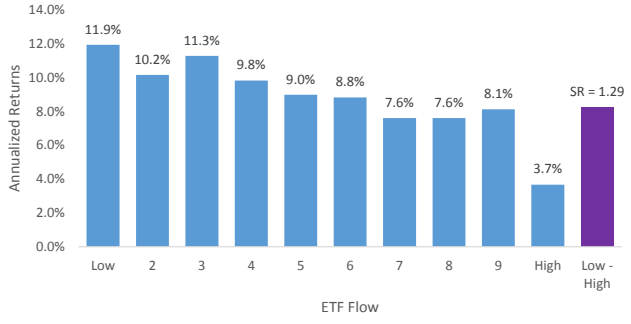
ETF Contraflow Strategy: A Review

The DB Quant Research team published a paper on July 16, 2018 which suggested that ETFs were affecting underlying stock prices. The measure we used to define ETF flows is shown in the equation below:

$$ETF\ Flow_t = \frac{ETF\ Ownership_t}{Market\ Cap_t} - \frac{ETF\ Ownership_{t-1}}{Market\ Cap_{t-1}}$$

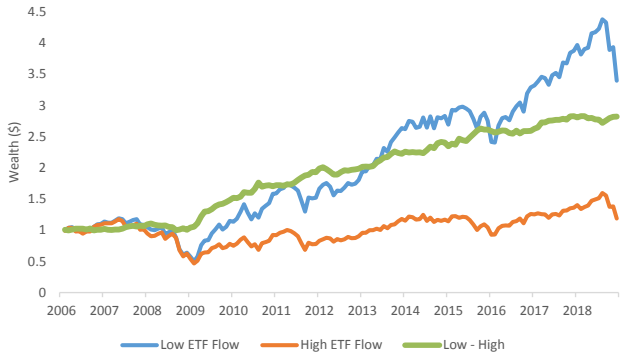
In our original paper we focused on a 12-month window to capture ETF flows. In this article, we have instead chosen to focus on a six month window as the shorter horizon focuses on more recent flows. Each month, we sort Russell 3000 stocks into ten equal groups within each sector based on six month ETF flow. We then form a dollar-neutral equal-weight portfolio that is long the bottom decile of stocks (largest ETF outflow) and short the top decile of stocks (largest ETF inflow).

Figure 1: Annualized returns for portfolios formed on ETF flow (Jan 2006 – Dec 2018)



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 2: Growth in wealth for portfolios formed on ETF flow



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

As we show, stocks with high ETF flows, have much lower average returns when compared to stocks with low ETF flows. The long/short return performance of a "contraflow" strategy that is long stocks with low ETF flows and short stocks with high ETF flows performs (i) strongly in 2009 and in recent periods (last 5 years).

What Drives Variation in ETF Flow?

There are two reasons that stocks experience ETF flows as defined above. First, investors may change their allocation to ETFs causing flows to the underlying stocks. For example, if an investor sells a Russell 1000 ETF and buys a Russell 2000 ETF, large capitalization stocks will have out-flows and small capitalization stocks will have in-flows. Second, stocks may be added, deleted or re-weighted due to reconstitution of the ETF's underlying benchmark index. If a stock migrates from the Russell 1000 to Russell 2000, the stock will have an outflow (for leaving Russell 1000) that is equal to its current weight (which is a function of its market capitalization relative to others in the index) multiplied by AUM of the relevant Russell 1000 ETFs. The stock will also have a corresponding inflow for entering into the Russell 2000. For non-capitalization weighted indices, there will also be reconstitution flows when the indices rebalance infrequently as stocks return back to target

weights. There are generally no weight adjustments for price drift for capitalization-weighted indices.[1]

The decomposition of the ETF flow into allocation and reconstitution flow can be found below:

$$ETF\ Flow_t = \frac{ETF\ Ownership_t}{Market\ Cap_t} - \frac{ETF\ Ownership_{t-1}}{Market\ Cap_{t-1}}$$

$$ETF\ Flow_t = \frac{\Sigma\ AUM_t * w_t}{Market\ Cap_t} - \frac{\Sigma\ AUM_{t-1} * w_{t-1}}{Market\ Cap_{t-1}}$$

$$ETF\ Flow_t = \frac{\Sigma\ P_t * SO_t * w_t}{Market\ Cap_t} - \frac{\Sigma\ P_{t-1} * SO_{t-1} * w_{t-1}}{Market\ Cap_{t-1}}$$

$$ETF\ Flow_t = \underbrace{\Sigma\ SO_t \left(\frac{P_t * w_t}{Market\ Cap_t} - \frac{P_{t-1} * w_{t-1}}{Market\ Cap_{t-1}}\right)}_{\text{ETF Reconstitution Flow}} + \underbrace{\Sigma \frac{P_{t-1} * w_{t-1}}{Market\ Cap_{t-1}} (SO_t - SO_{t-1})}_{\text{ETF Allocation Flow}}$$

P_t = ETF Price

SO_t = ETF Shares Outstanding

w_t = Stock weight in ETF

We can further decompose flows into index and weight reconstitution flows. Index reconstitution involves a stock being added or deleted from an index (for example when a stock gets upgraded from the Russell 2000 to the Russell 1000). Weight reconstitution is generally related to stocks that are changing weights for a non-market capitalization weighted index.

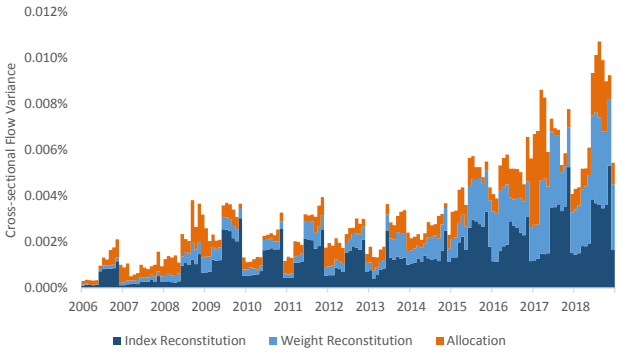
$$ETF\ Recon = \sum SO_t \times \begin{cases} \frac{P_t w_t}{Market\ Cap_t} & if\ w_{t-1} = 0\ Index\ Recon \\ -\frac{P_{t-1} w_{t-1}}{Market\ Cap_{t-1}} & if\ w_t = 0\ Index\ Recon \\ \frac{P_t w_t}{Market\ Cap_t} - \frac{P_{t-1} w_{t-1}}{Market\ Cap_{t-1}} & otherwise\ Weight\ Recon \end{cases}$$

Our first new analysis shown in Figure 3 and 4 decomposes ETF flow cross-sectional variance into the three components listed above: allocation, weight reconstitution and index reconstitution flows.

Our results suggest that ETF flow variation has increased substantially as the assets invested in ETFs have grown. Over the entire period, allocation, index and weight reconstitution drives 29%, 45% and 25% of total ETF flows, respectively. Allocation flows seem to be higher during specific periods that are associated with exceptional market stress (when potentially many ETFs exchanged hands as investors reallocated capital); generally, allocation flows do not have much variation across stocks. Index reconstitution flows while ever-present during our sample tend to be larger in the second half of the year compared to the first six months. Weight reconstitution is quite small earlier in the sample period, but increase substantially over the past two years, accounting for 39% of the variation in total cross-sectional ETF flow.

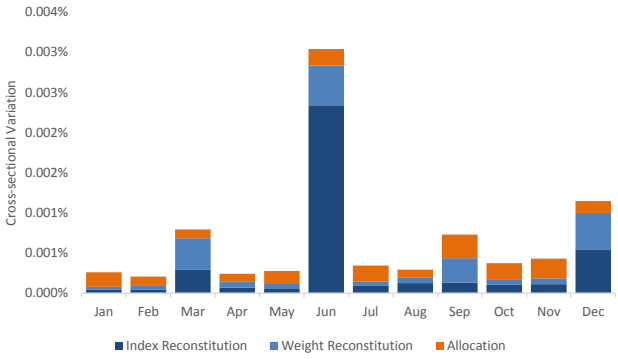
1 Other stocks in Russell 1000 and Russell 2000 will be re-weighted dependent on the relative market-caps of additions and deletions and changes in free float, however these re-weighting flows across other index constituents are generally small for market-cap weight indices where generally no adjustment for price drift is needed.

Figure 3: Decomposition of Cross-sectional six-month ETF Flow Variance (Jan 2006 – Dec 2018)



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 4: Decomposition of Cross-sectional Monthly ETF Flow Variance per Calendar Month (Jan 2006 – Dec 2018)

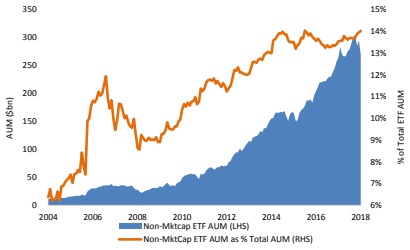


Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 5 reports the non-market capitalization assets under management and that number as a percentage of all equity ETFs AUM from 2004 to 2018 using a classification provided by Bloomberg. The assets of non-market capitalization-weighted ETFs have tripled since 2013, and these ETFs now make up close to 14% of the total amount invested in ETFs. The growing importance of re-weighting flows in our flow attribution reported in Figure 3 coincides with the growth in non-market capitalization-weighted ETF products.

Figure 4 displays the average flows by calendar month. Index reconstitution flows are the largest in June due to the annual Russell rebalances followed by December due to MSCI's semi-annual reviews. Index reconstitution flows are also higher in March and to a lesser extent September due to MSCI and S&P's quarterly rebalances. The large flows in June explain why six-month ETF flows reported in Figure 3 are larger in the second half of each year. The weight reconstitution flows for most calendar months are small, but are large at the end of the calendar quarters. Overall, there isn't much seasonality in allocation flows.

Figure 5: Historical ETF AUM by Index Weighting from 2004 to 2018



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit, DB Delta1 Strategy

Which Types of ETF Flows Are Large?

Next, we examine the distribution of flows in a single month – specifically, we examine June 2018 as the larger ETF flows tend to occur in June and 2018 is the most recent year in our study. Figures 6, 7 and 8 calculates the June 2018 allocation, index and weight reconstitution and allocation flows for each stock in the Russell 3000 plotted in ascending order from smallest to largest flow.

Figure 6: Monthly allocation flows for Russell 3000 stocks (June 2018)

Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 7: Monthly index reconstitution flows for Russell 3000 stocks (June 2018)

Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 8: Monthly weight reconstitution flows for Russell 3000 stocks (June 2018)

Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

As we show, allocation flows (Figure 6) increase gradually and generally show small differences between extremes. This is not the case for index reconstitution flows (Figure 6) which are essentially zero for the entire interquartile range. The distribution in flows is highly leptokurtic, which significant flows that are as much as 5% of market capitalization. Weight reconstitution (Figure 7) has a distribution which is similar to Index reconstitution but the fat tails are not as large and certain elements of the interquartile range are not zero.

Allocation Flow

Allocation flows occur often, have small relative differences across stocks and affect most stocks. For example, when an investor allocates $1 BN USD to a Russell 1000 ETF, all stocks receive inflows that are proportional to their weight in the index. Apple, one of the larger stocks in the index has a market capitalization of approximately $960 BN, with a weight of 3.6% in the index. As a result, approximately $36 MM of the flow should be allocated to Apple. The $36 MM flow is not material for Apple as the company is very large. Since the Russell 1000 is capitalization-weighted, a stock with a $9.6 BN market capitalization will likely have a flow of $360,000. Since allocation flows are spread pro-rata according to market capitalization among many stocks, either huge differences in ETF allocations or sufficient flows into ETFs with highly concentrated stocks need to occur for these flows to be material on the single-stock level.[2]

Index vs. Weight Reconstitution Flow

Index reconstitution flows are periodic, have large differences across stocks and affect few stocks.

Weight reconstitution flows are periodic, vary in size and affect many stocks. For a capitalization-weighted index such as the S&P 500 or Russell 1000 there are very little weight changes during reconstitutions that are not related to stocks changing indices. These changes come into play mainly when there are indices which are not capitalization weighted (e.g. equal weight for factor weight). Our research suggests the assets tracking non-market capitalization weighted ETFs were quite small before 2012 but have grown substantially in recent years (see figure 5).

Scenerio 1: Stock exits cap-weighted index a and enters cap-weighted index b

$$\text{Index Reconstitution Flow} = -\underbrace{\frac{SO_{a,t} * P_{a,t-1} * w_{i,t-1}}{Market\ Cap_{i,t-1}}}_{outflow} + \underbrace{\frac{SO_{b,t} * P_{b,t} * w_{i,t}}{Market\ Cap_{i,t}}}_{inflow} \longrightarrow \begin{array}{l} index\ return_a = \Sigma_{j=1}^{N} w_{j,t-1} * (1+r_{j,t}) = 1 + r_{a,t} \\ stock\ return_i = 1+r_{i,t} \\ P_t = P_{t-1} * (1 + r_{a,t}) \\ Market\ Cap_t = Market\ Cap_{t-1} * (1 + r_{i,t}) \\ AUM_t = SO_t * P_t \end{array}$$

$$\text{Index Reconstitution Flow} = -\frac{AUM_{a,t}/(1+r_{a,t})}{\Sigma_{j=1}^{N_a} Market\ Cap_{j,t-1}} + \frac{AUM_{b,t}}{\Sigma_{j=1}^{N_b} Market\ Cap_{j,t}} \longleftarrow$$

2 Note that our study examines allocation flows over a six-month window, industry-neutralizing flows by GICS sector. We did not examine short-term effects originating in large ETF allocation flows. We also by construction did not analyze the effect of Sector/Industry flows – for example, during the latest US election were very large and had potentially impacted industry stock returns.

The above equation shows that index reconstitution flow associated with a stock moving from index a to index b is proportional to the difference of the assets under management divided by the aggregate market capitalization of each index. For index a, we discount the assets under management at time t by the return on the index at time t. Our analysis suggests that if the aggregate market capitalization of Russell 2000 is $3 TN and the aggregate market capitalization of Russell 1000 is $ 30TN – the assets under management for the Russell 1000 must be 10x the assets in Russell 2000 to avoid an index reconstitution flow. Our research generally finds that the ratio of the capital invested in small capitalization ETF to large capitalization ETFs is greater than the ratio of aggregate market capitalization represented by these indices leading to a "Big Fish, Small Pond" effect or ETF outflows (inflows) when stocks are upgraded (downgraded) to large (small) capitalization index.

Scenerio 2: Non-cap-weighted index c rebalances

$$Weight\ Reconstitution\ Flow = SO_{c,t}\left(\frac{P_{c,t} * w_{i,t}}{Market\ Cap_t} - \frac{P_{c,t-1} * w_{i,t-1}}{Market\ Cap_{t-1}}\right)$$

$$Weight\ Reconstitution\ Flow = \frac{SO_{c,t} * P_{c,t-1}}{Market\ Cap_{t-1}}\left(\frac{1+r_{c,t}}{1+r_{i,t}} * w_{i,t} - w_{i,t-1}\right)$$

$$index\ return_c = \Sigma_{j=1}^{N} w_{j,t-1} * (1+r_{j,t}) = 1 + r_{c,t}$$

$$stock\ return_i = 1 + r_{i,t}$$

$$P_t = P_{t-1} * (1 + r_{c,t})$$

$$Market\ Cap_t = Market\ Cap_{t-1} * (1 + r_{i,t})$$

$$AUM_t = SO_t * P_t$$

If index is equal-weighted and N does not change:

$$w_t = \frac{1}{N}$$

$$Weight\ Reconstitution\ Flow = \frac{SO_{c,t} * P_{c,t-1}}{N * Market\ Cap_{t-1}}\left(\frac{1+r_{c,t}}{1+r_{i,t}} - 1\right)$$

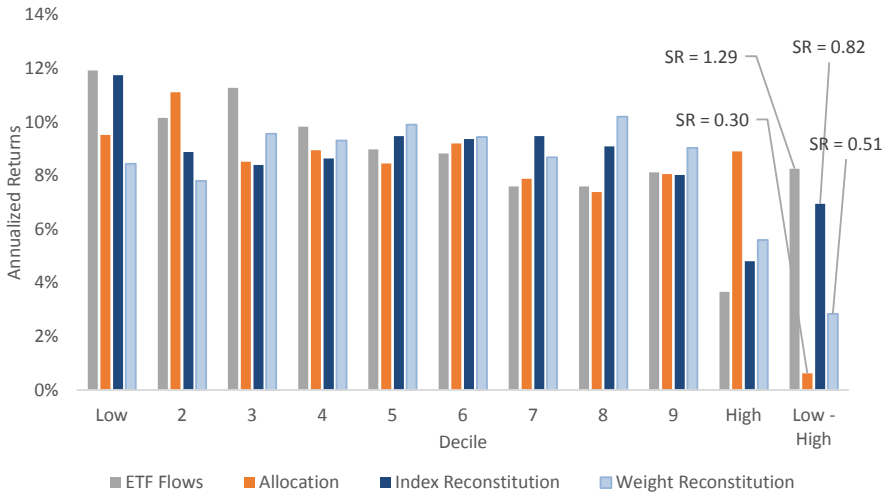
**Assume no dividends or corporate actions from t to t-1*

The second equation shows that weight reconstitution flow associated with a non-capitalization-weighted index rebalancing is (i) positively related to the assets tracking the ETF relative to the market capitalization of the underlying stock, the (ii) weight increase (wi,t –wi,t-1) and (iii) negatively related to the stock return relative to the underlying index return. Thus, if the stock out-performs the index and it's weight doesn't rise as fast, there will be an ETF outflow which is clearly expressed in the last equation.

How do ETF Flows Push Prices?

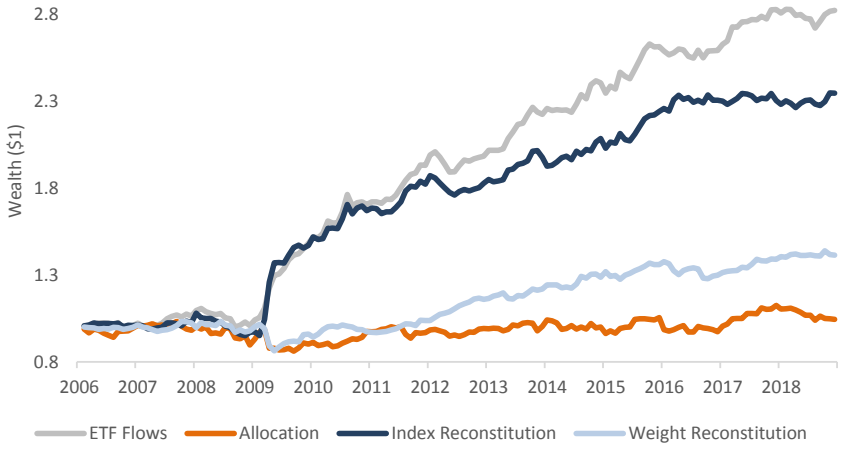
Figure 9 applies the same decomposition methodology to examining whether certain components of ETF flows have a larger impact on expected returns. While the ETF contraflow strategy of taking long positions in low ETF flow stocks and short positions in high ETF flow stocks generates a Sharpe ratio of 1.29. Focusing on index reconstitution alone yields a Sharpe ratio of 0.82, while sorting stocks on weight reconstitution produces a Sharpe ratio of 0.51. Allocation flows while additive, have lower return predictability (SR=0.30).

Figure 9: Annualized returns for portfolios formed on six-month ETF flow, reconstitution, and allocation flows (Jan 2006 - Dec 2018)



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 10: Growth in wealth for portfolios formed on ETF flows, reconstitution, and allocation flows



Source : Deutsche Bank Quantitative Strategy, Compustat, S&P, Russell, Axioma, IHS Markit

Figure 10 reports the growth in wealth for monthly rebalanced portfolios formed on ETF, allocation, index and weight reconstitution flows. Most of the returns are driven by reconstitution flows, particularly index reconstitution. Weight reconstitution appears to perform better in recent years, as figure 5 reports an increase in non-market-cap weighted products (e.g. equal weight and factor-weight ETFs). Performance for the allocation strategy is much weaker but still additive.

Conclusion

In this short note, we examine the various explanations for why ETF contraflow strategies explain variation in stock returns. Our analysis suggest that ETF contraflow strategies are likely driven by both index and weight changes associated with periodic rebalances. Like most structural anomalies, the performance of this strategy is likely contingent on the assets tracking strategies like ETF contraflow and the size of passive instruments such as ETFs relative to the overall market.

Macro update

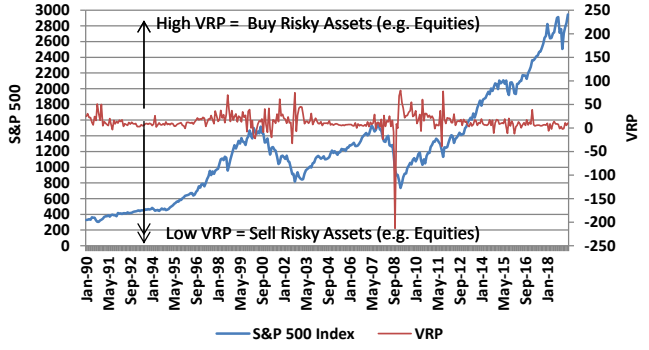
Turning our attention to the bigger picture, we also take the opportunity to update our favorite top-down market indicators.

Our favorite market timing indicator

Our Variance Risk Premium (VRP) indicator is a contrarian indicator that measures market overreaction and underreaction to realized risk. In simple terms, VRP is the difference between options-implied risk (i.e., the VIX index) and realized risk (i.e., the actual risk in the market, historically measured over the last month). If VRP is high, we see this as a buying opportunity for risky assets, like equities and high-yield bonds. Why? Our reasoning is as follows: when VRP is high, VIX has typically shot up dramatically (i.e., the market is in panic mode). At the same time, realized risk has probably also risen, but not to the same extent. In other words, the market has over-reacted relative to what the actual realized data is telling us. Our research shows that such episodes are good buying opportunities for risky assets on about a three-month horizon. On the other hand, when VRP is low, it tends to be a complacency indicator – investors are failing to price rising realized risk into the market, and as a result, we favor selling risky assets like equities.

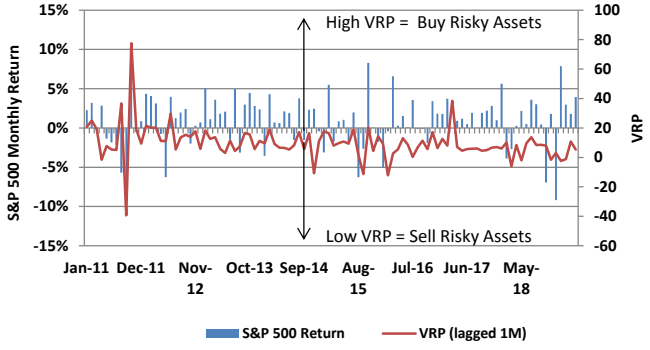
Our VRP indicator is at -1.2, less than the long-term average of 12. This reading signals slightly bearish sentiment. Generally, we pay attention to the VRP when it hits extreme levels (like +/- 2 standard deviations, or outside -10 and 34).

Figure 11: Variance Risk Premium (VRP)



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 12: Recent VRP (lagged) and market returns

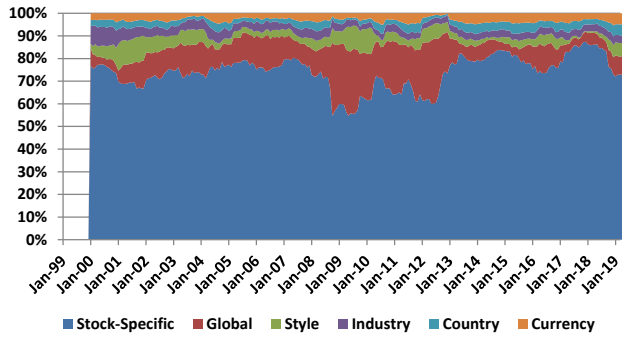


Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

The opportunity set for investors

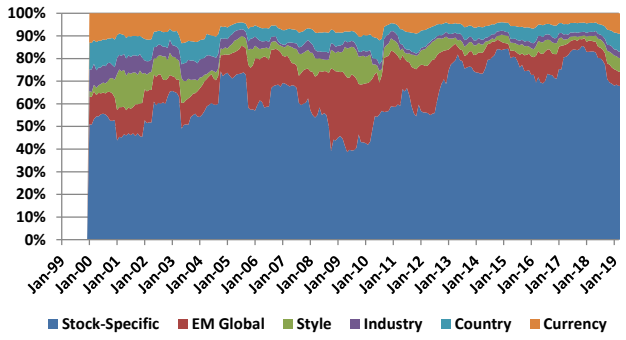
Another metric that we watch closely is the so-called "opportunity set" for investors. Think of this as the total alpha on the table. Our main interest is to understand what is driving that opportunity, because this can allow us to position our strategies to 'pick the juiciest fruit in the orchard.' In Figure 6, we show the opportunity set for global equity investors, and in Figure 7, we show the same for Emerging Market equity investors.

Figure 13: Global opportunity set



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 14: Emerging Markets opportunity set



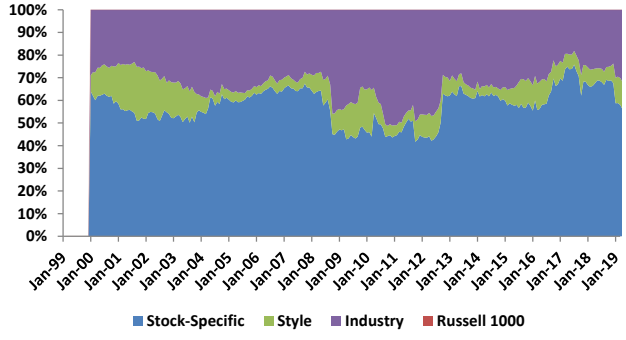
Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

The key result is the size of the blue portion relative to the other colors. The blue area represents the opportunity explained by stock selection, whereas we can think of the other colors as representing the opportunity from top-down calls, like picking the right countries, industries and styles. When the financial crisis occurred in 2008, we moved into a much more macro-dominated world. As a result, the portion of overall opportunity that could be explained by individual company characteristics (e.g., valuation, growth profile and earnings quality, etc.) shrunk sharply. For example, few investors cared if a stock looked good on fundamentals if it was exposed to Europe. Such an environment was challenging for quants and non-quants alike, since both camps tend to use stock-specific information to differentiate between stocks.

The small-cap opportunity set

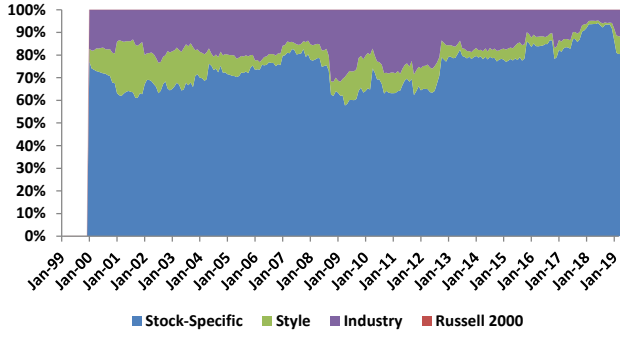
In Figure 8, we show the opportunity set for the large-cap universe, and in Figure 9, we show the opportunity set for the small-cap universe.

Figure 15: Large-cap opportunity set



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 16: Small- cap opportunity set



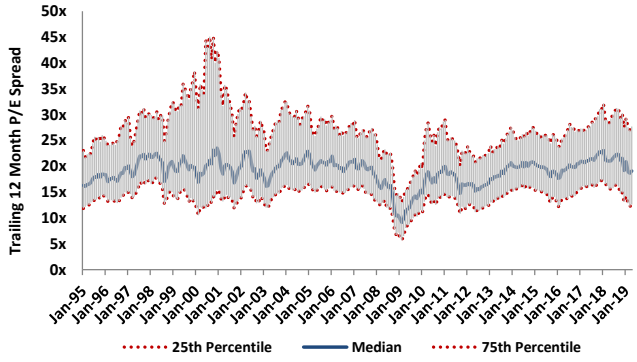
Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Both charts show that bottom-up stock picking is making a strong comeback. The blue area in both charts has reached levels last seen in 2007. The crucial observation is that the relative opportunity coming from stock selection is higher for small-cap stocks. In other words, this universe is particularly fruitful for managers with skill in picking individual stocks. We note that the relative opportunity set has remained fairly steady during the past month for small caps.

Valuation spreads

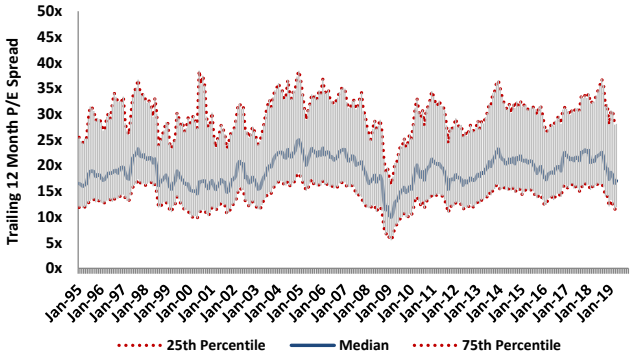
Similar to the opportunity set, valuation spreads allow investors to gauge the level of stock selection opportunity in the market. Widening valuation spreads typically indicate more stock-level differentiation, and consequently, a better environment for stock selection. On the other hand, narrowing valuation spreads are indicative of lower levels of stock differentiation. Figure 10 and Figure 11 show the median 25th percentile and 75th percentile of trailing price to earnings for the Russell 1000 and 2000 index constituents. Interestingly, we see that valuation spreads are wider on a more consistent basis for small-cap stocks. This reinforces the earlier evidence we saw in the opportunity set – the small-cap space is rich with opportunity for skilled stock pickers.

Figure 17: Large cap valuation spreads



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 18: Small cap valuation spreads

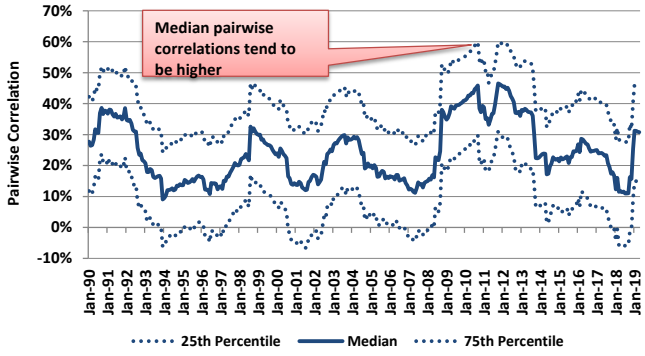


Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Keeping an eye on correlations

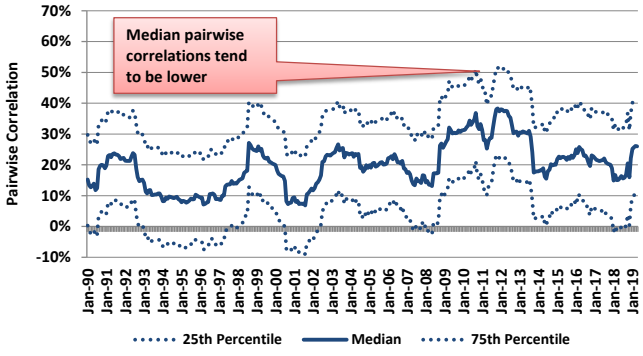
The median pairwise correlation among stocks in the market is closely related to the opportunity set and valuation spreads. This is calculated by taking every possible pair of stocks and computing the correlation of their monthly returns based on the past 24 months of data, and then taking the median across all the pairs. Figure 12 shows the median pairwise correlation for large caps. In general, median pairwise correlations for small-cap stocks (shown in Figure 13) tend to be lower when compared with large-cap stocks. This tells us that small-cap names tend to trade more on their own merits, rather than being driven by common factors.

Figure 19: Median pairwise correlation for large caps



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 20: Median pairwise correlation for small caps



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

The DB Quant Dashboard

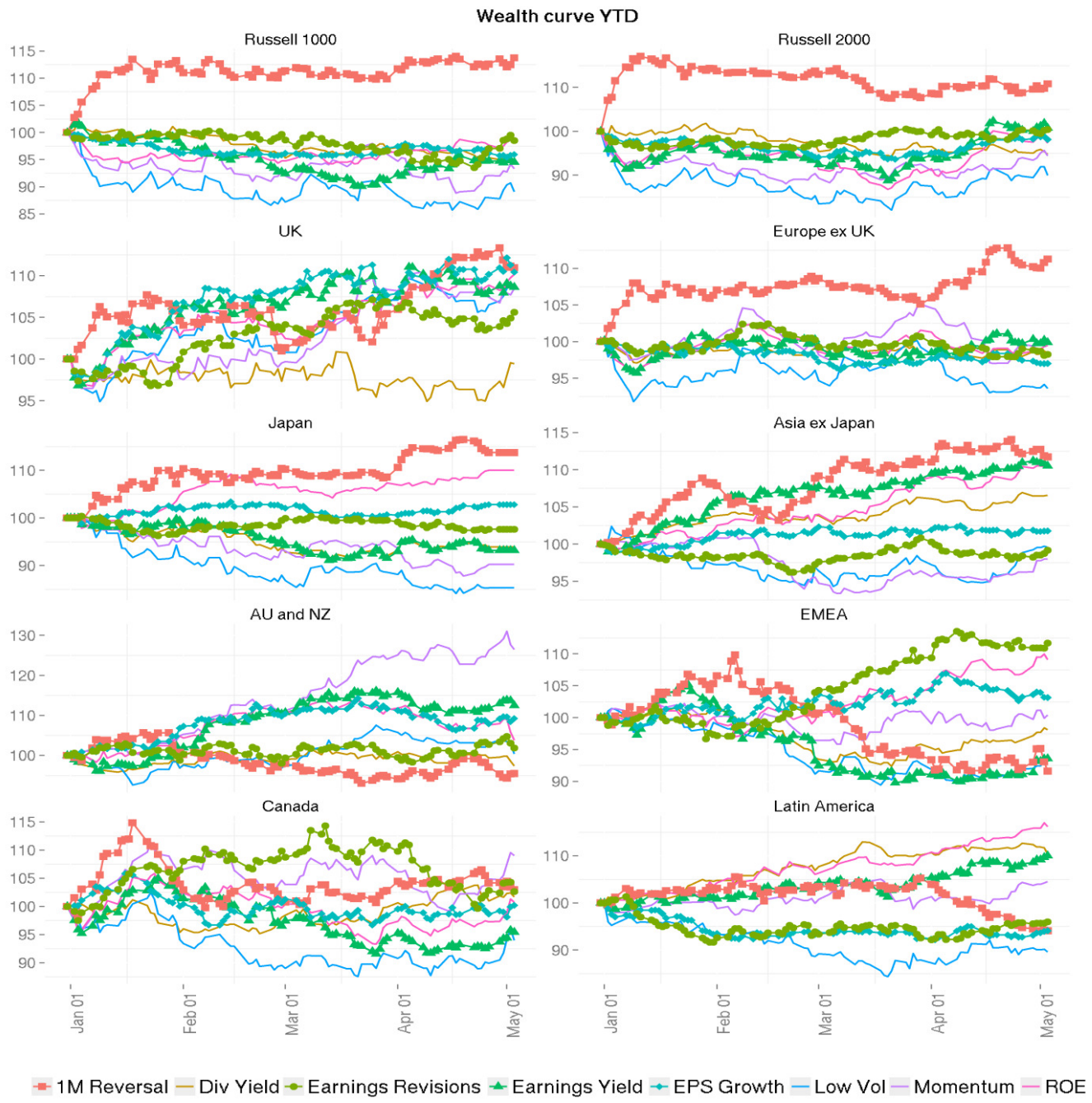
Which styles have been working around the world?

The DB Quant Dashboard is an easy-to-use 'cheat sheet' that shows which styles have been working in key markets around the world. We track cumulative factor performance year-to-date. For those who prefer the previous tabular format (which includes more factors), those results can be found in Appendix A.

For more details see our website

For the most recent weekly factor performance, as well as factor performance delineated by different universes (e.g., large cap, small cap) and regions, please contact us at DBEQS.Americas@db.com to be added to our Weekly Dashboard distribution list.

Figure 21: Global YTD cumulative factor performance (Q10-Q1 return spread)



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Bottom-up stock selection

N-LASR global stock selection model

- The N-LASR model is our flagship stock selection model for global equities.
- The model is based on a machine learning algorithm called AdaBoost, and is designed to adaptively learn which factors to use, often in a non-linear way.
- For complete details on the model, please see Wang et al, Signal Processing: The Rise of the Machines, 5 June 2012.

Current stock recommendations

Figure below shows the best 20 Buy and sell ideas from today's model. We note that a complete ranking for all global stocks is available in a spreadsheet format. If you would like to get a copy of the spreadsheet, please contact us at DBEQS.Americas@db.com

Figure 22: Current N-LASR model stock recommendations

BEST BUY IDEAS

Ticker	Name	SEDOL	Country	N-LASR Score (higher is better long)
ABBV	ABBVIE INC	B92SR70	USA	2.33
DPZ	DOMINO'S PIZZA INC	B01SD70	USA	2.16
9843 JT	Nitori Holdings Co	664480	Japan	2.07
GUD AU	GUD Hldgs Ltd	635800	Australia	2.01
ILMN	ILLUMINA INC	2613990	USA	1.93
6869 JT	Sysmex Corp	688380	Japan	1.86
PAYX	PAYCHEX INC	2674458	USA	1.86
WSU GY	Washtec AG	535543	Germany	1.85
TLKM IJ	Telekomunikasi Indonesia Tbk PT	BD4T6W	Indonesia	1.84
NTAP	NETAPP INC	2630643	USA	1.83
BH TB	Bumrungrad Hospital PCL	B0166D	Thailand	1.83
CLX	CLOROX CO/DE	2204026	USA	1.83
ZTS	ZOETIS INC	B95WG16	USA	1.81
JNJ	JOHNSON & JOHNSON	2475833	USA	1.80
T.	TELUS CORP	2381093	Canada	1.79
AMGN	AMGEN INC	2023607	USA	1.78
KINDSDB SS	Kindred Group	BYSY2K	Sweden	1.77
080160 KS	Modetour Network	B0FBSF	Korea	1.77
MMM	3M CO	2595708	USA	1.76
LLY	LILLY (ELI) & CO	2516152	USA	1.76

BEST SELL IDEAS

Ticker	Name	SEDOL	Country	N-LASR Score (lower is better short)
TRXC	TRANSENTERIX INC	BLBP5R2	USA	-2.30
IWCB MK	Iskandar Waterfront City Berhad	638135	Malaysia	-2.24
IRDM	IRIDIUM COMMUNICATIONS INC	B2QH310	USA	-2.23
JKBK IB	Jammu & Kashmir Bank Ltd	BQQF4T	India	-2.13
POWF IB	Power Finance Corp Ltd	B1S722	India	-2.11
197210 KS	LEED Corp	BR1714	Korea	-2.06
735 HK	China Power Clean Energy Developmer	BDT7WY	China	-2.06
ALBK IB	Allahabad Bank	670828	India	-2.06
3753 JT	Flight Holdings Inc	B031SF	Japan	-2.06
2395 JT	Shin Nippon Biomedical Laboratories	673890	Japan	-2.04
CRPBK IB	Corp Bank	BVFYBZ	India	-2.01
020560 KS	Asiana Airlines	620020	Korea	-2.01
1076 HK	Imperial Pacific International Holdings	BYM8MQ	China	-1.98
168330 KS	Naturalendo Tech Co Ltd	BG48DT	Korea	-1.97
UT IB	Unitech Ltd	B17MRV	India	-1.96
3049 TT	HannStar Touch Solution Incorporated	654504	Taiwan	-1.96
1068 HK	China Yurun Food Group Ltd.	B0D01C	China	-1.95
YNHB MK	YNH Property Bhd	671236	Malaysia	-1.91
BOI IB	Bank of India	609978	India	-1.91
5227 TT	Advanced Lithium Electrochemistry (Ca	BGH182	Taiwan	-1.90

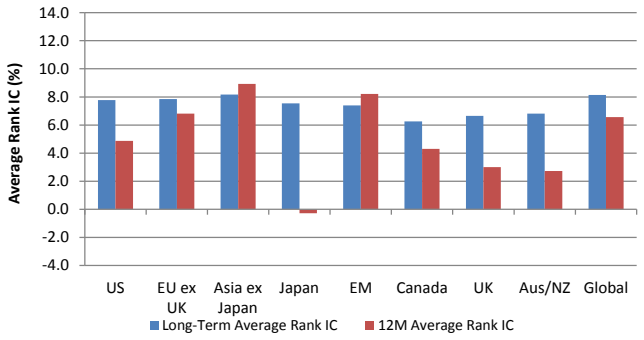
Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank
The recommendations in the table above may or may not reflect those of DB's fundamental analysts, given the different criteria used in evaluating the stocks.

Model performance

Figures below show the average pure signal performance, measured as a monthly rank information coefficient (IC) in different regions and the performance of a global model portfolio after costs, based on a realistically-optimized, market-neutral strategy.

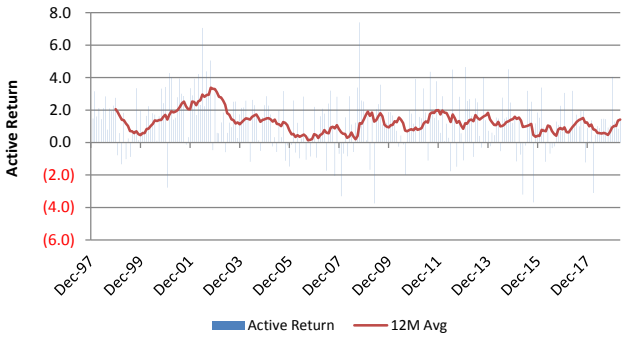
Past performance is no guarantee of future results. Transaction costs can vary. Additional information is available upon request.

Figure 23: Regional model performance, average rank IC



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

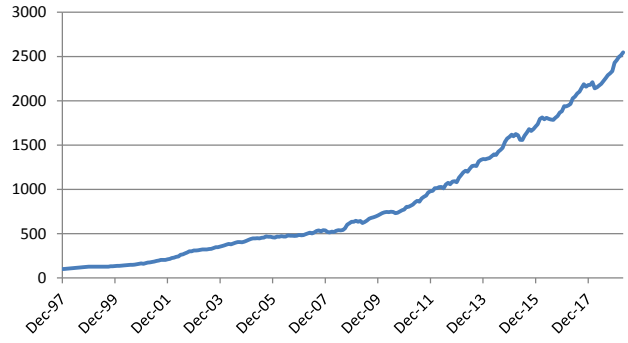
Figure 24: Global portfolio active return, after costs



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

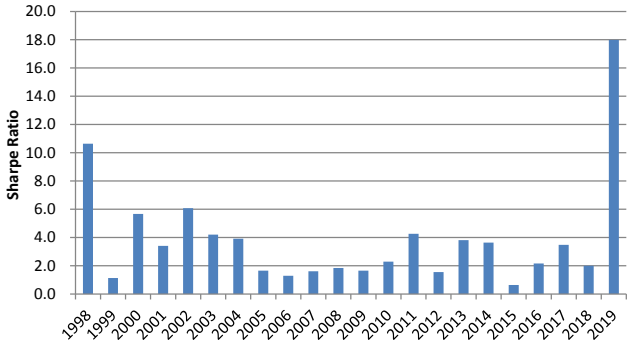
Figures below show the cumulative performance of the optimized strategy, and the annualized Sharpe Ratio (after costs) by calendar year.

Figure 25: Global portfolio cumulative, after costs



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 26: Annualized Sharpe Ratio, after costs



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Top-down country rotation

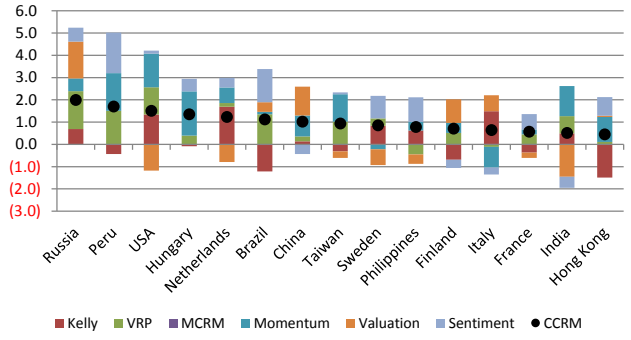
CCRM country rotation model

- Our Composite Country Rotation Model (CCRM) uses three sets of inputs to dynamically rotate between countries in the MSCI All Country World Index.
- The inputs include top-down macro signals (e.g., VRP, Kelly's Tail Risk), aggregate bottom-up fundamental signals (e.g., country-level valuation and momentum) and lead-lag signals, based on economic trade linkages.
- For complete details on the model, please see Luo et al, Signal Processing: New Insights in Country Rotation, 9 February 2012.

Current recommendations

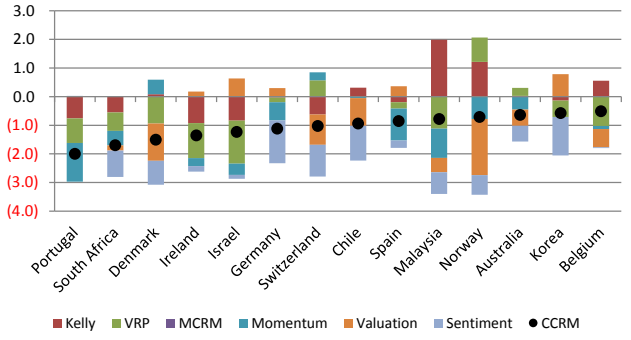
Figures below show the top and bottom third of countries, as ranked currently by our CCRM model. The bars show what is driving these calls.

Figure 27: Top tercile countries



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 28: Bottom tercile countries

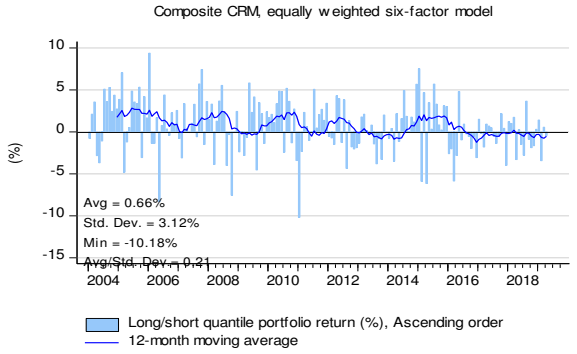


Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Model performance

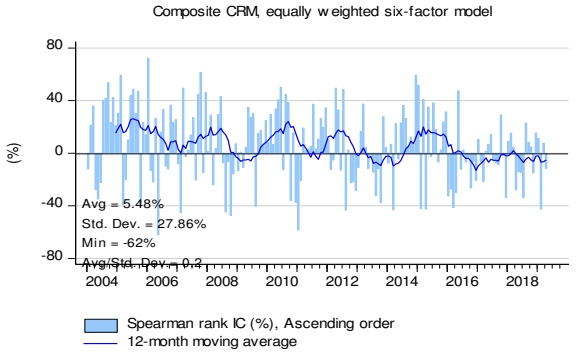
Figures below show the performance of the model over time.

Figure 29: Long/Short portfolio return (%)



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 30: Model performance with rank IC



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Top-down asset allocation

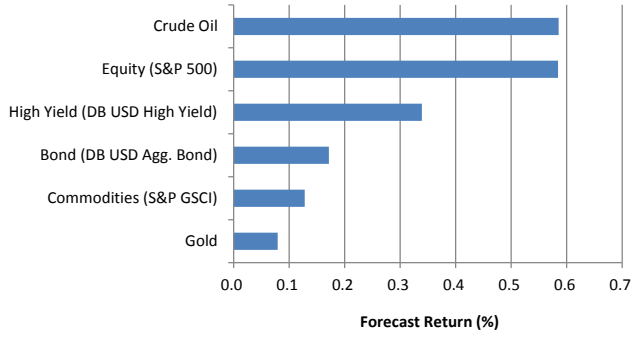
Quant Tactical Asset Allocation (QTAA) model

- Our Quantitative Tactical Asset Allocation (QTAA) model uses a model-of-models methodology to rotate between six asset classes.
- The model uses a wide range of fundamental and market-based factors as inputs, and dynamically selects a subset of those factors to use at each point in time.
- For complete details on the model, please see Luo et al, Signal Processing: Quant Tactical Asset Allocation, 19 September 2011.

Current recommendations and performance

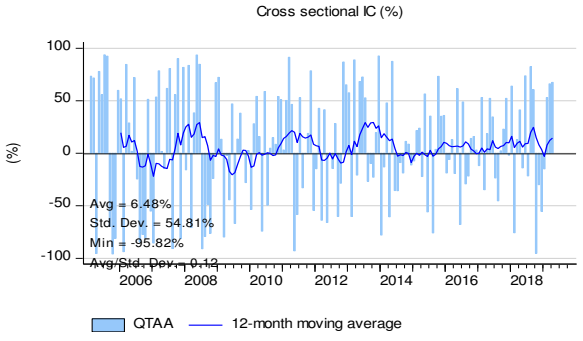
Figures below show the current ranking of our six asset classes, ranked from best to worst in terms of month-ahead forecast returns and the monthly performance of the QTAA model over time.

Figure 31: Current QTAA forecasts



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 32: Performance of QTAA model



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Top-down style rotation

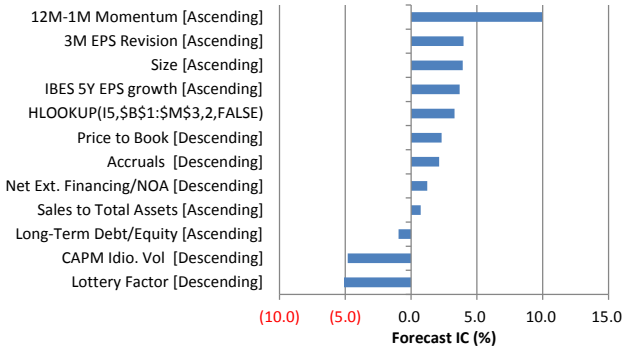
Style rotation model

- Our Style Rotation model dynamically rotates between 12 "typical" quant factors.
- The model uses market-based and macroeconomic inputs to predict month-ahead factor returns using a backward stepwise linear regression model.
- For complete details on the model, please see Luo et al, Signal Processing: Style Rotation, 7 September 2010.

Current recommendations and performance

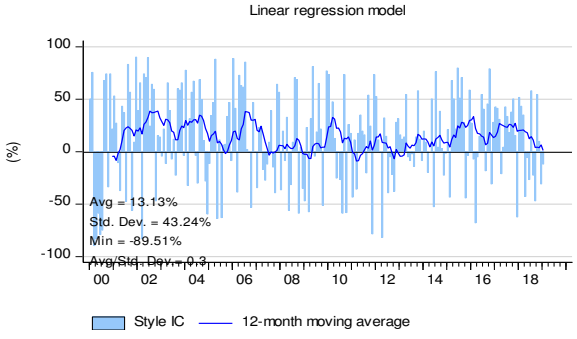
Figures below show the current ranking of our 12 factors, ranked from best to worst in terms of month-ahead forecast performance and the monthly performance of the Style Rotation model over time.

Figure 33: Current Style Rotation forecasts



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 34: Performance of style rotation model



Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Appendix A: Factor performance

Figure 35: US factor performance, measured as rank IC (Russell 3000 universe)

Factor Name	Direction[1]	Current # of Stocks	Average IC (%) Last M	12M Avg	3Y Avg	Since Inception Avg	Std Dev	Avg / Std Dev	Max	Min	p-value[2]	# of Months	Avg # of Stocks	Hit Rate (%)	Serial Corr (%)[3]
1. Value															
1 Dividend yield, trailing 12M	Ascending	2,949	5.07	3.47	1.48	2.81	13.87	0.20	42.59	(33.26)	0.00	376	2,892	55.05	98.15
2 Expected dividend yield	Ascending	2,949	5.57	3.56	1.63	3.04	14.35	0.21	44.46	(33.89)	0.00	376	2,892	54.52	98.85
3 Price-to-operating EPS, trailing 12M, Basic	Descending	2,119	14.37	(3.55)	(0.58)	2.21	10.45	0.21	30.82	(32.28)	0.00	300	2,321	56.00	93.56
4 Operating earnings yield, trailing 12M, Basic	Ascending	2,917	20.63	2.22	2.71	4.53	12.38	0.37	47.24	(33.30)	0.00	300	2,887	62.33	95.30
5 Earnings yield, forecast FY1 mean	Ascending	2,790	23.75	0.88	2.43	4.27	11.96	0.36	48.88	(34.61)	0.00	376	2,578	62.77	94.66
6 Earnings yield, forecast FY2 mean	Ascending	2,774	24.43	(0.82)	1.99	3.68	11.66	0.32	47.02	(34.31)	0.00	376	2,494	62.77	94.29
7 Earnings yield x IBES 5Y growth	Ascending	1,079	12.76	(4.51)	0.13	1.44	10.21	0.14	41.11	(26.63)	0.02	300	1,813	58.33	93.21
8 Sector-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,916	5.62	3.47	2.74	4.16	8.06	0.52	28.96	(14.90)	0.00	300	2,884	69.00	94.95
9 Hist-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,322	5.53	0.51	0.82	1.38	6.23	0.22	20.73	(18.74)	0.00	206	2,124	60.19	95.89
10 Operating cash flow yield (income stmt def)	Ascending	2,949	17.55	(0.16)	1.02	3.70	10.73	0.35	47.14	(32.67)	0.00	376	2,892	62.50	94.78
11 Cash flow yield, FY1 mean	Ascending	1,737	10.98	(4.59)	(2.49)	1.98	16.78	0.12	66.06	(54.29)	0.03	346	945	54.91	94.54
12 Free cash flow yield	Ascending	2,860	16.73	1.64	2.08	4.62	7.85	0.59	31.93	(22.64)	0.00	339	2,580	73.45	94.44
13 Price-to-sales, trailing 12M	Descending	2,830	8.11	(3.36)	(1.76)	1.29	10.93	0.12	30.02	(41.46)	0.02	376	2,813	55.05	98.56
14 Price-to-book	Descending	2,794	6.44	(4.15)	(1.88)	0.46	10.85	0.04	26.28	(35.75)	0.41	376	2,776	47.61	95.73
15 EBITDA/EV	Ascending	2,912	15.25	(0.11)	0.89	3.76	9.74	0.39	39.32	(27.15)	0.00	376	2,842	64.10	91.21
16 Price-to-book adj for ROE, sector adj	Descending	2,645	2.86	(3.63)	(2.22)	0.20	8.65	0.02	22.50	(33.21)	0.66	376	2,467	47.87	95.76
2. Growth															
17 Hist 5Y operating EPS growth	Descending	2,820	13.41	2.76	1.69	1.38	8.35	0.17	30.58	(22.70)	0.01	288	2,760	56.25	95.36
18 Hist 5Y operating EPS acceleration	Ascending	2,820	(0.03)	(0.77)	0.64	0.85	6.25	0.14	25.31	(16.13)	0.02	288	2,760	55.90	93.09
19 IBES 5Y EPS growth	Ascending	2,240	15.57	2.91	2.43	1.17	7.82	0.15	21.65	(27.86)	0.00	376	2,299	56.65	98.08
20 IBES 5Y EPS growth/stability	Ascending	2,240	18.08	3.88	3.30	1.67	7.64	0.22	20.64	(19.20)	0.00	376	2,298	59.04	98.37
21 IBES LTG EPS mean	Descending	1,318	(3.43)	(0.05)	(1.73)	1.34	14.77	0.09	37.64	(52.38)	0.08	376	2,074	48.67	97.03
22 IBES FY2 mean DPS growth	Ascending	2,204	8.75	1.78	1.59	1.42	8.39	0.17	24.12	(21.96)	0.02	203	1,715	53.69	84.08
23 IBES FY1 mean EPS growth	Ascending	2,754	6.43	(1.20)	1.46	1.13	7.17	0.16	20.76	(24.42)	0.00	376	2,549	61.44	88.82
24 Year-over-year quarterly EPS growth	Ascending	2,920	5.52	(0.41)	0.76	2.37	6.67	0.36	23.85	(21.12)	0.00	300	2,895	65.00	79.06
25 IBES FY1 mean CFPS growth	Descending	1,638	(6.87)	(0.32)	(1.48)	0.12	10.23	0.01	38.08	(42.07)	0.84	303	742	49.83	92.20
26 IBES SUE, amortized	Ascending	2,611	(1.14)	1.46	2.10	1.08	6.15	0.17	20.62	(16.30)	0.00	315	1,416	56.83	73.22
3. Price Momentum and Reversal															
27 Total return, 1D	Descending	2,949	1.73	(0.35)	1.35	4.56	7.14	0.64	16.33	(33.75)	0.00	376	2,892	76.06	1.88
28 Total return, 21D (1M)	Descending	2,948	9.94	2.90	1.73	1.81	10.60	0.17	29.03	(43.69)	0.00	376	2,891	56.12	1.03
29 Maximum daily return in last 1M (lottery factor)	Descending	2,940	12.83	5.42	3.99	5.08	14.54	0.35	39.13	(56.07)	0.00	376	2,786	64.10	50.27
30 21D volatility of volume/price	Descending	2,949	6.28	2.66	1.03	0.47	6.54	0.07	24.16	(21.49)	0.17	376	2,883	52.13	52.25
31 Total return, 252D (12M)	Ascending	2,845	(8.09)	(0.66)	0.23	2.85	14.00	0.20	39.62	(57.00)	0.00	376	2,803	61.97	89.70
32 12M-1M total return	Ascending	2,845	(6.14)	(0.11)	0.61	3.61	13.14	0.27	37.65	(49.06)	0.00	376	2,803	62.50	88.30
33 Price-to-52 week high	Ascending	2,901	1.52	3.25	2.66	3.18	17.42	0.18	49.63	(62.50)	0.00	376	2,112	61.17	84.57
34 Total return, 1260D (60M)	Ascending	2,340	11.35	3.88	3.29	1.47	10.98	0.13	25.63	(35.41)	0.01	364	2,255	57.42	97.26
4. Sentiment															
35 IBES LTG Mean EPS Revision, 3M	Ascending	1,301	0.24	(0.27)	(0.26)	0.75	3.82	0.20	11.16	(12.06)	0.00	376	2,046	60.64	59.05
36 IBES FY1 Mean EPS Revision, 3M	Ascending	2,750	2.41	(0.28)	0.85	2.64	8.16	0.32	29.96	(33.00)	0.00	376	2,520	65.16	71.67
37 IBES FY1 EPS up/down ratio, 3M	Ascending	2,717	(1.59)	0.41	1.14	2.80	7.61	0.37	27.54	(24.41)	0.00	376	2,398	67.02	78.93
38 Expectation gap, short-term - long-term	Descending	2,127	5.59	3.63	1.59	1.24	5.37	0.23	11.80	(19.91)	0.00	376	2,128	58.24	91.11
39 IBES FY1 Mean CFPS Revision, 3M	Ascending	1,689	6.94	0.91	1.38	1.97	14.55	0.14	69.38	(75.04)	0.01	345	878	63.19	61.46
40 IBES FY1 Mean SAL Revision, 3M	Ascending	2,705	0.49	(1.48)	1.34	1.27	7.72	0.16	27.43	(24.32)	0.01	275	2,296	61.45	67.82
41 IBES FY1 Mean FFO Revision, 3M	Ascending	174	6.48	2.18	1.79	2.51	19.38	0.13	71.43	(80.00)	0.02	348	100	56.90	68.00
42 IBES FY1 Mean DPS Revision, 3M	Ascending	1,326	3.24	(0.28)	0.66	0.72	5.12	0.14	14.91	(17.55)	0.05	200	1,109	59.00	63.83
43 IBES FY1 Mean ROE Revision, 3M	Ascending	2,099	2.51	0.64	1.20	1.00	6.15	0.16	23.70	(22.19)	0.02	200	1,869	60.00	60.33
44 Recommendation, mean	Descending	2,791	2.28	(0.78)	0.78	0.70	7.46	0.09	21.85	(19.41)	0.10	305	2,696	57.38	94.90
45 Mean recommendation revision, 3M	Descending	2,781	(1.99)	0.22	0.39	0.99	3.86	0.26	19.86	(11.55)	0.00	302	2,682	61.59	60.82
46 Target price implied return	Descending	2,771	1.83	3.99	1.49	0.44	16.04	0.03	60.74	(39.59)	0.67	241	2,537	48.96	81.22
47 Mean target price revision, 3M	Ascending	2,760	(1.60)	1.40	1.36	2.15	12.37	0.17	30.14	(41.94)	0.01	238	2,524	60.92	74.70
5. Quality															
48 ROE, trailing 12M	Ascending	2,774	18.84	4.55	3.20	3.83	10.04	0.38	33.42	(29.52)	0.00	300	2,852	65.33	93.78
49 Return on invested capital (ROIC)	Ascending	2,901	16.94	4.16	3.43	4.12	10.20	0.40	33.02	(31.24)	0.00	300	2,871	68.67	95.62
50 Sales to total assets (asset turnover)	Ascending	2,828	0.06	2.02	0.86	1.39	8.47	0.16	22.78	(22.02)	0.00	376	2,825	55.59	99.20
51 Operating profit margin	Ascending	2,825	7.44	3.25	3.53	1.41	5.62	0.25	16.98	(14.17)	0.00	376	2,747	60.90	97.85
52 Current ratio	Descending	2,213	8.80	1.76	0.19	1.67	10.09	0.17	31.95	(38.66)	0.00	376	2,244	54.52	97.54
53 Long-term debt/equity	Ascending	2,776	6.44	1.56	(0.52)	0.71	9.29	0.08	35.65	(28.14)	0.14	376	2,760	49.73	96.82
54 Altman's z-score	Ascending	2,084	4.72	4.60	3.59	0.76	9.18	0.08	31.74	(30.44)	0.11	376	2,159	51.86	97.61
55 Merton's distance to default	Ascending	2,374	4.30	7.07	4.62	3.61	12.23	0.30	35.09	(41.45)	0.00	376	2,351	66.22	94.43
56 Ohlson default model	Descending	2,181	7.40	3.65	2.94	2.38	6.57	0.36	16.95	(25.59)	0.00	339	2,140	67.85	98.08
57 Accruals (Sloan 1996 def)	Descending	2,133	1.61	(0.85)	(0.83)	0.25	4.22	0.06	12.07	(15.48)	0.25	376	2,141	53.46	87.95
58 Firm-specific discretionary accruals	Descending	993	1.45	(0.89)	(0.96)	0.16	3.70	0.04	10.45	(12.89)	0.44	316	1,925	53.80	65.00
59 Hist 5Y operating EPS stability, coef of determination	Ascending	2,820	10.57	0.81	0.99	0.93	4.93	0.19	20.01	(12.27)	0.00	288	2,760	52.43	97.11
60 IBES 5Y EPS stability	Descending	2,240	12.98	3.34	2.61	1.40	8.27	0.17	25.00	(34.33)	0.00	376	2,299	55.59	98.89
61 IBES FY1 EPS dispersion	Descending	2,790	9.32	7.32	4.53	2.03	9.46	0.22	31.67	(28.25)	0.00	376	2,578	60.90	83.00
62 Payout on trailing operating EPS	Ascending	2,119	(9.67)	2.72	(0.25)	0.72	12.94	0.06	38.55	(30.91)	0.28	376	2,203	49.20	97.07
63 YoY change in # of shares outstanding	Descending	2,902	14.39	4.39	2.16	2.60	8.85	0.29	19.53	(46.21)	0.00	376	2,789	60.11	92.09
64 YoY change in debt outstanding	Descending	2,345	(4.49)	(1.86)	(1.67)	0.01	4.06	0.00	13.07	(10.40)	0.95	376	2,230	52.93	89.44
65 Net external financing/net operating assets	Ascending	2,935	12.45	2.45	0.80	2.29	8.41	0.27	44.61	(21.76)	0.00	376	2,858	60.64	94.61
66 Piotroski's F-score	Ascending	2,949	10.00	0.83	1.42	2.81	8.02	0.35	29.20	(27.83)	0.00	376	2,894	67.29	88.79
67 Mohanram's G-score	Ascending	550	(5.89)	3.48	2.85	2.57	9.82	0.26	35.27	(32.14)	0.00	288	422	58.33	95.56
6. Technicals															
68 # of days to cover short	Descending	315	7.72	3.02	2.45	2.25	7.29	0.31	33.80	(25.16)	0.00	376	2,026	59.84	91.99
69 CAPM beta, 5Y monthly	Descending	4,032	(0.22)	0.77	0.81	0.98	12.70	0.08	40.19	(42.70)	0.17	317	3,075	50.79	96.29
70 CAPM idosyncratic vol, 1Y daily	Descending	3,062	14.16	7.32	4.78	5.28	17.55	0.30	42.60	(60.80)	0.00	364	2,912	62.09	98.76
71 Realized vol, 1Y daily	Descending	2,899	11.55	6.77	4.49	5.12	18.25	0.28	42.69	(59.63)	0.00	376	2,807	61.17	98.59
72 Skewness, 1Y daily	Descending	2,899	4.95	2.28	1.06	1.15	5.37	0.21	13.93	(22.86)	0.00	376	2,807	56.38	89.89
73 Kurtosis, 1Y daily	Descending	2,899	(1.17)	(0.70)	(0.21)	1.31	5.58	0.24	15.28	(15.82)	0.00	376	2,807	60.90	91.54
74 Idiosyncratic vol surprise	Descending	2,919	(7.98)	(0.69)	(0.41)	2.47	7.60	0.32	22.66	(33.71)	0.00	363	2,866	63.64	87.79
75 Normalized abnormal volume	Ascending	2,949	6.03	3.92	1.61	2.22	6.38	0.35	23.10	(16.38)	0.00	376	2,885	64.89	64.58
76 Float turnover, 12M	Descending	3,186	6.65	1.69	1.66	0.59	11.03	0.05	29.93	(31.61)	0.31	365	2,846	49.32	99.24
77 Moving average crossover, 15W-36W	Ascending	2,888	2.47	2.62	1.69	2.14	13.05	0.16	46.29	(55.07)	0.00	376	2,593	59.57	91.08
78 Log float-adj capitalization	Ascending	2,949	1.54	4.08	1.09	3.15	11.00	0.29	29.53	(40.68)	0.00	376	2,888	61.17	99.47
79 # of month in the database	Ascending	2,949	4.28	2.18	0.68	2.09	8.52	0.25	35.61	(23.86)	0.00	376	2,892	56.38	99.99
80 DB composite options factor	Ascending	1,701	0.95	(0.03)	0.55	1.03	3.65	0.28	13.99	(13.88)	0.00	213	1,917	63.38	26.39

Note:

1 Direction indicates how the factor scores are sorted. Ascending order means higher factors scores are likely to be associated with higher subsequent stock returns, and vice versa for descending order.
2 P-value indicates the statistical significance of the factor's performance. A smaller p-value suggests that is it more likely the factor's performance is different from zero.
3 This is the autocorrelation of the factor scores over time. Higher serial correlation indicates lower portfolio turnover based on the factor.

Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 36: Global factor performance, measured as rank IC (S&P BMI World universe)

Factor Name	Direction[1]	Current # of Stocks	Average IC (%)			Since Inception									
			Last M	12M Avg	3Y Avg	Avg	Std Dev	Avg / Std Dev	Max	Min	p-value[2]	# of Months	Avg # of Stocks	Hit Rate (%)	Serial Corr (%)[3]
1. Value															
1 Dividend yield, trailing 12M	Ascending	10,928	5.06	4.99	4.30	4.17	9.93	0.42	36.88	(23.89)	0.00	352	8,558	65.06	97.85
2 Dividend yield, FY1	Ascending	8,332	3.89	3.03	2.39	3.83	10.20	0.38	32.17	(22.90)	0.00	295	5,941	63.05	98.26
3 Dividend yield, FY2	Ascending	8,237	4.02	2.74	2.35	3.67	10.29	0.36	33.19	(24.39)	0.00	285	5,921	62.81	98.27
4 Price/Earnings	Descending	9,088	2.81	(0.80)	1.24	3.36	12.24	0.27	39.66	(50.73)	0.00	345	6,813	59.42	96.38
5 Price-to-FY0 EPS	Descending	8,728	6.98	(1.37)	0.26	2.26	9.96	0.23	28.98	(37.08)	0.00	352	6,488	59.09	96.55
6 Earnings yield, FY0	Ascending	9,945	9.08	1.13	2.17	3.58	8.76	0.41	31.67	(18.68)	0.00	352	7,515	62.50	96.48
7 Earnings yield, forecast FY1 mean	Ascending	9,027	10.81	(0.45)	1.97	4.14	10.39	0.40	35.35	(22.20)	0.00	352	6,943	62.78	95.81
8 Earnings yield, forecast FY2 mean	Ascending	8,918	10.81	(1.91)	1.39	3.66	11.36	0.32	37.31	(31.50)	0.00	352	6,781	60.23	95.96
9 Cash flow yield, FY0	Ascending	7,161	4.42	(1.22)	0.03	2.92	6.70	0.44	26.42	(12.09)	0.00	228	5,598	67.98	97.41
10 Cash flow yield, FY1 mean	Ascending	6,297	4.78	(2.83)	(0.53)	1.34	9.49	0.14	31.42	(32.01)	0.02	284	4,946	54.23	96.03
11 Price/Sales	Descending	10,445	4.15	(3.16)	0.43	1.25	9.09	0.14	26.48	(31.59)	0.01	352	8,031	55.40	99.27
12 Price/Book	Descending	10,537	(0.88)	(2.05)	(0.14)	0.82	10.19	0.08	31.56	(37.54)	0.13	352	8,087	54.55	98.46
13 Est Book-to-price, median	Ascending	7,833	1.64	(2.97)	(0.85)	0.42	9.66	0.04	30.37	(26.29)	0.50	236	6,109	51.69	98.30
14 EBITDA to EV	Ascending	3,158	13.84	(0.62)	1.22	3.78	10.62	0.36	36.69	(26.20)	0.00	352	4,978	62.50	95.67
15 Sales/EV	Ascending	10,274	4.11	(3.10)	0.90	1.80	7.47	0.24	24.81	(20.06)	0.00	352	7,979	61.65	99.05
2. Growth															
16 IBES 5Y EPS growth	Ascending	8,915	5.53	1.71	1.80	1.25	5.81	0.22	19.09	(21.86)	0.00	352	6,698	60.80	98.03
17 EPS Growth	Ascending	9,797	2.85	0.79	0.89	1.98	6.33	0.31	29.72	(28.97)	0.00	336	7,444	64.88	87.88
18 IBES LTG EPS mean	Descending	3,849	(1.65)	1.03	(0.65)	1.07	11.15	0.10	28.22	(40.36)	0.07	352	4,275	50.85	96.50
19 IBES FY1 mean EPS growth	Ascending	8,771	0.92	(1.18)	0.02	0.33	5.77	0.06	14.44	(20.10)	0.29	352	6,780	53.98	88.67
20 IBES FY1 mean CFPS growth	Descending	5,213	(0.78)	0.73	0.35	1.42	3.97	0.36	7.47	(11.39)	0.00	228	4,335	61.84	91.68
21 IBES FY2 mean DPS growth	Ascending	8,226	2.74	(0.99)	0.71	2.01	10.07	0.20	38.85	(31.49)	0.00	294	5,803	58.50	88.42
22 Asset growth	Descending	10,413	1.49	0.08	0.12	0.58	7.86	0.07	21.57	(27.36)	0.17	352	7,849	51.99	93.70
3. Price Momentum and Reversal															
23 Total return, 1D	Descending	10,947	(0.59)	1.82	1.65	3.35	6.99	0.48	21.94	(41.58)	0.00	352	8,654	70.45	1.95
24 Weekly Total Return	Descending	10,946	(2.51)	2.89	2.57	2.71	8.31	0.33	30.60	(33.64)	0.00	352	8,653	63.64	1.47
25 Total return, 21D (1M)	Ascending	10,943	(9.55)	(3.03)	(2.21)	0.02	10.78	0.00	27.69	(44.07)	0.97	352	8,648	51.99	3.89
26 Total return, 252D (12M)	Ascending	10,704	(5.81)	(0.30)	1.47	4.02	13.74	0.29	41.64	(46.50)	0.00	352	8,434	66.19	90.62
27 12M-1M total return	Ascending	10,704	(2.65)	0.81	2.27	4.59	13.22	0.35	40.96	(42.52)	0.00	352	8,434	67.61	88.94
28 Total return, 1260D (60M)	Ascending	9,204	(1.57)	0.81	1.10	1.55	13.20	0.12	40.32	(44.84)	0.03	352	6,944	58.81	97.72
4. Sentiment															
29 IBES LTG Mean EPS Revision, 1M	Ascending	3,838	(2.25)	(0.18)	(0.10)	0.61	2.57	0.24	7.26	(8.59)	0.00	352	4,240	61.36	1.33
30 IBES LTG Mean EPS Revision, 3M	Ascending	3,820	(2.84)	0.90	0.46	0.80	3.33	0.24	11.05	(10.26)	0.00	352	4,187	61.36	60.76
31 IBES FY1 EPS up/down ratio, 1M	Ascending	6,188	(2.46)	0.51	1.39	3.38	5.33	0.63	17.76	(13.76)	0.00	352	4,626	74.43	34.22
32 IBES FY1 EPS up/down ratio, 3M	Ascending	7,900	(2.86)	1.13	1.70	3.43	5.63	0.61	17.92	(12.36)	0.00	352	6,248	73.86	78.22
33 IBES FY1 Mean EPS Revision, 1M	Ascending	8,891	(1.77)	0.78	1.21	2.64	4.95	0.53	16.50	(12.79)	0.00	352	6,792	71.02	23.24
34 IBES FY1 Mean EPS Revision, 3M	Ascending	8,822	(1.47)	0.94	1.61	3.18	6.38	0.50	19.37	(20.12)	0.00	352	6,695	72.16	73.78
35 IBES FY1 Mean CFPS Revision, 3M	Ascending	6,105	0.79	0.84	1.15	2.23	5.16	0.43	15.81	(23.83)	0.00	274	4,757	74.45	63.44
36 IBES FY1 Mean DPS Revision, 1M	Ascending	6,671	(3.88)	0.76	1.25	1.68	4.12	0.41	12.65	(16.63)	0.00	293	4,881	72.70	11.09
37 IBES FY1 Mean DPS Revision, 3M	Ascending	6,620	(3.99)	0.64	1.37	2.13	5.51	0.39	19.08	(24.51)	0.00	291	4,822	71.13	65.99
38 IBES FY1 Mean FFO Revision, 1M	Ascending	7,943	(1.14)	0.73	1.19	2.00	3.94	0.51	11.73	(8.89)	0.00	220	5,267	75.00	13.62
39 IBES FY1 Mean FFO Revision, 3M	Ascending	7,830	(1.36)	1.16	1.54	2.67	5.46	0.49	16.27	(14.53)	0.00	217	5,168	71.89	67.93
40 IBES FY1 Mean ROE Revision, 1M	Ascending	8,865	(3.23)	0.51	1.13	1.69	4.05	0.42	13.70	(10.51)	0.00	272	6,222	67.65	15.65
41 IBES FY1 Mean ROE Revision, 3M	Ascending	8,790	(2.95)	0.39	1.37	2.12	5.00	0.42	15.70	(13.58)	0.00	270	6,100	68.52	69.56
42 Target price implied return	Descending	8,808	(5.17)	1.20	0.18	1.05	13.18	0.08	55.58	(36.25)	0.22	236	7,033	54.24	83.08
43 Recommendation, mean	Descending	9,129	(0.24)	(1.64)	0.01	1.47	6.54	0.22	17.41	(16.84)	0.00	305	7,624	63.28	94.79
44 Mean recommendation revision, 3M	Descending	9,102	(0.37)	0.33	0.35	1.59	2.82	0.56	10.01	(10.13)	0.00	302	7,598	71.52	60.32
5. Quality															
45 Return on Equity	Ascending	10,383	9.69	4.30	3.67	4.08	9.33	0.44	30.68	(34.69)	0.00	304	8,194	69.41	97.19
46 return on capital	Ascending	10,443	7.29	3.17	3.06	4.20	11.36	0.37	49.47	(34.02)	0.00	352	7,586	66.48	98.00
47 Return on Assets	Ascending	10,558	12.54	6.91	4.03	4.68	12.49	0.37	44.20	(30.31)	0.00	352	7,706	65.34	98.05
48 Asset Turnover	Ascending	10,463	11.21	5.36	2.94	2.75	15.81	0.17	44.64	(51.55)	0.00	352	8,084	58.24	99.86
49 Gross margin	Ascending	9,883	4.82	3.77	1.80	1.78	5.52	0.32	16.60	(13.45)	0.00	352	7,426	63.64	98.96
50 EBITDA margin	Ascending	10,486	13.97	6.34	2.73	3.87	13.18	0.29	42.97	(41.30)	0.00	352	8,108	59.94	96.70
51 Berry Ratio	Ascending	8,632	1.21	2.71	1.69	2.51	8.86	0.28	29.57	(20.79)	0.00	352	5,897	59.09	97.95
52 IBES FY1 EPS dispersion	Descending	9,027	2.41	3.48	1.42	0.91	9.41	0.10	32.68	(25.37)	0.07	352	6,943	52.84	88.06
53 IBES 5Y EPS growth/stability	Ascending	8,913	7.40	2.92	2.38	1.62	5.71	0.28	18.66	(20.47)	0.00	352	6,697	61.65	98.29
54 YoY change in debt outstanding	Descending	8,791	(2.20)	(1.03)	(0.52)	0.18	3.64	0.05	11.51	(11.34)	0.35	352	6,724	52.84	91.50
55 Current ratio	Descending	8,808	1.96	(0.05)	(0.16)	0.53	8.36	0.06	27.86	(27.01)	0.24	352	6,633	49.72	98.54
56 Long-term debt/equity	Ascending	10,338	5.56	2.12	1.18	0.81	6.26	0.13	22.37	(18.17)	0.02	352	7,990	54.55	98.91
57 Merton's distance to default	Ascending	8,933	(0.50)	4.73	3.03	2.92	10.78	0.27	31.19	(31.18)	0.00	352	6,924	61.65	93.17
58 Capex to Dep	Descending	8,574	2.53	2.73	1.39	1.51	6.54	0.23	22.38	(19.93)	0.00	352	5,794	60.51	97.13
6. Technicals															
59 Realized vol, 1Y daily	Descending	10,706	4.75	7.74	5.50	5.31	14.36	0.37	29.45	(44.64)	0.00	352	8,439	63.07	98.97
60 Skewness, 1Y daily	Descending	10,706	8.12	4.43	3.41	1.83	5.22	0.35	15.03	(32.98)	0.00	352	8,439	65.91	90.14
61 Moving average crossover, 15W-36W	Ascending	10,634	(7.76)	0.04	1.80	2.86	13.74	0.21	37.15	(45.46)	0.00	352	7,595	63.35	91.34
62 Normalized abnormal volume	Ascending	10,924	6.20	4.24	3.52	2.56	6.33	0.40	20.47	(14.71)	0.00	352	8,453	63.92	66.98

Note:

1 Direction indicates how the factor scores are sorted. Ascending order means higher factors scores are likely to be associated with higher subsequent stock returns, and vice versa for descending order.

2 P-value indicates the statistical significance of the factor's performance. A smaller p-value suggests that is it more likely the factor's performance is different from zero.

3 This is the autocorrelation of the factor scores over time. Higher serial correlation indicates lower portfolio turnover based on the factor.

Source : Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

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Appendix 1

Important Disclosures

*Other information available upon request

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