Deutsche Bank
Markets Research

North America
United States

Quantitative Strategy
The Quant View

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Updating our best quant ideas

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Quantitative macro and micro forecasts for the month

In this report we present our latest quantitative forecasts for the coming month. Our models are designed to generate both bottom-up stock selection ideas as well as top-down asset, country, and style allocation calls.

The downside of being popular

Last month we argued that the Low Volatility/High Dividend Yield trade was looking crowded, and cautioned that this could indicate elevated downside risk. It turns out that call was prescient. Since then, Low Volatility has suffered a drawdown that ranks in the worse 10% of monthly losses for that factor over the past 25 years.

Momentum's tilt towards low beta is unwinding

For most of this year, 12-month Price Momentum was strongly tilted towards low beta stocks. In other words, the stocks with good past performance were lower volatility, lower beta names. While this is still true, it is starting to change given the sell-off in defensive stocks. The negative cross-sectional correlation between momentum and beta has moderated from -60% to -30%.

Deutsche Bank Securities Inc.

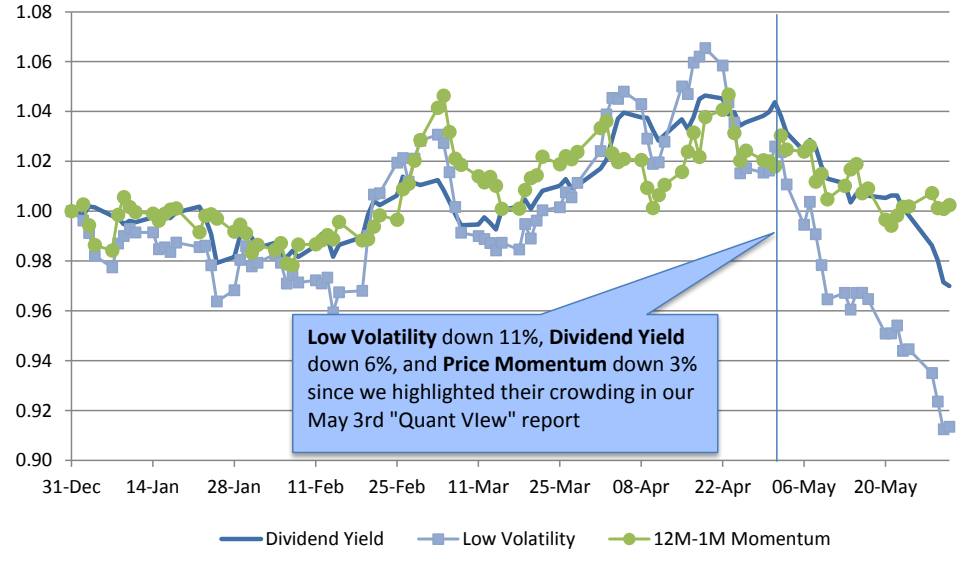
Quantifying markets

The dark side of being popular

In last month's "Quant View" we argued that the tremendous appetite for yield and lower volatility had led to crowding in the defensive yield trade that had been leading the rally up to that point.[1] We came to this conclusion by employing our novel Median Pairwise Tail Dependence crowding metric, which scrutinizes the intraday trading of a basket of stocks to identify any abnormal co-movement among them relative to other stocks in the market. If a trade is becoming crowded, then we expect to see higher co-movement among the stocks in a basket representing that trade, since investors will start to trade these stocks in unison rather than as individual names. This is exactly what we observed in the Low Volatility, Dividend Yield, and Price Momentum strategies at the start of May.

Crowding is neither good nor bad on its own (after all, in the short-term you probably want everyone else to buy the same stocks as you), but it does imply higher downside risk should everyone decide to exit the trade at the same time. A crowded room only becomes a problem when everyone runs for the exits at the same time. This is why last month we emphasized the elevated downside tail risk in Low Volatility, Dividend Yield, and 12M Price Momentum in particular. It turns out that was a prescient call. Since then, all three strategies have sold off aggressively, as investors moved away from crowded defensives into more cyclical names (Figure 1). To put things in context, the 11% sell-off in Low Volatility this month is in the worse 10% of months since 1988 for this factor.

Figure 1: Year-to-date performance of Low Volatility, Dividend Yield, and 12M Price Momentum

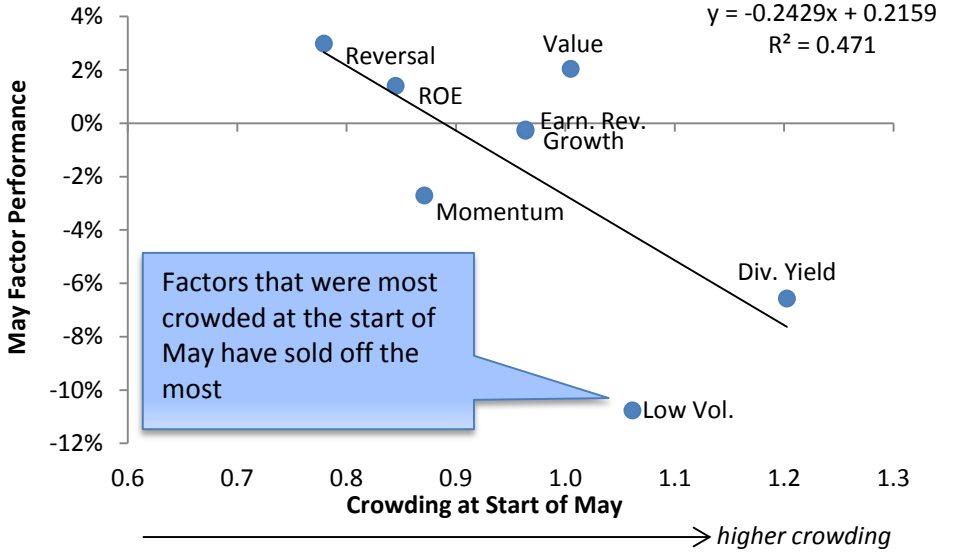


Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

[1] Cahan et al., "The Quant View", *Deutsche Bank Quantitative Strategy*, 3 May 2013

In fact, if we do a scatter plot of factor performance over May versus crowding at the *start* of May, we see the result even more clearly (Figure 2). Strategies that were most crowded at the start of the month have been the ones that have sold off the most.

Figure 2: Crowding at start of May and subsequent factor performance over that month



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

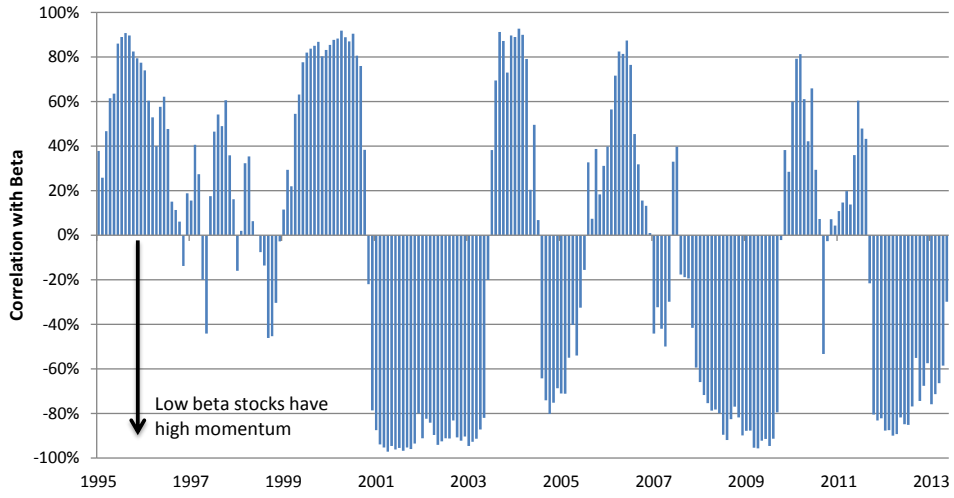
Momentum: A shifty character

The sell-off in Low Volatility and Dividend Yield is understandable given the month-long rotation from defensives into cyclicals, but what about Momentum? Last month we showed that Momentum was really just Low Volatility and Dividend Yield in disguise. Up to that point, stocks that had been doing well tended to be higher yield and lower volatility, so buying past winners was an implicit Low Volatility/High Yield strategy. However, given the sharp moves in these factors, is that still the case?

In Figure 3 we show the cross-sectional correlation between momentum and beta (very similar to volatility) at each point in time; when the bars are negative it means that *low* beta stocks have *high* momentum.[2] For about the past two years, momentum was negatively aligned with beta, meaning buying momentum was akin to buying low beta. However, the most recent data point for the start of June shows that the negative correlation has reduced from -60% to around -30%. So price momentum is starting to look less and less like a low beta play.

[2] Note when computing the cross-sectional correlation, we include the risk model in the computation to more accurately reflect the correlation structure of stocks, see: Alvarez et al., "Signal Processing: Reviving Momentum", *Deutsche Bank Quantitative Strategy*, 5 July 2011.

Figure 3: Cross-sectional exposure of 12M Price Momentum to Beta



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

Where to from here?

The market action of the past month has illustrated all too clearly the left tail risk of crowded trades. However, observing crowding is one thing, a more important question is what to do about it. One thing we recommend is to design portfolios that explicitly steer away from crowded trades. In our monster 100 page "DB Handbook of Portfolio Construction" report that we published last week, we introduced the Minimum Tail Dependence Portfolio.[3] This portfolio seeks out assets that have low left tail dependence with each other. As we've mentioned before, the way we measure crowding is by looking for baskets of stocks that tend to sell off simultaneously. By focusing on names that do not have this property, we can build a basket of stocks that is less exposed to simultaneous losses across the portfolio's holdings. In our paper, we found the Minimum Tail Dependence Portfolio is effective not just at the stock level, but also in numerous other contexts, including multi-asset portfolios and portfolios of country and sector indexes. For a more detailed discussion of this and other useful portfolio construction techniques, please see that paper.

[3] Luo et al., "Portfolios Under Construction: DB Handbook of Portfolio Construction", *Deutsche Bank Quantitative Strategy*, 30 May 2013

Macro update

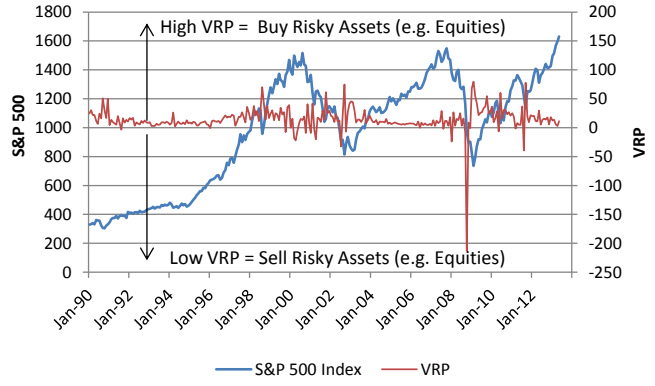
Turning our attention to the bigger picture, we also take the opportunity to update our favorite top-down market indicators.

Variance Risk Premium

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 measured historically 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? The intuition 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 overreacted 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.[4] On the other hand, when VRP is low, it tends to be a complacency indicator: investors are failing to price in rising realized risk in the market, and as a result we should be selling risky assets like equities.

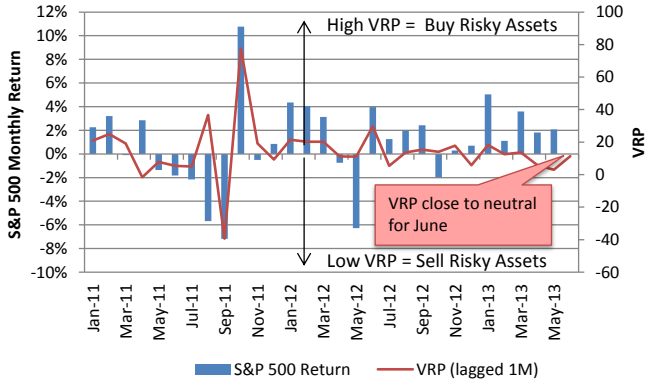
Today our VRP indicator is reading 11, compared to a long-term average of 14.3. This indicates a fairly neutral stance, i.e. investors appear to be pricing the realized risk in the market quite accurately right now. Generally we pay attention to the VRP when it hits extreme levels (like +/- 2 standard deviations); today's reading is only around 0.2 standard deviations below the long-term average, so really nothing to write home about.

Figure 4: Variance Risk Premium (VRP)



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

Figure 5: Recent VRP (lagged) and market returns



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

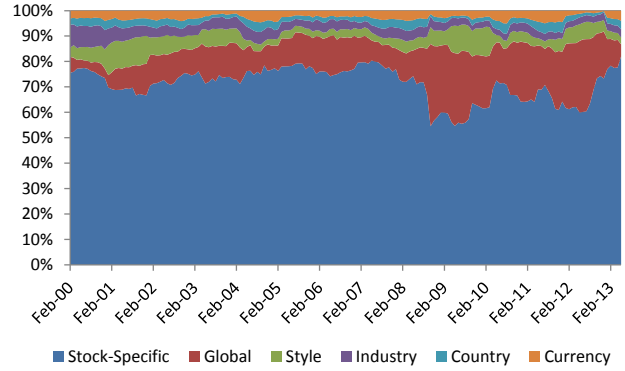
The opportunity set for investors

Another metric we keep a close eye on 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 in the orchard with the juiciest fruit. In Figure 6 we show the opportunity set for global

[4] For more details on the VRP, including our backtesting work, see: Luo et al., 2011, "Signal Processing: Quant Tactical Asset Allocation (QTAA)", *Deutsche Bank Quantitative Strategy*, 19 September 2011.

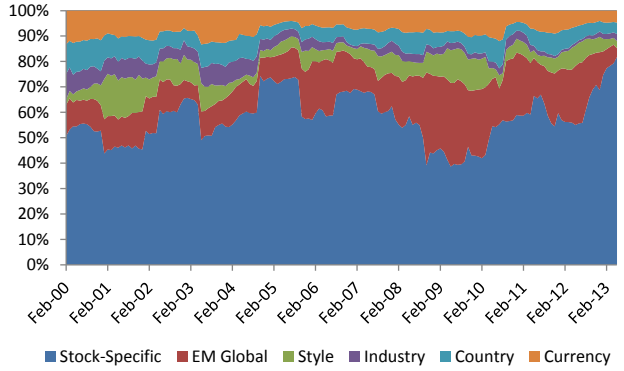
equity investors, and in Figure 7 we show the same thing for emerging market equity investors.

Figure 6: Global opportunity set



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

Figure 7: Emerging markets opportunity set



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

Both charts actually tell a similar story. The key result is the size of the blue portion relative to the other colors. The blue 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 exploded 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, earnings quality, etc.) shrunk sharply; no one cared if a stock looked good on fundamentals if it was exposed to Europe for example. Needless to say, such an environment was challenging for quants and non-quants alike, since both camps tend to use stock specific information to differentiate between stocks.

However, the good news is that both charts show that bottom-up stock picking is making a strong comeback. The blue area in both the global and emerging markets charts has reached levels last seen in 2007. This suggests that despite renewed concerns about a summer slowdown, there is still ample opportunity to trade stocks on their own merits. Or put another way, investors just aren't as concerned about big picture macro threats as they were in the past five years.[5]

[5] For technical details on our definition of the opportunity set, see: Alvarez et al., 2012, "Portfolios Under Construction: Correlation and Opportunity", *Deutsche Bank Quantitative Strategy*, 24 January 2012.

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, and highlight what we think are the noteworthy observations in each region. For those who prefer the previous tabular format (which includes more factors), you can find those results in the Appendix.

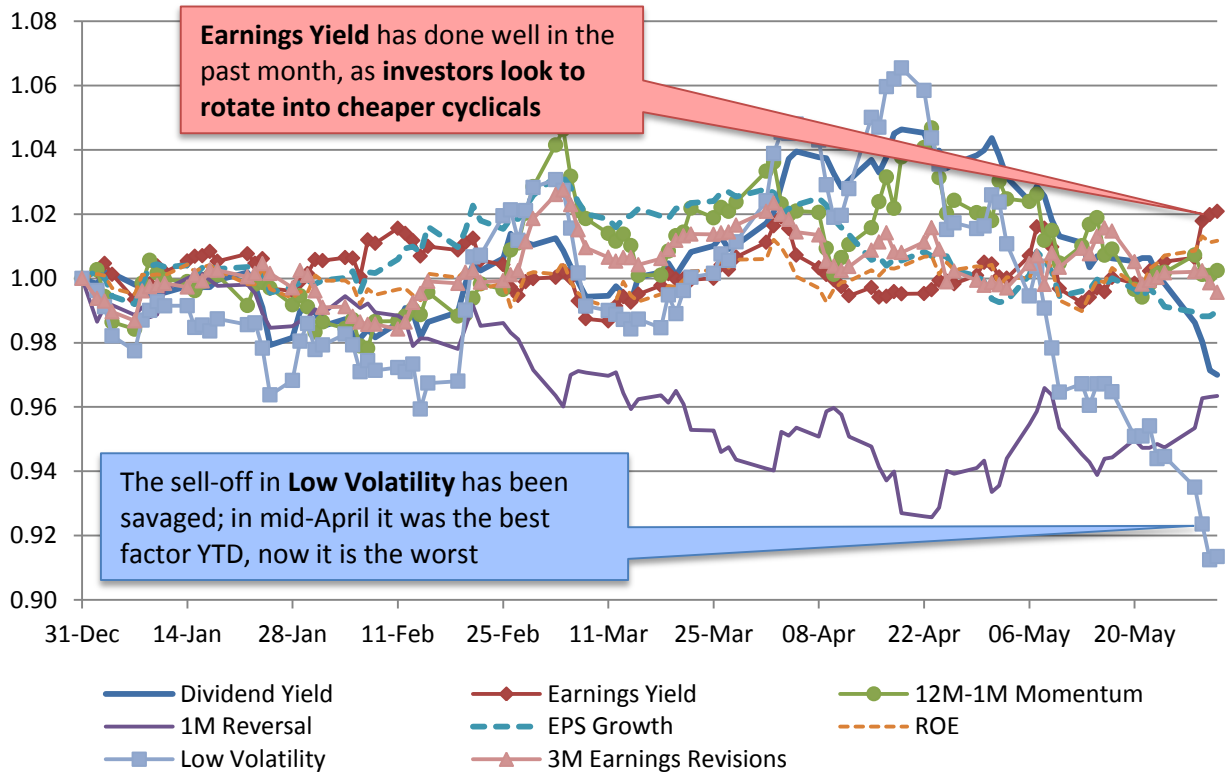
It is hard to get away from the dominant story this month: the dramatic sell-off in the Low Volatility/High Yield complex. Nonetheless, the performance of these factors around the world is a little more nuanced than what we see in the U.S. market. For example, Low Volatility was also sold off in Canada (Figure 9), Australia/New Zealand (Figure 14), and the U.K. (Figure 10), but not nearly to the same degree as in the U.S. In all those markets, the factor is still well up for the year-to-date. On the other hand, Japan looks more like the U.S., with the Low Volatility strategy now down more than 10% on the year (Figure 12). Circling back to our crowding hypothesis, it is interesting to note that as of the beginning of May it was the U.S. and Japan that showed the highest levels of crowding in Low Volatility. As we said, the more people in the room, the worse it is when everyone runs for the exit.

More generally, May was a difficult month for quant factors all around the world. In fact, it's hard to spot a consistent theme. Value investing is not working consistently anywhere in the world, but somewhat depressingly, neither is growth. Even a diversified factor model would have struggled in an environment where none of the factors are adding value (indeed our N-LASR global stock selection model was down in most regions this month).

For more details see our website

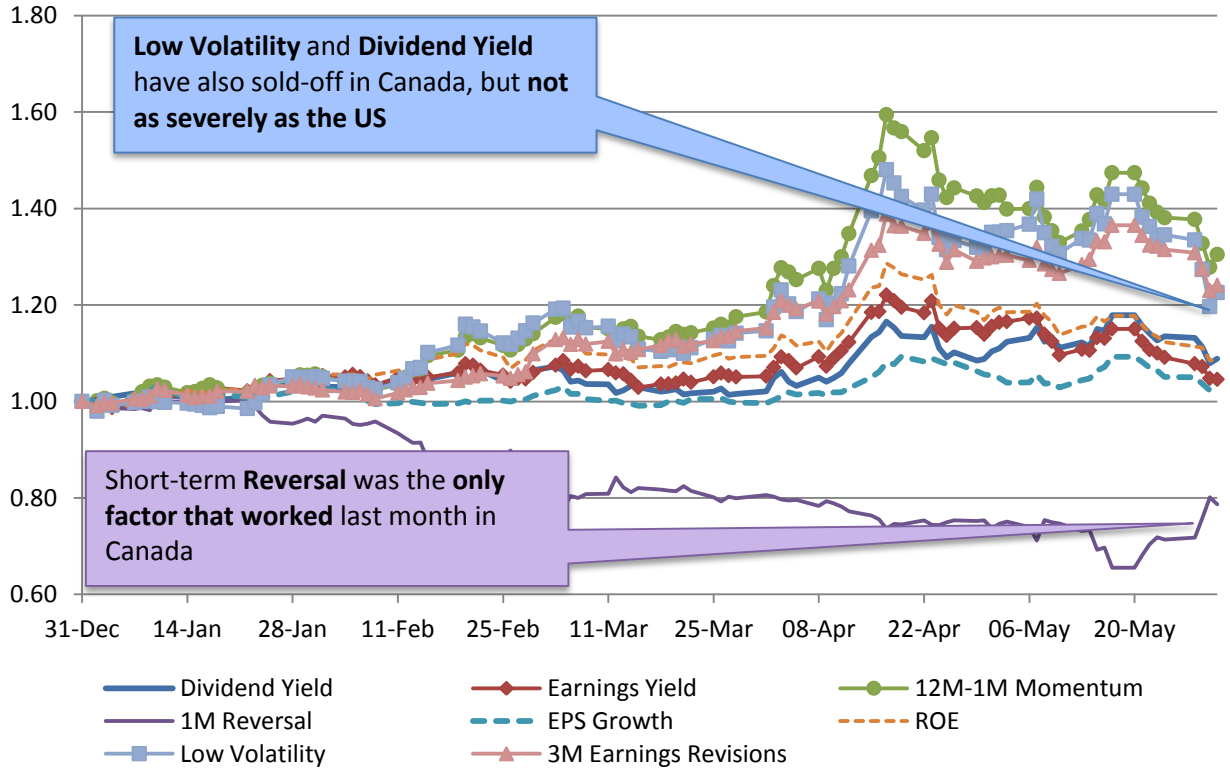
For the most recent daily factor performance, as well as factor performance delineated by different universes (e.g. large cap, small cap) and regions, please see our Global Quantitative Strategy website at https://eqindex.db.com/gqs/. Note that you need a username and password to log on to this website. If you don't have login details, please contact us at DBEQS.Americas@db.com and we'd be happy to set you up.

Figure 8: United States: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



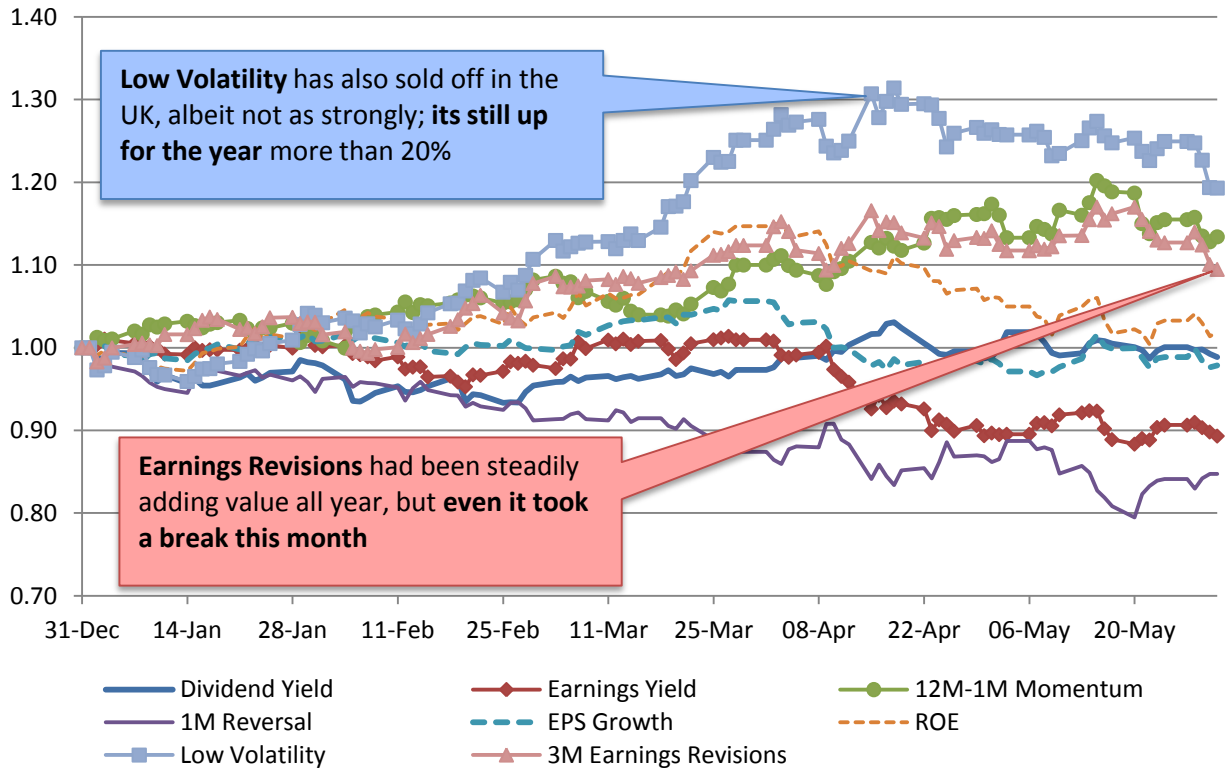
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 9: Canada: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



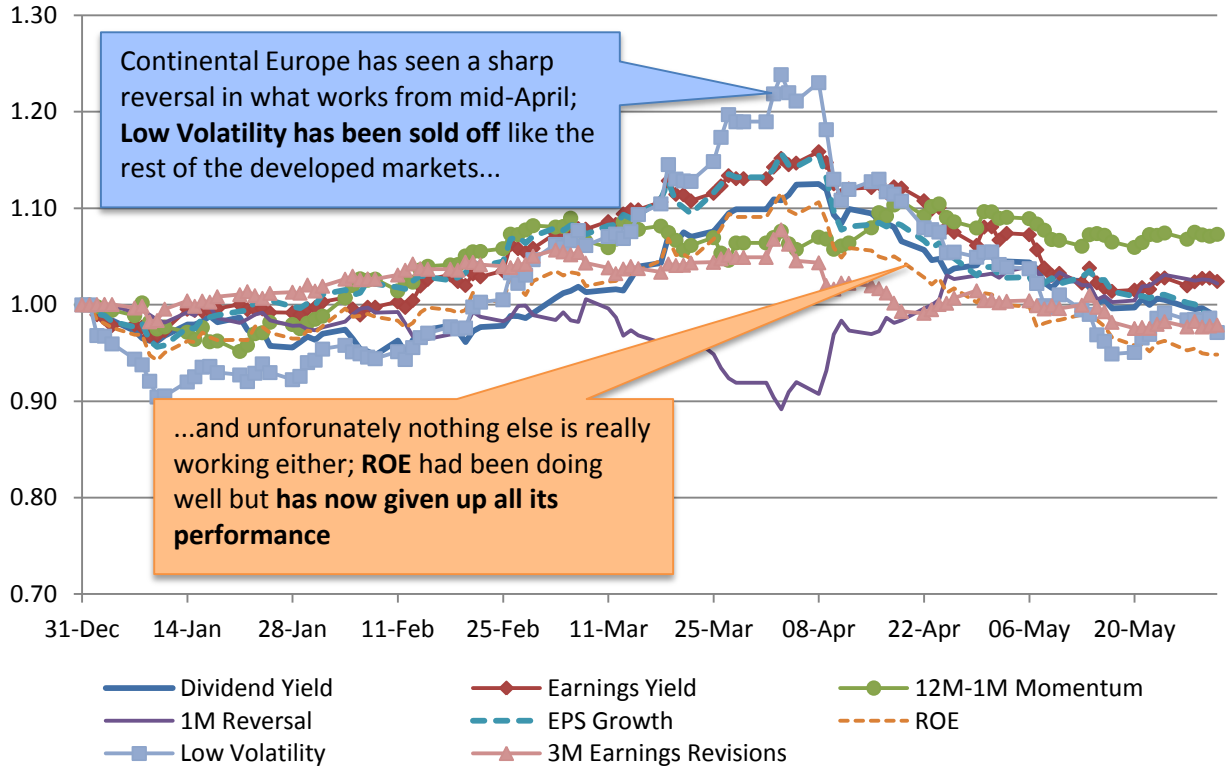
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 10: United Kingdom: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



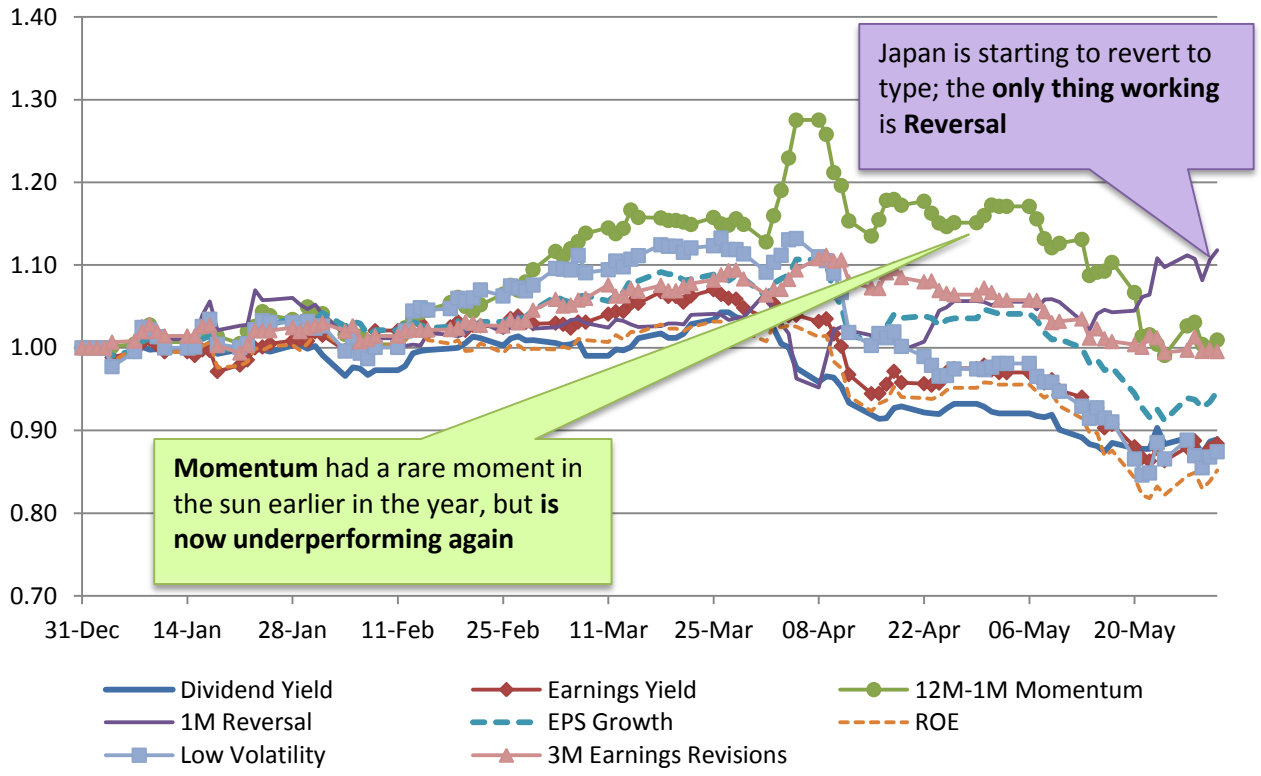
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 11: Europe ex UK: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



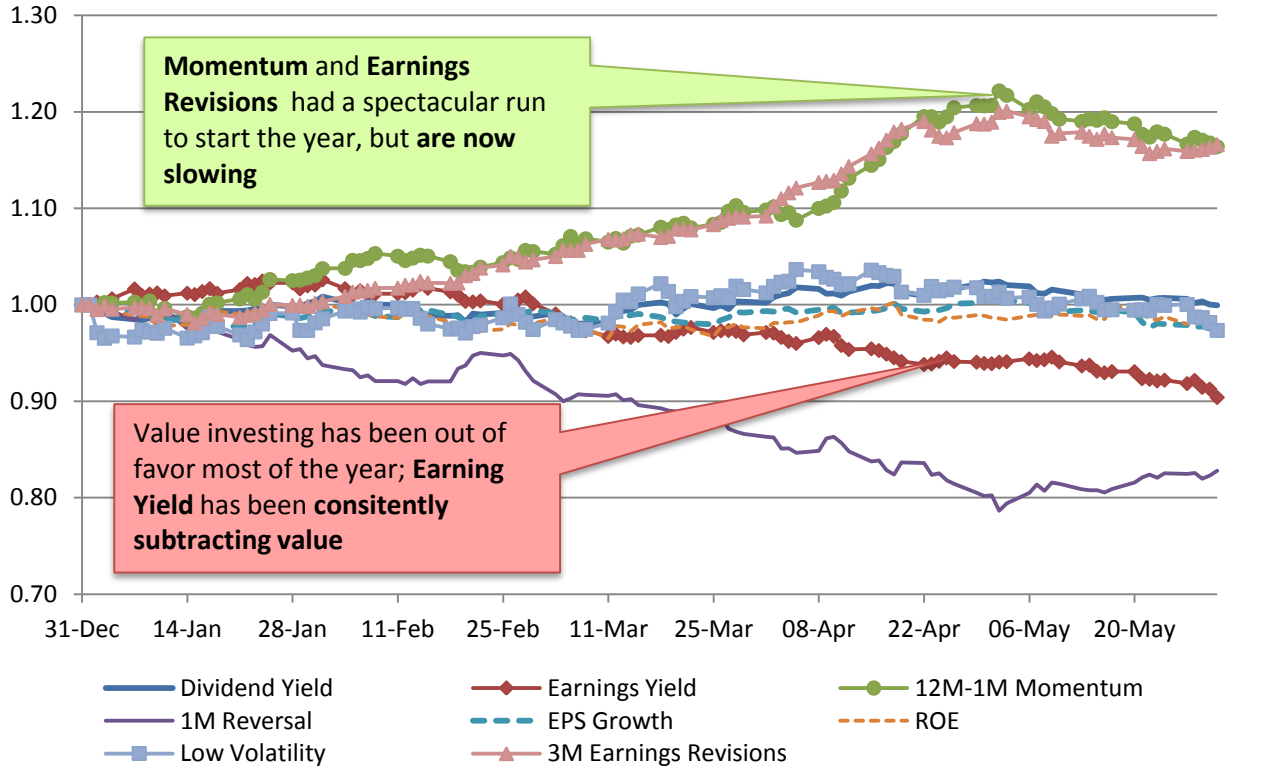
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 12: Japan: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



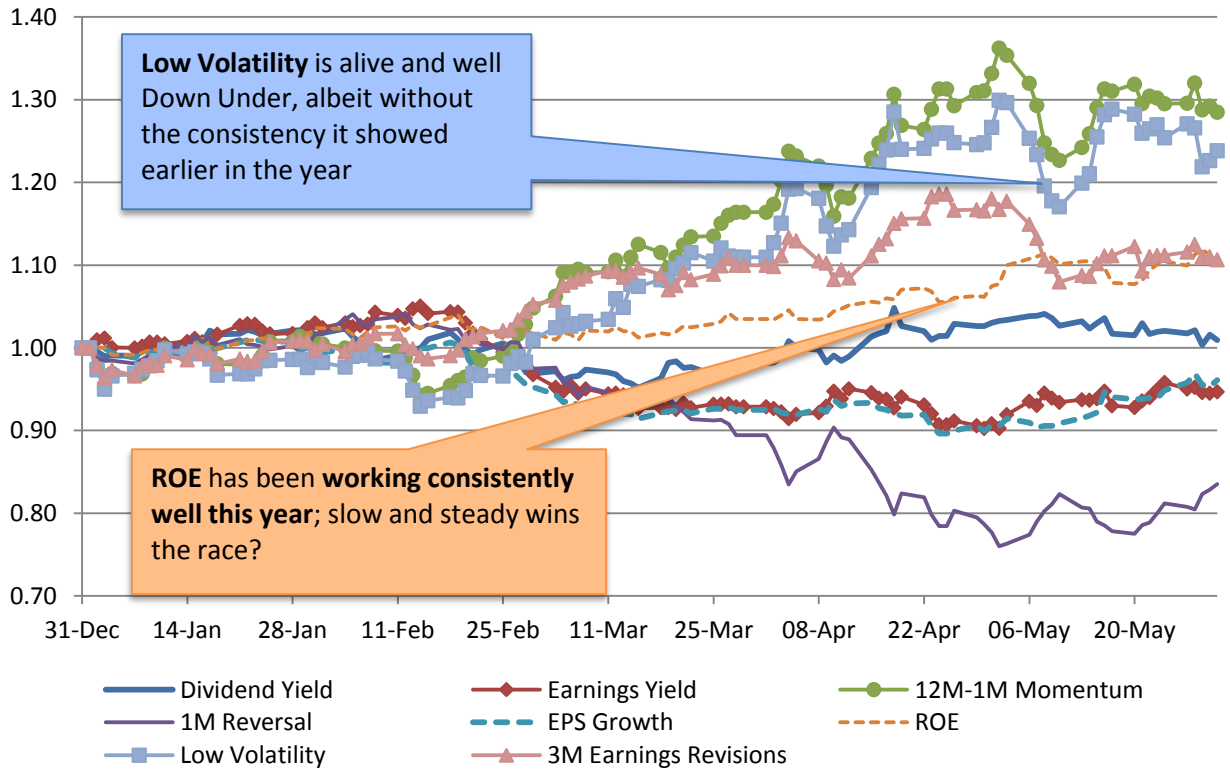
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 13: Asia ex Japan: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



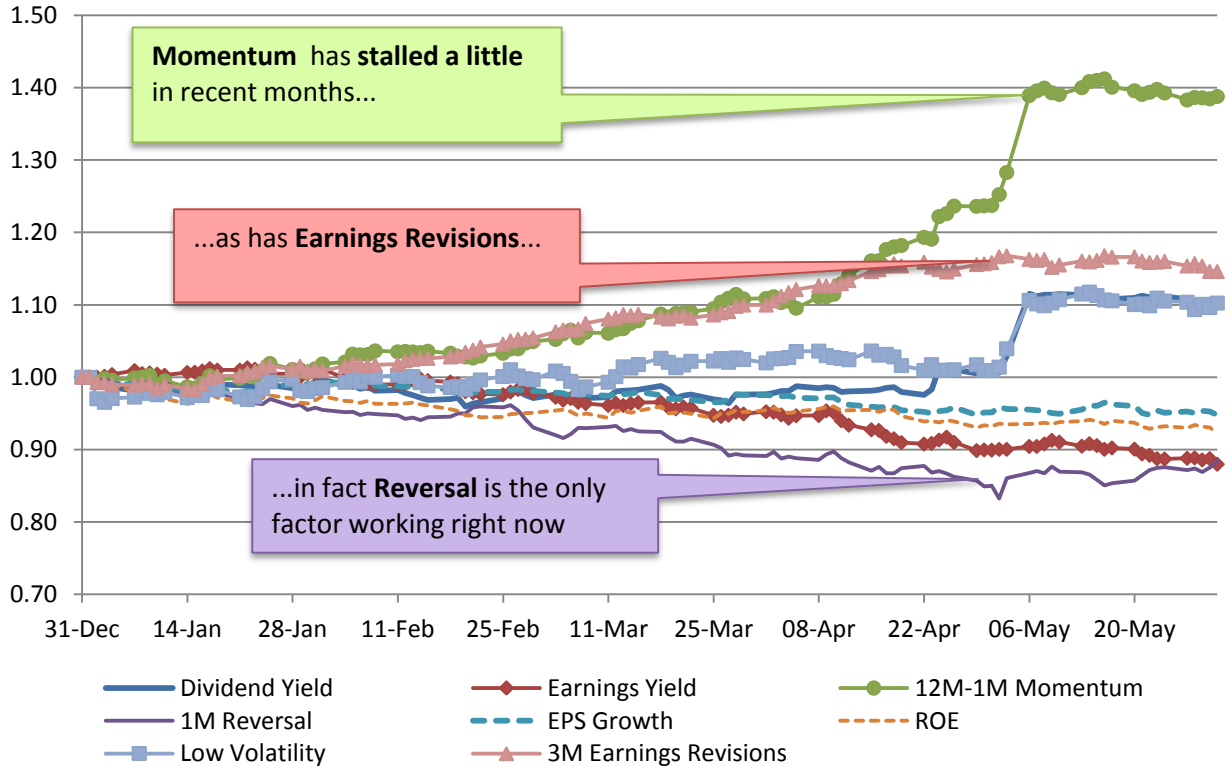
Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 14: Australia/New Zealand: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



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

Figure 15: Emerging Markets: YTD cumulative factor performance (Q10-Q1 return spread, local currency)



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

Bottom-up stock selection

QCD U.S. stock selection model

- The QCD model is our flagship stock selection model for U.S. equities.
- The model incorporates a number of unique features including dynamic factor selection, a non-linear TREE component, and active style and sector rotation.
- For complete details on the model, please see Luo et al., "QCD Model: DB Quant Handbook", 22 July 2010.

Current stock recommendations

Figure 16 shows the best 20 buy ideas and sell ideas from today's model. Note that a complete ranking for all Russell 3000 stocks is available in spreadsheet format. If you would like to get a copy of the spreadsheet, please contact us at DBEQS.Americas@db.com.

Figure 16: Current QCD model stock recommendations

BEST BUY IDEAS (SECTOR NEUTRAL)

Ticker	Name	CUSIP	GICS Sector	QCD Score (higher is better long)
TREE	TREE.COM INC	894675107	Financials	15.1%
NFP	NATIONAL FINANCIAL PRTNRS CP	63607P208	Financials	14.9%
ABC	AMERISOURCEBERGEN CORP	03073E105	Health Care	14.8%
UFI	UNIFI INC	904677200	Consumer Discretionary	13.7%
HBI	HANESBRANDS INC	410345102	Consumer Discretionary	12.8%
ACM	AECOM TECHNOLOGY CORP	00766T100	Industrials	12.5%
PRXL	PAREXEL INTERNATIONAL CORP	699462107	Health Care	11.9%
USNA	USANA HEALTH SCIENCES INC	90328M107	Consumer Staples	11.3%
SAIA	SAIA INC	78709Y105	Industrials	11.1%
AVP	AVON PRODUCTS	054303102	Consumer Staples	9.2%
IDT	IDT CORP	448947507	Telecommunication Services	8.6%
VG	VONAGE HOLDINGS CORP	92886T201	Telecommunication Services	7.8%
INT	WORLD FUEL SERVICES CORP	981475106	Energy	6.8%
TTEC	TELETECH HOLDINGS INC	879939106	Information Technology	5.7%
AES	AES CORP	00130H105	Utilities	5.5%
UGI	UGI CORP	902681105	Utilities	5.5%
LNDC	LANDEC CORP	514766104	Materials	5.4%
SLGN	SILGAN HOLDINGS INC	827048109	Materials	4.9%
EEFT	EURONET WORLDWIDE INC	298736109	Information Technology	3.9%
DK	DELEK US HOLDINGS INC	246647101	Energy	3.7%

BEST SELL IDEAS (SECTOR NEUTRAL)

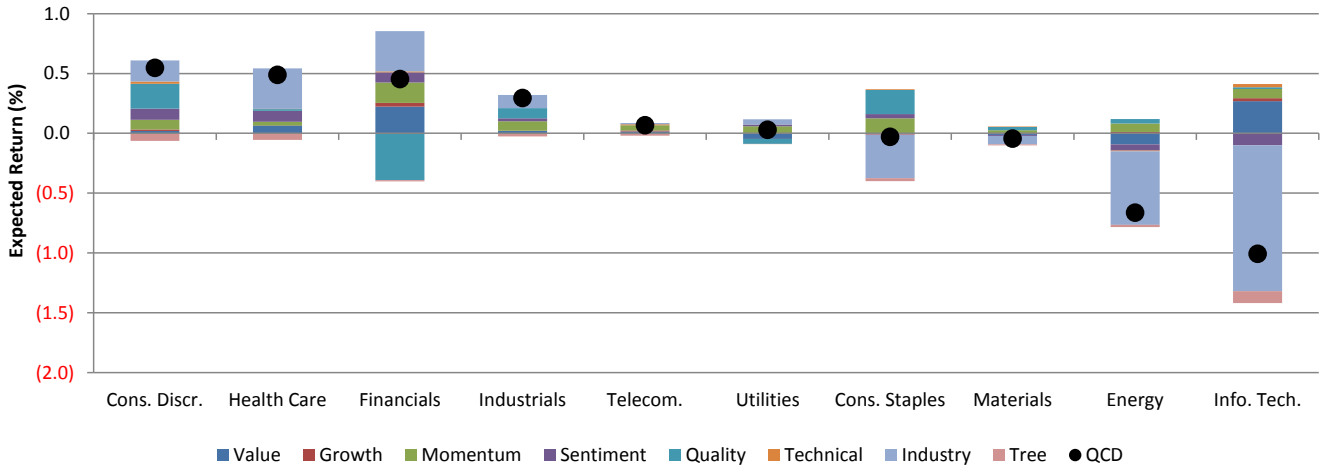
Ticker	Name	CUSIP	GICS Sector	QCD Score (lower is better short)
HNR	HARVEST NATURAL RESOURCES	41754V103	Energy	-34.1%
PRKR	PARKERVISION INC	701354102	Information Technology	-32.4%
RBCN	RUBICON TECHNOLOGY INC	78112T107	Information Technology	-32.1%
GEVO	GEVO INC	374396109	Energy	-31.5%
ETRM	ENTEROMEDICS INC	29365M208	Health Care	-30.1%
AUMN	GOLDEN MINERALS CO	381119106	Materials	-29.7%
PZG	PARAMOUNT GOLD AND SILVER	69924P102	Materials	-28.4%
ZIOP	ZIOPHARM ONCOLOGY INC	98973P101	Health Care	-23.5%
GNK	GENCO SHIPPING & TRADING	Y2685T107	Industrials	-21.9%
AMSC	AMERICAN SUPERCONDUCTOR CP	030111108	Industrials	-21.4%
NGVC	NATURAL GROCERS VITAMIN CTGE	63888U108	Consumer Staples	-20.6%
MNTG	MTR GAMING GROUP INC	553769100	Consumer Discretionary	-19.9%
TWER	TOWERSTREAM CORP	892000100	Telecommunication Services	-19.8%
CLWR	CLEARWIRE CORP	18538Q105	Telecommunication Services	-19.6%
AT	ATLANTIC POWER CORP	04878Q863	Utilities	-19.5%
MBI	MBIA INC	55262C100	Financials	-18.9%
OEH	ORIENT-EXPRESS HOTELS	G67743107	Consumer Discretionary	-18.5%
FMD	FIRST MARBLEHEAD CORP	320771108	Financials	-17.2%
HTSI	HARRIS TEETER SUPERMARKETS	414585109	Consumer Staples	-14.5%
CDZI	CADIZ INC	127537207	Utilities	-14.0%

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

Current sector recommendations

The QCD model also implicitly makes sector predictions. Figure 17 shows the current ranking of the 10 GICS Level 1 Sectors, ranked from best (most likely to outperform this month) to worse (least likely to outperform). The bars show the key drivers for each call.

Figure 17: Current QCD sector recommendations

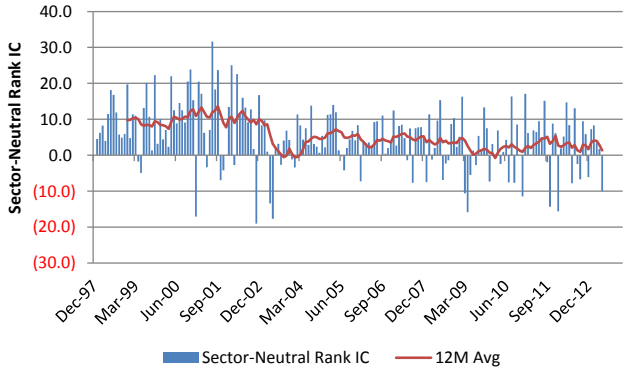


Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Model performance

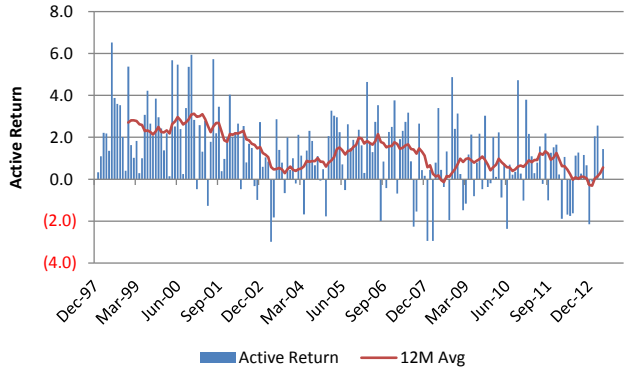
The QCD model has performed well since inception. Figure 18 shows the pure signal performance, measured as a monthly sector-neutral rank information coefficient (IC). Figure 19 shows the performance of an actual model portfolio, after costs, based on a realistically optimized market-neutral strategy.

Figure 18: Model performance, sector-neutral rank IC



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

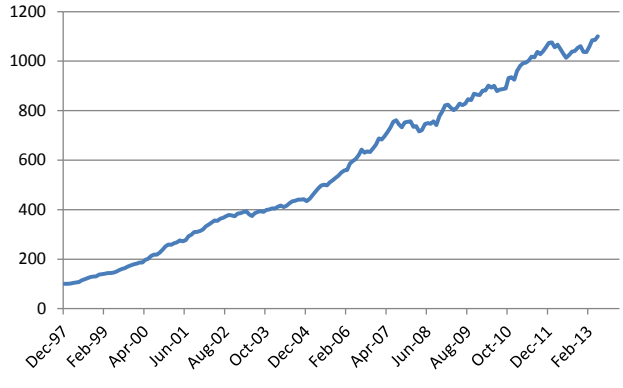
Figure 19: Model portfolio active return, after costs



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

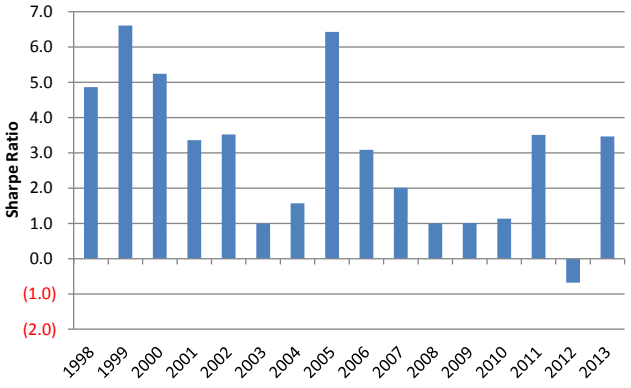
Figure 20 shows the cumulative performance of the optimized strategy, and Figure 21 shows the annualized Sharpe ratio (after costs) by calendar year.

Figure 20: Model portfolio cumulative, after costs



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

Figure 21: Annualized Sharpe ratio, after costs



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

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 22 shows the best 20 buy ideas and sell ideas from today's model. Note that a complete ranking for all global stocks is available in 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	County	N-LASR Score (higher is better long)
115160 KS	Humax Co Ltd	B4TSY2	Korea	2.02
SCL.	SHAWCOR LTD	B9M2YJ3	Canada	1.98
OC	OWENS CORNING	B1FW7Q2	USA	1.86
SMWH LN	WH Smith PLC	B2PDGW	UK	1.76
HBI	HANESBRANDS INC	B1BJSL9	USA	1.70
JBT	JOHN BEAN TECHNOLOGIES	B3BRJZ8	USA	1.68
AGO	ASSURED GUARANTY LTD	B00V7H8	USA	1.67
064960 KS	S&T Motiv Co Ltd	651543	Korea	1.66
743 HK	Asia Cement (China) Holdings Corporation	B2R8HK	China	1.64
9072 JT	Nippon Konpo Unyu Soko Co	664220	Japan	1.64
AALB NA	Aalberts Industries NV	B1W8P1	Netherlands	1.64
SUN VX	Sulzer AG Reg	485471	Switzerland	1.64
KELYA	KELLY SERVICES INC -CL A	2487117	USA	1.63
SAABB SS	SAAB AB B	546955	Sweden	1.63
NP	NEENAH PAPER INC	B03W0P7	USA	1.62
USNA	USANA HEALTH SCIENCES INC	2267698	USA	1.62
MYR AU	Myer Holdings Ltd	B50YPZ	Australia	1.61
SU.	SUNCOR ENERGY INC	B3NB1P2	Canada	1.60
ENC SM	Grupo Empresarial Ence, SA	B1W7BK	Spain	1.59
TEL	TE CONNECTIVITY LTD	B62B7C3	USA	1.59

BEST SELL IDEAS

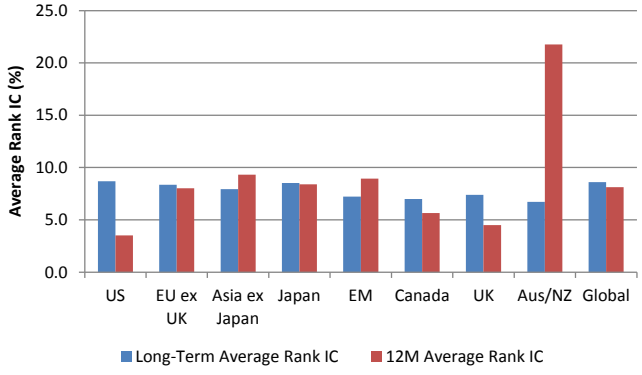
Ticker	Name	SEDOL	County	N-LASR Score (lower is better short)
3049 TT	HannStar Touch Solution Incorpora	654504	Taiwan	-2.00
LANCI IB	Lanco Infratech Ltd	B1BQS3	India	-1.90
2049 TT	Hiwin Technologies Corp	B1YMYT	Taiwan	-1.83
5727 JT	Toho Titanium Co	689462	Japan	-1.81
1051 HK	G-Resources Group Ltd.	B11Z22	Hong Kong	-1.77
ENJOY CI	Enjoy SA	B62KG9	Chile	-1.76
ISRL	ISRAMCO INC	2247571	USA	-1.76
OGXP3 BS	OGX Petroleo E Gas Participa	B19RPM	Brazil	-1.75
SDL AU	Sundance Resources Limited	624651	Australia	-1.75
9504 JT	Chugoku Electric Power Co Inc	619590	Japan	-1.73
HNR	HARVEST NATURAL RESOURCES	2092867	USA	-1.72
CIMBT TB	CIMB Thai Bank PCL	615811	Thailand	-1.70
MAN GY	MAN AG	556352	Germany	-1.70
ADANI IB	Adani Power Ltd	B3WQH4	India	-1.70
LCB PM	Lepanto Consolidated Mining B	651290	Philippines	-1.69
068760 KS	Celltrion Pharm Inc	B0V3YP	Korea	-1.67
UEC	URANIUM ENERGY CORP	B0VLLY2	USA	-1.66
3431 JT	Miyaji Engineering Group	668755	Japan	-1.66
6101 JT	Tsugami Corp	690676	Japan	-1.66
UKCM LN	UK Commercial Property Trust	B19Z2J	UK	-1.66

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

Model performance

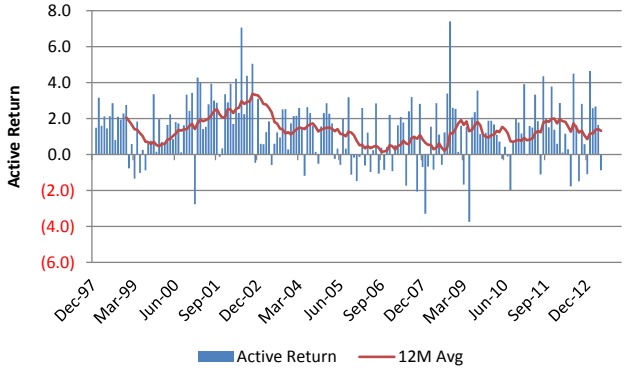
The N-LASR model has performed well since inception. Figure 23 shows the average pure signal performance, measured as a monthly rank information coefficient (IC), in different regions. Figure 24 shows the performance of a global model portfolio, after costs, based on a realistically optimized market-neutral strategy.

Figure 23: Regional model performance, average rank IC



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

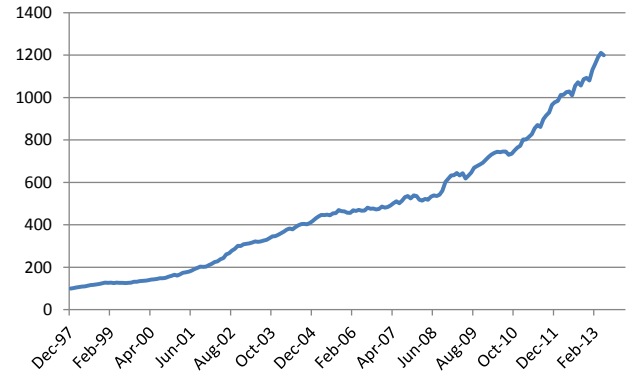
Figure 24: Global portfolio active return, after costs



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

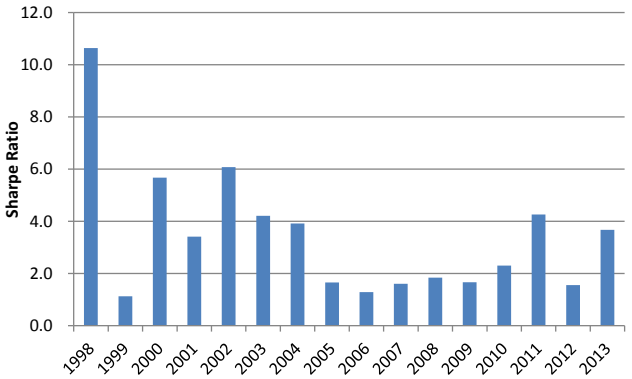
Figure 25 shows the cumulative performance of the optimized strategy, and Figure 26 shows the annualized Sharpe ratio (after costs) by calendar year.

Figure 25: Global portfolio cumulative, after costs



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

Figure 26: Annualized Sharpe ratio, after costs



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

Top-down country rotation

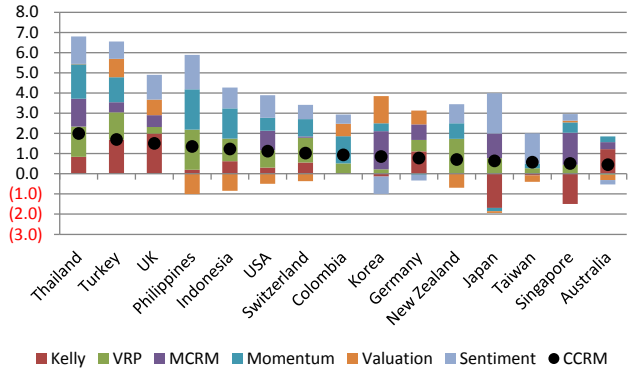
CCRM country rotation model

- 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

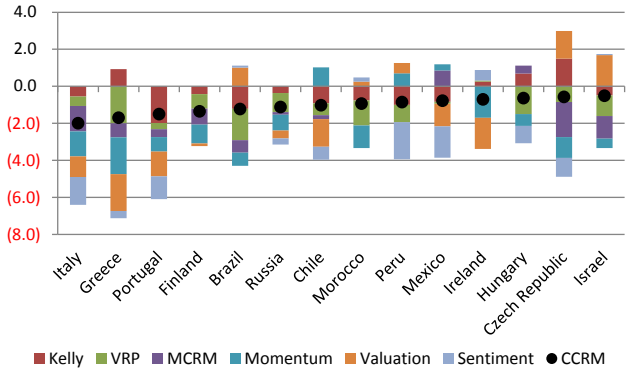
Figure 27 and Figure 28 show the top and bottom third of countries, as ranked currently by our CCRM model. The bars show what is driving these calls.

Figure 27: Top tercile countries



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

Figure 28: Bottom tercile countries

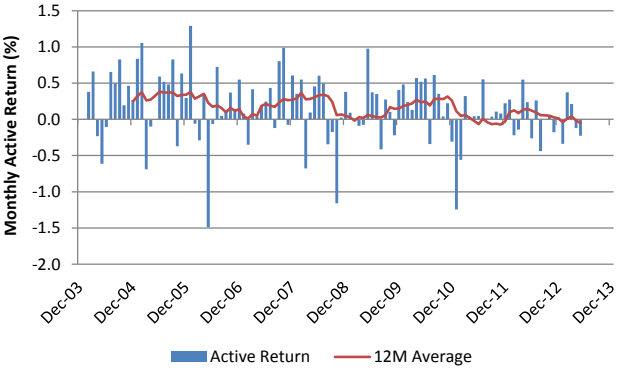


Source: Bloomberg Finance LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Model performance

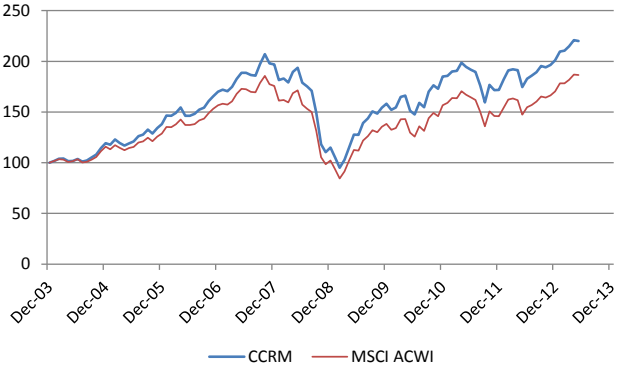
Figure 29 and Figure 30 show the performance of the model over time.

Figure 29: Monthly returns



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

Figure 30: Cumulative performance



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

Top-down asset allocation

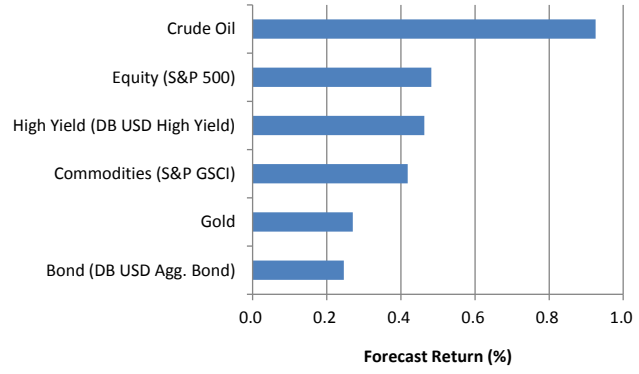
Quant Tactical Asset Allocation (QTAA) model

- 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

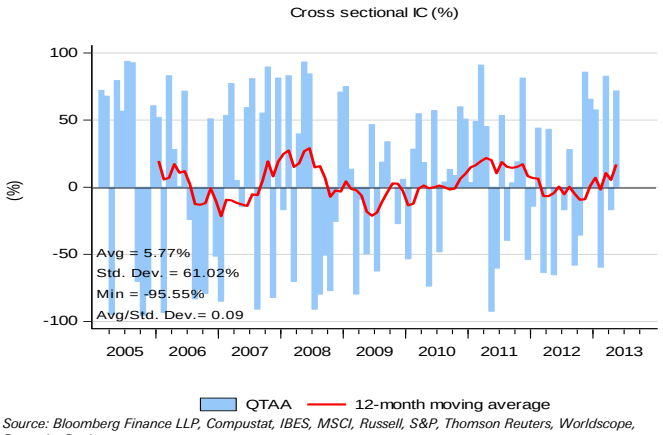
Figure 31 shows the current ranking of our six asset classes, ranked from best to worse in terms of month-ahead forecast returns. Figure 32 shows the monthly performance of the QTAA model over time.

Figure 31: Current QTAA forecasts



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

Figure 32: Performance of QTAA model



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

Top-down style rotation

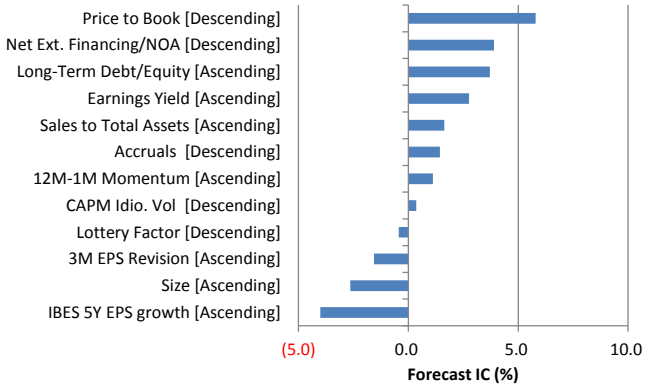
Style rotation model

- 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 backwards 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

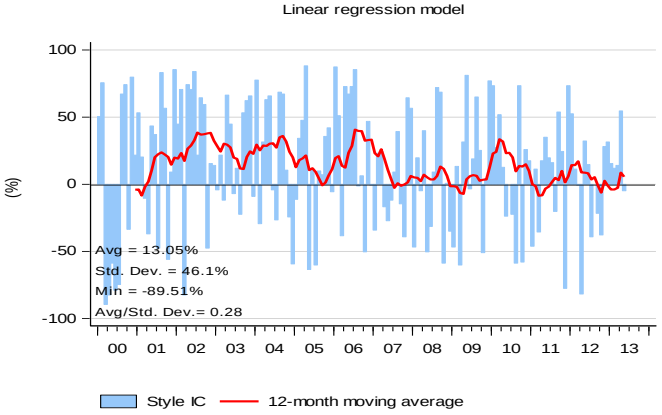
Figure 33 shows the current ranking of our 12 factors, ranked from best to worse in terms of month-ahead forecast performance. Figure 34 shows the monthly performance of the Style Rotation model over time.

Figure 33: Current style rotation forecasts



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

Figure 34: Performance of style rotation model



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

Appendix: 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	2,954	(19.60)	0.91	2.22	2.95	14.44	0.20	42.59	(33.26)	0.00	305	2,872	55.08	99.24
2 Expected dividend yield	Ascending	2,954	(20.55)	0.87	2.52	3.20	14.98	0.21	44.46	(33.89)	0.00	305	2,872	54.43	99.31
3 Price-to-operating EPS, trailing 12M, Basic	Descending	2,360	8.71	3.46	1.29	2.81	10.40	0.27	30.82	(32.28)	0.00	229	2,355	59.83	95.20
4 Operating earnings yield, trailing 12M, Basic	Ascending	2,925	3.06	3.59	4.15	4.87	13.04	0.37	47.24	(33.30)	0.00	229	2,871	61.57	96.42
5 Earnings yield, forecast FY1 mean	Ascending	2,803	7.85	4.25	3.71	4.43	12.36	0.36	48.88	(34.61)	0.00	305	2,536	62.62	94.96
6 Earnings yield, forecast FY2 mean	Ascending	2,784	12.46	4.53	2.98	3.89	11.97	0.33	47.02	(34.31)	0.00	305	2,435	63.28	94.34
7 Earnings yield x IBES 5Y growth	Ascending	1,713	20.73	4.41	1.76	1.84	10.50	0.18	41.11	(26.63)	0.01	229	1,927	58.95	93.45
8 Sector-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,925	4.53	3.15	3.75	4.33	8.36	0.52	28.96	(14.90)	0.00	229	2,869	69.00	95.98
9 Hist-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,115	2.91	0.69	1.66	1.70	6.92	0.25	20.73	(18.74)	0.00	135	2,013	62.96	96.85
10 Operating cash flow yield (income stmt def)	Ascending	2,954	3.17	3.94	3.26	4.11	10.89	0.38	47.14	(32.67)	0.00	305	2,872	64.59	96.02
11 Cash flow yield, FY1 mean	Ascending	1,630	11.71	3.21	0.85	2.75	17.63	0.16	66.06	(54.29)	0.01	275	753	58.18	95.74
12 Free cash flow yield	Ascending	2,875	6.10	4.15	3.25	4.91	7.92	0.62	31.93	(22.64)	0.00	268	2,507	75.37	94.61
13 Price-to-sales, trailing 12M	Descending	2,887	18.23	5.11	0.94	1.85	10.98	0.17	30.02	(41.46)	0.00	305	2,797	57.05	99.11
14 Price-to-book	Descending	2,860	(0.47)	1.74	(0.87)	0.84	10.67	0.08	26.28	(35.75)	0.17	305	2,762	49.18	97.64
15 EBITDA/EV	Ascending	2,911	5.27	2.81	2.86	4.18	9.71	0.43	39.32	(27.15)	0.00	305	2,818	67.87	95.53
16 Price-to-book adj for ROE, sector adj	Descending	2,686	7.22	2.34	(0.95)	0.46	8.75	0.05	22.50	(33.21)	0.36	305	2,431	49.18	95.59
2. Growth															
17 Hist 5Y operating EPS growth	Descending	2,873	0.66	1.86	3.04	1.08	8.72	0.12	30.58	(22.70)	0.07	217	2,731	53.00	97.24
18 Hist 5Y operating EPS acceleration	Ascending	2,873	(2.84)	1.93	0.27	0.83	6.70	0.12	25.31	(16.13)	0.07	217	2,731	53.92	94.71
19 IBES 5Y EPS growth	Ascending	2,457	2.71	(0.65)	2.17	0.89	8.11	0.11	21.65	(27.86)	0.06	305	2,296	54.10	98.28
20 IBES 5Y EPS growth/stability	Ascending	2,457	2.70	(0.57)	2.31	1.32	7.71	0.17	20.64	(19.20)	0.00	305	2,296	56.39	98.62
21 IBES LTG EPS mean	Descending	1,953	(17.73)	(0.58)	(1.07)	1.69	15.87	0.11	37.64	(52.38)	0.06	305	2,152	49.84	97.76
22 IBES FY2 mean DPS growth	Ascending	2,156	(12.96)	(0.09)	1.56	0.92	8.59	0.11	24.12	(21.96)	0.22	132	1,477	50.76	87.70
23 IBES FY1 mean EPS growth	Ascending	2,776	4.65	2.17	1.61	1.06	7.52	0.14	20.76	(24.42)	0.01	305	2,515	60.98	88.76
24 Year-over-year quarterly EPS growth	Ascending	2,934	(3.52)	2.88	2.97	2.53	7.06	0.36	23.85	(21.12)	0.00	229	2,875	66.38	81.47
25 IBES FY1 mean CFPS growth	Descending	1,488	(9.73)	(3.58)	(1.43)	0.44	11.21	0.04	38.08	(42.07)	0.55	232	517	50.43	92.71
26 IBES SUE, amortized	Ascending	2,610	2.86	(0.08)	1.86	0.77	6.51	0.12	20.62	(16.30)	0.07	244	1,074	53.69	73.76
3. Price Momentum and Reversal															
27 Total return, 1D	Descending	2,954	7.44	1.86	2.77	5.00	7.18	0.70	15.52	(33.75)	0.00	305	2,873	78.03	1.64
28 Total return, 21D (1M)	Descending	2,954	9.59	1.59	0.68	1.85	10.95	0.17	29.03	(43.69)	0.00	305	2,872	58.03	0.40
29 Maximum daily return in last 1M (lottery factor)	Descending	2,948	(15.04)	0.95	3.57	5.13	14.99	0.34	39.13	(56.07)	0.00	305	2,743	64.26	54.29
30 21D volatility of volume/price	Descending	2,954	(4.03)	2.17	2.43	0.27	6.56	0.04	24.16	(16.78)	0.48	305	2,862	51.48	56.43
31 Total return, 252D (12M)	Ascending	2,877	(13.84)	1.04	2.60	3.26	14.14	0.23	39.62	(57.00)	0.00	305	2,791	64.26	89.93
32 12M-1M total return	Ascending	2,877	(11.86)	1.54	3.11	4.11	13.24	0.31	37.65	(49.06)	0.00	305	2,791	65.25	88.43
33 Price-to-52 week high	Ascending	2,849	(19.34)	(0.64)	2.98	3.15	17.83	0.18	49.63	(62.50)	0.00	305	1,937	61.97	83.37
34 Total return, 1260D (60M)	Ascending	2,521	(7.84)	(2.56)	2.61	1.12	10.98	0.10	25.63	(35.41)	0.08	293	2,233	56.66	97.47
4. Sentiment															
35 IBES LTG Mean EPS Revision, 3M	Ascending	1,922	(0.52)	0.27	1.09	0.88	3.76	0.23	11.16	(12.06)	0.00	305	2,124	61.64	59.73
36 IBES FY1 Mean EPS Revision, 3M	Ascending	2,754	(4.25)	0.10	1.74	2.92	8.47	0.34	29.96	(33.00)	0.00	305	2,474	66.56	75.36
37 IBES FY1 EPS up/down ratio, 3M	Ascending	2,726	(4.99)	(0.19)	1.72	3.08	7.88	0.39	27.54	(24.41)	0.00	305	2,336	67.54	79.57
38 Expectation gap, short-term - long-term	Descending	2,208	(0.34)	1.88	2.00	1.23	5.17	0.24	9.60	(19.91)	0.00	305	2,123	58.03	91.13
39 IBES FY1 Mean CFPS Revision, 3M	Ascending	1,558	0.52	0.60	1.92	2.01	16.03	0.13	69.38	(75.04)	0.04	274	685	62.41	64.47
40 IBES FY1 Mean SAL Revision, 3M	Ascending	2,709	(2.62)	1.01	2.15	1.08	7.89	0.14	27.43	(24.32)	0.05	204	2,164	60.29	71.54
41 IBES FY1 Mean FFO Revision, 3M	Ascending	141	(25.30)	(2.13)	2.61	2.89	21.13	0.14	71.43	(80.00)	0.02	277	83	57.40	69.66
42 IBES FY1 Mean DPS Revision, 3M	Ascending	1,257	5.89	0.97	1.09	0.69	5.18	0.13	14.91	(17.55)	0.13	129	993	58.14	62.50
43 IBES FY1 Mean ROE Revision, 3M	Ascending	2,101	(3.56)	(1.33)	0.70	0.63	6.67	0.09	23.70	(22.19)	0.28	129	1,722	58.14	65.77
44 Recommendation, mean	Descending	2,806	5.73	2.24	2.09	0.80	7.56	0.11	21.85	(19.41)	0.11	234	2,675	56.41	94.37
45 Mean recommendation revision, 3M	Descending	2,792	0.95	0.81	0.39	1.25	4.09	0.30	19.86	(11.55)	0.00	231	2,662	62.77	59.92
46 Target price implied return	Ascending	2,743	18.46	3.14	0.48	0.07	16.92	0.00	60.74	(39.59)	0.96	170	2,456	52.94	80.06
47 Mean target price revision, 3M	Ascending	2,729	(1.60)	0.33	1.28	2.37	12.73	0.19	30.14	(41.94)	0.02	167	2,443	63.47	74.95
5. Quality															
48 ROE, trailing 12M	Ascending	2,922	2.89	1.39	3.52	3.89	10.10	0.39	33.42	(29.52)	0.00	229	2,863	64.63	96.44
49 Return on invested capital (ROIC)	Ascending	2,916	4.81	0.76	3.91	4.20	10.26	0.41	33.02	(31.24)	0.00	229	2,855	68.56	98.20
50 Sales to total assets (asset turnover)	Ascending	2,925	18.68	1.90	1.96	1.62	8.71	0.19	22.78	(22.02)	0.00	305	2,813	56.07	99.45
51 Operating profit margin	Ascending	2,880	(1.73)	(3.07)	0.37	1.15	5.44	0.21	16.98	(14.17)	0.00	305	2,717	59.34	98.43
52 Current ratio	Descending	2,286	(5.72)	1.90	1.12	1.86	10.23	0.18	31.95	(38.66)	0.00	305	2,238	54.43	97.90
53 Long-term debt/equity	Ascending	2,845	(9.75)	3.85	2.03	0.84	9.62	0.09	35.65	(28.14)	0.13	305	2,746	48.85	98.51
54 Altman's z-score	Ascending	2,254	7.16	(1.54)	1.44	0.29	9.20	0.03	31.74	(30.44)	0.59	305	2,158	49.18	98.34
55 Merton's distance to default	Ascending	2,373	(11.98)	(1.88)	2.89	3.32	11.81	0.28	33.03	(41.45)	0.00	305	2,334	65.57	95.04
56 Ohlson default model	Descending	2,261	1.39	(1.29)	1.79	2.31	6.37	0.36	16.95	(18.63)	0.00	268	2,123	68.28	98.28
57 Accruals (Sloan 1996 def)	Descending	2,233	0.47	(0.01)	(0.26)	0.55	4.18	0.13	12.07	(15.48)	0.02	305	2,138	55.41	88.47
58 Firm-specific discretionary accruals	Descending	2,187	0.27	(0.42)	(0.20)	0.50	3.17	0.16	7.82	(10.87)	0.01	245	2,119	55.92	80.96
59 Hist 5Y operating EPS stability, coef of determination	Ascending	2,873	5.12	0.12	(0.04)	0.82	5.03	0.16	20.01	(12.27)	0.02	217	2,731	52.53	96.87
60 IBES 5Y EPS stability	Descending	2,457	(3.59)	(0.30)	1.21	1.18	8.63	0.14	25.00	(34.33)	0.02	305	2,296	54.10	98.95
61 IBES FY1 EPS dispersion	Descending	2,803	0.73	(0.92)	2.97	1.55	9.11	0.17	31.67	(25.17)	0.00	305	2,536	60.00	84.16
62 Payout on trailing operating EPS	Ascending	2,253	(24.99)	(1.56)	0.13	0.80	13.53	0.06	38.55	(30.91)	0.30	305	2,211	49.84	99.23
63 YoY change in # of shares outstanding	Descending	2,905	6.60	2.96	2.98	2.63	8.90	0.30	19.53	(46.21)	0.00	305	2,768	60.66	94.26
64 YoY change in debt outstanding	Descending	2,263	1.15	(0.06)	(0.65)	0.27	4.06	0.07	13.07	(10.40)	0.24	305	2,220	55.74	89.85
65 Net external financing/net operating assets	Ascending	2,942	0.32	3.03	2.50	2.50	8.46	0.30	44.61	(21.76)	0.00	305	2,834	61.64	94.67
66 Piotroski's F-score	Ascending	2,954	(2.13)	2.29	3.06	2.93	8.11	0.36	29.20	(27.83)	0.00	305	2,874	67.54	88.17
67 Mohanram's G-score	Ascending	548	(2.21)	(2.36)	1.72	2.67	10.60	0.25	35.27	(32.14)	0.00	217	383	57.14	95.45
6. Technicals															
68 # of days to cover short	Descending	2,944	(8.07)	2.13	2.81	2.23	7.30	0.31	33.80	(25.16)	0.00	305	2,014	58.69	91.36
69 CAPM beta, 5Y monthly	Descending	2,954	(13.04)	(3.09)	(0.00)	1.00	13.81	0.07	40.19	(42.70)	0.26	246	2,907	51.22	97.70
70 CAPM idosyncratic vol, 1Y daily	Descending	2,938	(22.47)	1.53	5.43	5.21	18.15	0.29	42.60	(60.80)	0.00	293	2,880	62.12	99.18
71 Realized vol, 1Y daily	Descending	2,878	(24.52)	0.45	4.86	5.05	18.78	0.27	42.69	(59.63)	0.00	305	2,791	61.31	99.16
72 Skewness, 1Y daily	Descending	2,878	(0.97)	(0.36)	0.93	1.26	5.35	0.24	13.93	(22.86)	0.00	305	2,791	57.38	89.74
73 Kurtosis, 1Y daily	Descending	2,878	(12.10)	0.39	1.54	1.42	5.49	0.26	15.28	(15.82)	0.00	305	2,791	62.30	91.50
74 Idiosyncratic vol surprise	Descending	2,904	(0.33)	0.68	1.84	2.87	8.01	0.36	22.66	(33.71)	0.00	292	2,861	66.78	87.80
75 Normalized abnormal volume	Ascending	2,948	(4.09)	2.96	3.23	2.29	6.37	0.36	23.10	(16.38)	0.00	305	2,865	65.90	64.19
76 Float turnover, 12M	Descending	2,768	(8.44)	(1.69)	(0.44)	0.21	10.73	0.02	23.53	(26.97)	0.73	294	2,784	48.30	99.77
77 Moving average crossover, 15W-36W	Ascending	2,892	2.04	0.60	0.17	2.20	13.23	0.17	46.29	(55.07)	0.00	305	2,526	60.00	90.76
78 Log float-adj capitalization	Ascending	2,954	(8.94)	2.82	4.35	3.54	10.97	0.32	29.53	(40.68)	0.00	305	2,869	61.64	99.40
79 # of month in the database	Ascending	2,954	(0.09)	1.05	1.51	2.21	8.82	0.25	35.61	(23.86)	0.00	305	2,872	57.38	99.99
80 DB composite options factor	Ascending	2,039	0.73	(0.11)	1.41	1.48	3.67	0.40	13.99	(13.88)	0.00	142	2,024	66.20	23.06

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 LLP, 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 (%) 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	9,737	(14.16)	2.30	3.91	4.32	10.55	0.41	36.88	(23.89)	0.00	281	7,991	64.77	4.32
2 Dividend yield, FY1	Ascending	7,628	(14.43)	2.06	3.62	4.40	10.89	0.40	32.17	(22.90)	0.00	224	5,210	64.29	4.40
3 Dividend yield, FY2	Ascending	7,547	(14.40)	2.19	3.42	4.29	10.95	0.39	33.19	(24.39)	0.00	214	5,167	64.02	4.29
4 Price/Earnings	Descending	7,691	2.23	0.73	0.44	4.08	13.17	0.31	39.66	(50.73)	0.00	274	6,281	62.04	-4.08
5 Price-to-FY0 EPS	Descending	7,822	3.55	0.65	(0.57)	2.93	10.31	0.28	28.98	(37.08)	0.00	281	6,007	62.28	-2.93
6 Earnings yield, FY0	Ascending	8,984	(0.06)	2.21	1.67	4.03	9.22	0.44	31.67	(18.68)	0.00	281	6,986	64.77	4.03
7 Earnings yield, forecast FY1 mean	Ascending	8,185	(0.83)	3.02	2.47	4.77	10.90	0.44	35.35	(22.20)	0.00	281	6,438	64.06	4.77
8 Earnings yield, forecast FY2 mean	Ascending	8,079	3.50	2.50	1.30	4.39	11.89	0.37	37.31	(31.50)	0.00	281	6,263	62.99	4.39
9 Cash flow yield, FY0	Ascending	6,863	1.05	0.91	0.58	4.07	6.42	0.63	26.42	(11.80)	0.00	157	4,915	75.16	4.07
10 Cash flow yield, FY1 mean	Ascending	5,810	5.08	0.51	(0.84)	2.04	9.76	0.21	31.42	(32.01)	0.00	213	4,455	58.22	2.04
11 Price/Sales	Descending	8,744	4.27	0.47	(0.39)	1.47	9.61	0.15	26.48	(31.59)	0.01	281	7,469	55.87	-1.47
12 Price/Book	Descending	8,911	(5.62)	(0.71)	(1.55)	1.20	10.52	0.11	31.56	(37.54)	0.06	281	7,516	56.94	-1.20
13 Est Book-to-price, median	Ascending	7,167	(4.41)	(0.32)	(2.30)	1.21	9.92	0.12	30.37	(26.29)	0.12	165	5,369	52.73	1.21
14 EBITDA to EV	Ascending	6,918	15.56	3.33	4.62	3.93	10.82	0.36	36.69	(26.20)	0.00	281	4,641	62.63	3.93
15 Sales/EV	Ascending	8,728	3.54	0.54	0.84	1.94	7.91	0.25	24.81	(20.06)	0.00	281	7,435	60.85	1.94
2. Growth															
16 IBES 5Y EPS growth	Ascending	8,230	1.75	0.26	1.89	1.12	6.16	0.18	19.09	(21.86)	0.00	281	6,188	59.07	1.12
17 EPS Growth	Ascending	8,353	(2.94)	2.01	1.19	2.07	6.88	0.30	29.72	(28.97)	0.00	265	6,862	63.77	2.07
18 IBES LTG EPS mean	Descending	5,087	(11.10)	(0.67)	0.10	1.33	12.18	0.11	28.22	(40.36)	0.07	281	4,157	52.67	-1.33
19 IBES FY1 mean EPS growth	Ascending	7,963	3.18	1.21	0.70	0.43	6.06	0.07	14.44	(20.10)	0.23	281	6,348	55.16	0.43
20 IBES FY1 mean CFPS growth	Descending	5,186	(2.18)	0.73	0.76	1.71	4.23	0.40	7.47	(11.39)	0.00	157	3,882	64.97	-1.71
21 IBES FY2 mean DPS growth	Ascending	7,536	(3.01)	1.66	0.55	2.53	11.02	0.23	38.85	(31.49)	0.00	223	5,049	59.64	2.53
22 Asset growth	Descending	8,704	5.95	1.61	1.26	0.60	8.54	0.07	21.57	(27.36)	0.24	281	7,259	51.96	-0.60
3. Price Momentum and Reversal															
23 Total return, 1D	Descending	9,754	4.35	1.46	2.89	3.59	7.43	0.48	21.94	(41.58)	0.00	281	8,105	70.82	-3.59
24 Weekly Total Return	Descending	9,753	(0.93)	0.11	3.21	2.95	8.75	0.34	30.60	(33.64)	0.00	281	8,103	64.41	-2.95
25 Total return, 21D (1M)	Ascending	9,750	(11.07)	0.98	0.66	0.12	11.50	0.01	27.69	(44.07)	0.86	281	8,098	53.02	0.12
26 Total return, 252D (12M)	Ascending	9,605	(11.65)	6.49	5.60	4.42	14.59	0.30	41.64	(46.50)	0.00	281	7,906	66.55	4.42
27 12M-1M total return	Ascending	9,605	(9.91)	6.75	6.07	5.05	14.05	0.36	40.96	(42.52)	0.00	281	7,906	68.68	5.05
28 Total return, 1260D (60M)	Ascending	8,568	(9.33)	0.68	2.64	1.46	14.13	0.10	40.32	(44.84)	0.08	281	6,397	58.36	1.46
4. Sentiment															
29 IBES LTG Mean EPS Revision, 1M	Ascending	5,067	1.61	0.62	0.63	0.67	2.58	0.26	7.26	(8.59)	0.00	281	4,119	62.99	0.67
30 IBES LTG Mean EPS Revision, 3M	Ascending	5,025	1.50	0.99	0.93	0.87	3.35	0.26	11.05	(10.26)	0.00	281	4,063	61.57	0.87
31 IBES FY1 EPS up/down ratio, 1M	Ascending	5,798	(0.93)	2.69	3.39	3.68	5.42	0.68	17.76	(13.76)	0.00	281	4,333	76.51	3.68
32 IBES FY1 EPS up/down ratio, 3M	Ascending	7,601	(2.49)	3.90	3.87	3.66	5.80	0.63	17.92	(12.36)	0.00	281	5,812	75.09	3.66
33 IBES FY1 Mean EPS Revision, 1M	Ascending	7,996	(0.59)	2.49	2.71	2.89	5.07	0.57	16.50	(12.79)	0.00	281	6,290	72.24	2.89
34 IBES FY1 Mean EPS Revision, 3M	Ascending	7,933	(3.44)	3.74	3.89	3.39	6.64	0.51	19.37	(20.12)	0.00	281	6,199	73.31	3.39
35 IBES FY1 Mean CFPS Revision, 3M	Ascending	5,541	(0.72)	2.55	2.68	2.52	5.55	0.45	15.81	(23.83)	0.00	203	4,279	77.34	2.52
36 IBES FY1 Mean DPS Revision, 1M	Ascending	5,966	(0.85)	2.20	2.94	1.76	4.39	0.40	12.65	(16.63)	0.00	222	4,316	71.62	1.76
37 IBES FY1 Mean DPS Revision, 3M	Ascending	5,962	(0.03)	3.23	3.73	2.19	5.87	0.37	19.08	(24.51)	0.00	220	4,256	72.27	2.19
38 IBES FY1 Mean FFO Revision, 1M	Ascending	7,263	(0.05)	3.34	3.47	2.25	4.04	0.56	11.73	(8.89)	0.00	149	3,992	77.18	2.25
39 IBES FY1 Mean FFO Revision, 3M	Ascending	7,105	(0.79)	4.95	4.61	2.86	5.75	0.50	16.27	(14.53)	0.00	146	3,899	73.97	2.86
40 IBES FY1 Mean ROE Revision, 1M	Ascending	7,982	(2.07)	1.80	1.93	1.77	4.08	0.43	13.70	(10.51)	0.00	201	5,330	69.65	1.77
41 IBES FY1 Mean ROE Revision, 3M	Ascending	7,906	(2.16)	2.34	2.34	2.18	5.00	0.44	13.57	(13.58)	0.00	199	5,199	69.35	2.18
42 Target price implied return	Descending	8,270	(12.59)	0.30	1.19	0.87	14.71	0.06	55.58	(36.25)	0.45	165	6,246	52.73	-0.87
43 Recommendation, mean	Descending	8,466	8.61	2.58	2.41	1.79	6.86	0.26	17.41	(16.84)	0.00	234	7,176	65.38	-1.79
44 Mean recommendation revision, 3M	Descending	8,439	(0.56)	1.11	1.43	1.89	2.92	0.65	10.01	(10.13)	0.00	231	7,154	75.32	-1.89
5. Quality															
45 Return on Equity	Ascending	8,652	1.50	2.87	3.81	4.25	10.18	0.42	30.68	(34.69)	0.00	233	7,655	66.52	4.25
46 return on capital	Ascending	8,372	0.32	2.06	3.53	4.48	12.34	0.36	49.47	(34.02)	0.00	281	6,942	64.77	4.48
47 Return on Assets	Ascending	8,833	15.17	3.07	4.73	4.74	13.29	0.36	44.20	(30.31)	0.00	281	7,042	63.70	4.74
48 Asset Turnover	Ascending	8,829	27.49	2.00	2.92	2.57	16.30	0.16	44.64	(51.55)	0.01	281	7,530	58.01	2.57
49 Gross margin	Ascending	8,062	1.71	1.28	2.15	1.83	5.84	0.31	16.60	(13.45)	0.00	281	6,846	62.99	1.83
50 EBITDA margin	Ascending	8,855	13.31	2.93	3.45	4.00	13.82	0.29	42.97	(41.30)	0.00	281	7,550	59.43	4.00
51 Berry Ratio	Ascending	6,497	(4.10)	1.25	1.34	2.92	9.30	0.31	29.57	(20.79)	0.00	281	5,288	59.79	2.92
52 IBES FY1 EPS dispersion	Descending	8,185	(2.77)	0.85	3.14	0.42	9.50	0.04	32.68	(25.37)	0.46	281	6,438	50.53	-0.42
53 IBES 5Y EPS growth/stability	Ascending	8,230	2.62	0.58	2.24	1.46	6.00	0.24	18.66	(20.47)	0.00	281	6,188	58.72	1.46
54 YoY change in debt outstanding	Descending	7,328	1.79	0.03	(0.04)	0.24	3.92	0.06	11.51	(11.34)	0.31	281	6,272	53.38	-0.24
55 Current ratio	Descending	7,259	(7.71)	1.08	0.87	0.64	8.94	0.07	27.86	(27.01)	0.23	281	6,137	49.82	-0.64
56 Long-term debt/equity	Ascending	8,742	(1.10)	3.85	1.42	0.81	6.47	0.13	22.37	(18.17)	0.04	281	7,443	54.80	0.81
57 Merton's distance to default	Ascending	7,474	2.83	0.43	3.74	2.60	11.17	0.23	31.19	(31.18)	0.00	281	6,448	59.79	2.60
58 Capex to Dep	Descending	6,417	11.03	3.35	2.02	1.45	6.43	0.23	22.38	(19.93)	0.00	281	5,110	61.21	-1.45
6. Technicals															
59 Realized vol, 1Y daily	Descending	9,614	(10.06)	2.98	5.10	5.10	15.38	0.33	29.45	(44.64)	0.00	281	7,914	61.21	-5.10
60 Skewness, 1Y daily	Descending	9,614	2.70	0.81	1.99	1.64	5.33	0.31	15.03	(32.98)	0.00	281	7,914	64.06	-1.64
61 Moving average crossover, 15W-36W	Ascending	9,334	(4.02)	3.07	1.41	2.96	14.61	0.20	37.15	(45.46)	0.00	281	6,900	62.28	2.96
62 Normalized abnormal volume	Ascending	9,735	(4.84)	2.98	2.59	2.24	6.57	0.34	20.47	(14.71)	0.00	281	7,865	60.50	2.24

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 LLP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Appendix 1

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Additional information available upon request

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