Quantitative Strategy

The Quant View

The Momentum Transition

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.

Momentum is rallying strongly
YTD momentum has been one of the best performing factors in the US, Europe, Japan, Canada, Australia, and New Zealand as well as emerging markets. So what is driving this outperformance in momentum?

The momentum style and industry drivers
We perform a detailed decomposition of momentum. We argue that momentum has experienced a style transition (i.e. The Momentum Transition) that has made it one of the best performing factors YTD.

The transition from defensive to cyclicals
We also analyze momentum's risk exposure to particular sectors which also sheds insight into why momentum has performed so strongly. Looking ahead, we decompose the return and risk exposure of the current momentum portfolio so that investors well aware of its inherent benefits and risks.

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Disentangling Momentum

Momentum has rallied

Since December 2012, twelve month price momentum[1] has been the one of the best performing strategies in the US market. It has outperformed most other quantitative factors YTD (Figure 1). Momentum (i.e. 12 minus 1 month momentum) buys stocks that have been outperforming over the last year, and sells those that have been underperforming (after subtracting the most recent month to avoid the reversal effect). Interestingly, momentum has also been one of the best performing factors YTD in Europe, Japan, Canada, Australia, and New Zealand as well as in Emerging Markets. The other factor which showed promise during the first quarter of the year was Low Volatility[2] (Figure 1). However, the Low Volatility factor took a sharp turn towards the end of April and has since suffered a steady decline in performance placing it in the bottom rung of US equity factor performance YTD.

Figure 1: Factor performance YTD for the Russell 1000 stock universe
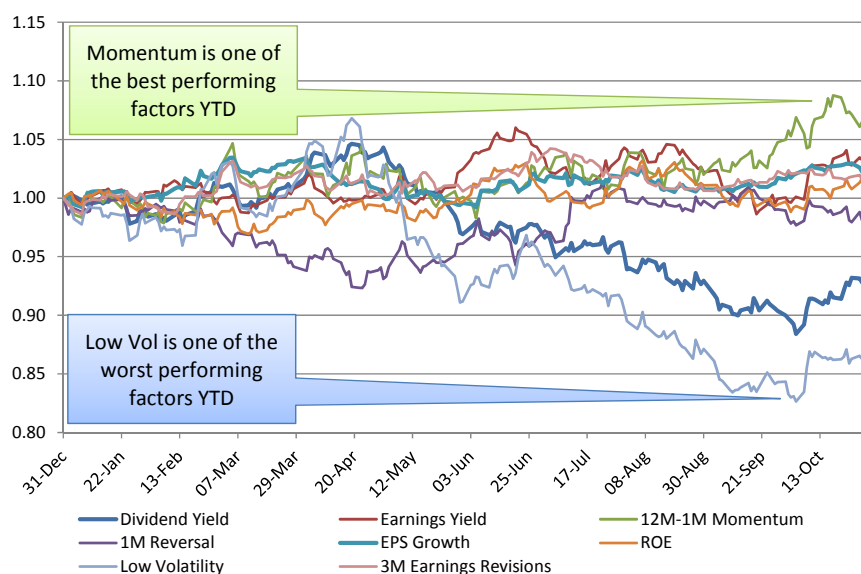
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

There are a multitude of reasons that attempt to explain the momentum anomaly including under/over reaction to news, biases, information diffusion etc. These explanations are primarily behavioral based. However, in previous research papers we have shown that momentum's performance can in part be explained by analyzing its exposure to various factors such as beta and volatility. Maybe analyzing momentum and low volatility in tandem can shed some light on why momentum has been one of the best performing factors globally. As such, in this month's edition of the Quant View, we perform a detailed decomposition of momentum. We argue that momentum has experienced a style and sector transition (i.e. The Momentum Transition) that has made it one of the best performing factors YTD. Looking ahead, we also analyze the return

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[1] Specifically, our Momentum factor is the 12-month price return minus the return over the most recent month to account for the short-term reversal effect across stocks.

[2] This factor captures the return spread between low and high volatility stocks across the Russell 1000.

and risk decomposition of current momentum strategies so that investment managers are well aware of its inherent benefits and risks.

What is fundamentally driving momentum's outperformance?

We start off by analyzing momentum's return exposure to low volatility (see blue line in Figure 2). Essentially, the exposure measures to what extent momentum is betting on low volatility. Interestingly, we see that momentum is taking a positive exposure or bet on low volatility up until the end of June. Thereafter, momentum took a negative exposure to low volatility (i.e. betting against low volatility). The point where momentum shifted its exposure to low volatility from positive to negative, we call the "Momentum Transition". This is a prescient shift from a positive to negative low volatility exposure because low volatility outperformed during the first half of the year and underperformed thereafter (see red line on Figure 2). So what is going on here?

During the beginning half of the year, low volatility stocks were outperforming quite strongly. Because momentum is essentially a trend chasing strategy, it gravitated towards low volatility stocks. Once the FED clarified their initial comments regarding tapering, low volatility stocks took a turn and underperformed during the latter half of the year. As such, momentum reverses and begins to pull back from low volatility stocks during the second half of the year. Analyzing momentum's exposure to low volatility does help explain why momentum has been on a rally this year. Analyzing momentum's risk exposure may also shed some additional insight.

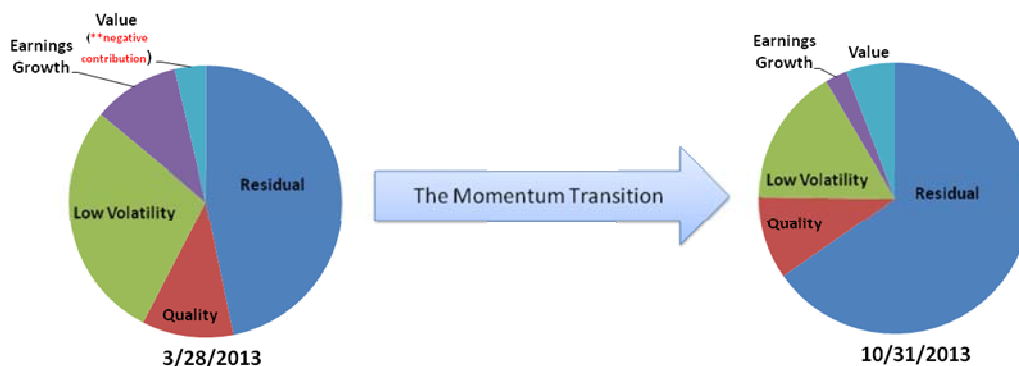Figure 2: The momentum transition away from low volatility
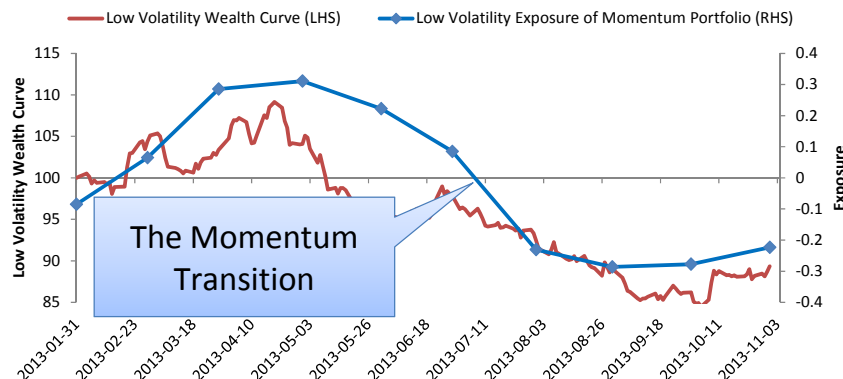
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 3 shows the risk exposure during the end of March and October of 2013 for momentum. In a nutshell, the risk exposure simply shows the fundamental style drivers of the momentum portfolio. Figure 3 shows that the risk inherent in momentum was dominated by various style factors such as such as value, earnings growth, and quality, etc. and less influenced by the residual component when compared to the same analysis at the end of October, 2013. The residual component can be considered the *pure* trending component of momentum after accounting for the trend implicit in other style factors. By the end of October 2013, the risk exposure has transitioned significantly. Momentum's risk exposure is now commanded less by style factors and more so by the residual component.

Figure 3: The momentum transition away from fundamental factors

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

This means that in the past, the risk inherent in momentum was being driven more by style exposure, which can be problematic for investors. As we discussed in several past research pieces, styles are susceptible to investor crowding and overbuying. As a style gains momentum and becomes increasingly crowded, investors face the risk of a massive unwinding. This is especially true in cases when the underlying style factor portfolio does not change significantly over time – i.e. those with slow turnover such as Low Volatility. The good news for momentum investors this time around is that it seems to be less influenced by style factors and driven more by the residual component or the pure trending aspect of momentum. This is promising since it suggests that the risk inherent in momentum is less guided by styles and more influenced by pure stock trending. Analyzing momentum's exposure to particular sectors may also shed some new insight.

The defensive to cyclical transition

In this section, we change gears slightly and analyze momentum's return exposure to defensive versus cyclical sectors. We define defensive sectors as utilities, health care, telecommunication, and consumer staples. We group all other sectors into our cyclical classification. Figure 4 shows momentum's exposure to defensive versus cyclical stocks. Interestingly, we see that momentum is positively exposed to defensive stocks in the first half of the year. Towards the end of May, momentum then gravitated towards more cyclical stocks. Again, we call this inflection point the "Momentum Transition". Not only do we see momentum's exposure shift from defensive to cyclical stocks, but we also observe that the spread between the defensive and cyclical exposure is shrinking. A risk contribution analysis similar to that in Figure 3 shows that sector exposure is contributing less to risk and return while residual is contributing more today relative to the beginning part of the year. This again provides further compelling analysis that momentum is being less dominated by sector and style effects and guided by *pure* trending.

Figure 4: The cyclical-defensive spread has flipped
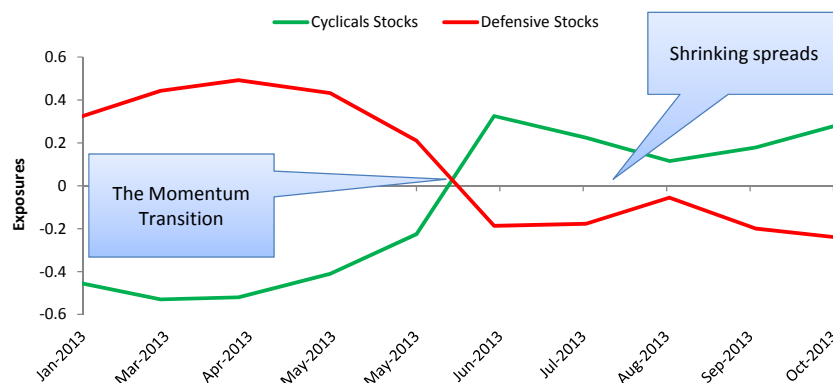
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Looking ahead, what investors need to know about momentum?

In its pursuit to capture the latest trend, we have seen that Momentum exposure can experience sharp transitions across styles and sectors and it will continuously gravitate towards those sources of return that are driving the trend. With this in mind, keeping an eye on Momentum's exposures and risk contributions to styles and sectors is essential to identify the likelihood of concentration or crowding risks underlying the factor. Two important scenarios to watch out for are:

- High levels of risk and return contribution from styles with low turnover (e.g. Low Volatility, Dividend Yield, Quality).

- Significant transitions across styles and sector exposure and risk contribution.

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 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.

Our Variance Risk Premium (VRP) indicator is a contrarian indicator that measures market overreaction and underreaction to realized risk. Today our VRP indicator is reading 5.7, compared to a long-term average of 14.3. Its lower compare with last month's reading, suggesting a slightly negative position. Generally we pay attention to the VRP when it hits extreme levels (like +/- 2 standard deviations).

Figure 5: Variance Risk Premium (VRP)
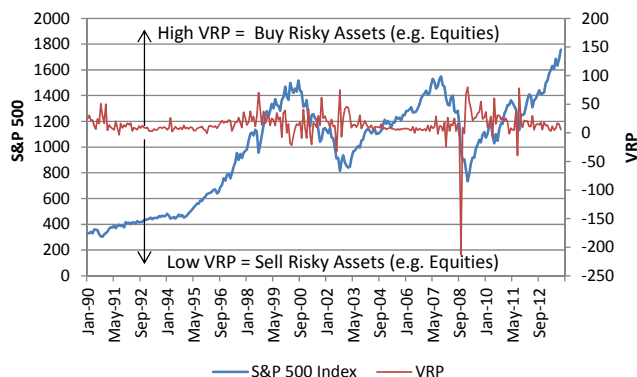
Source: Deutsche Bank

Figure 6: Recent VRP (lagged) and market returns
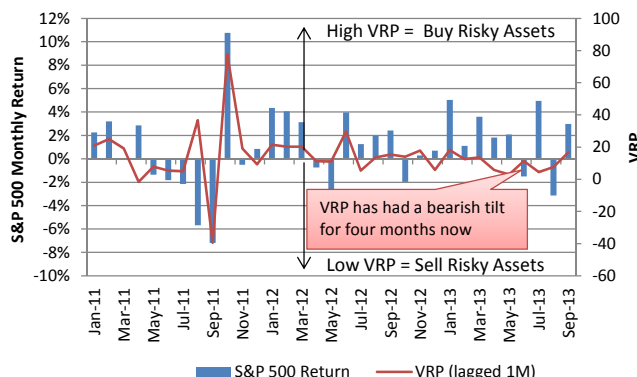
Source: Deutsche Bank

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 7 we show the opportunity set for global equity investors, and in Figure 8 we show the same thing for emerging market equity investors.
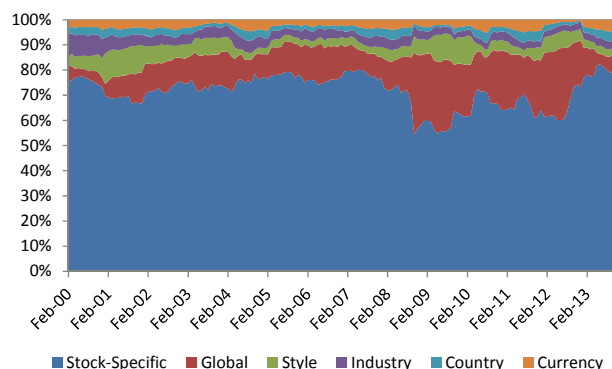
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank
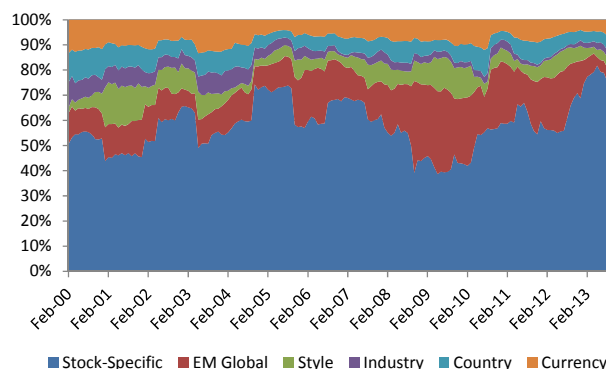
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

The key result is the size of the blue portion relative to the other colors. The blue 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.
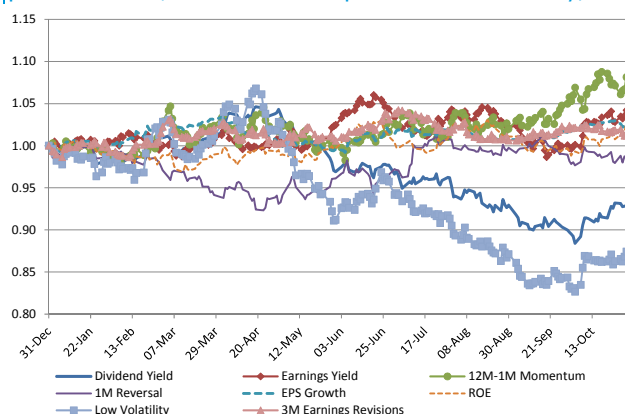
The DB Quant Dashboard

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.

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 9: United States: YTD cumulative factor performance (Q10-Q1 return spread, local currency)	Figure 10: Canada: YTD cumulative factor performance (Q10-Q1 return spread, local currency)
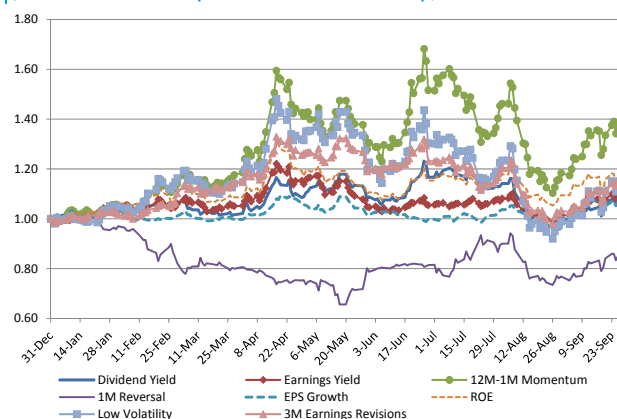
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

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

Figure 11: United Kingdom: YTD cumulative factor performance (Q10-Q1 return spread, local currency)

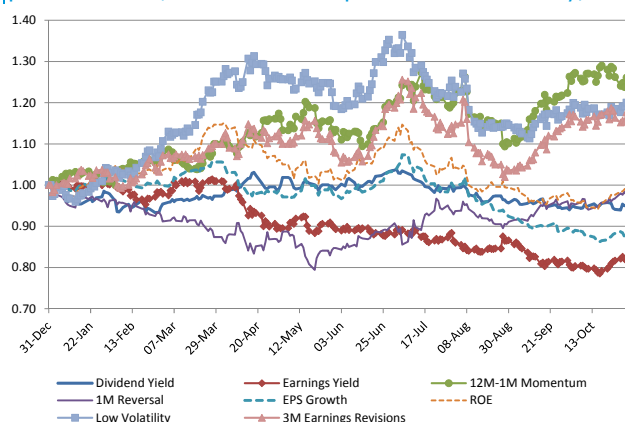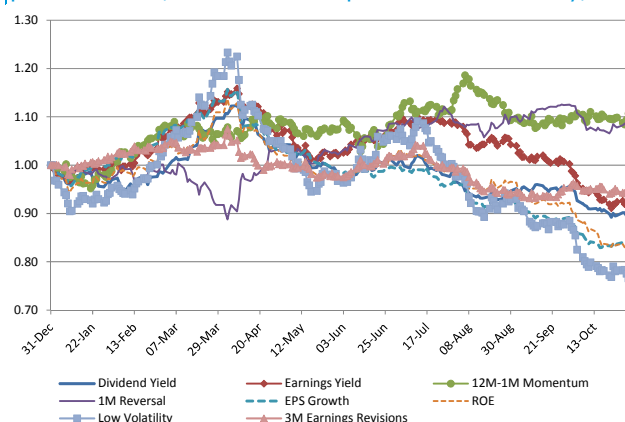Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

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

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

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

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

Figure 14: Asia ex Japan: YTD cumulative factor performance (Q10-Q1 return spread, local currency)

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

Figure 15: Australia/New Zealand: YTD cumulative factor performance (Q10-Q1 return spread, local currency)

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

Figure 16: Emerging Markets: YTD cumulative factor performance (Q10-Q1 return spread, local currency)
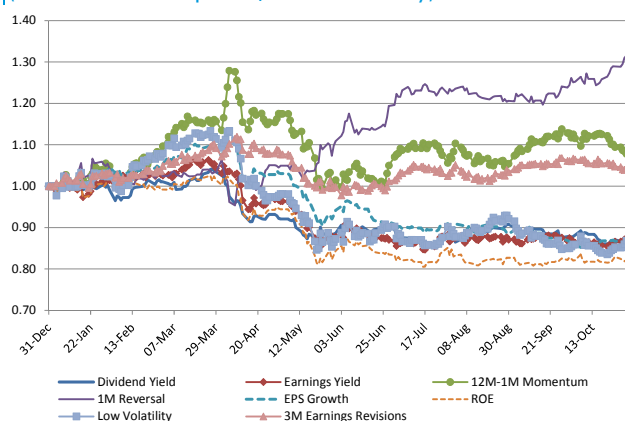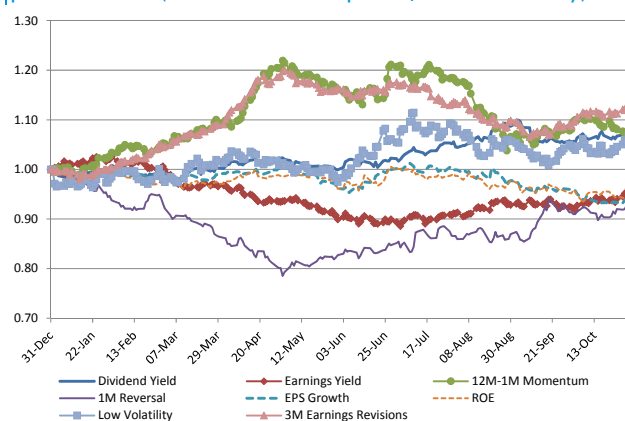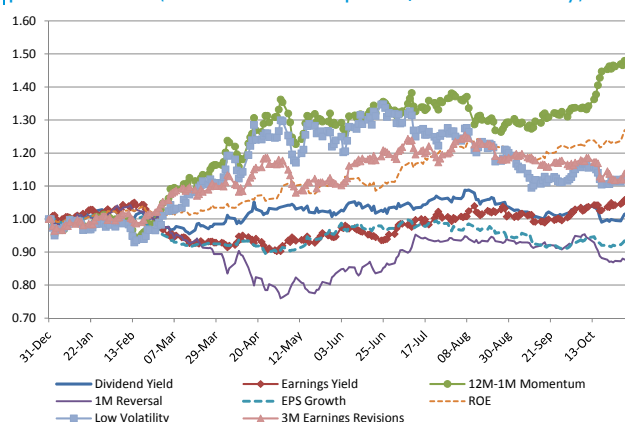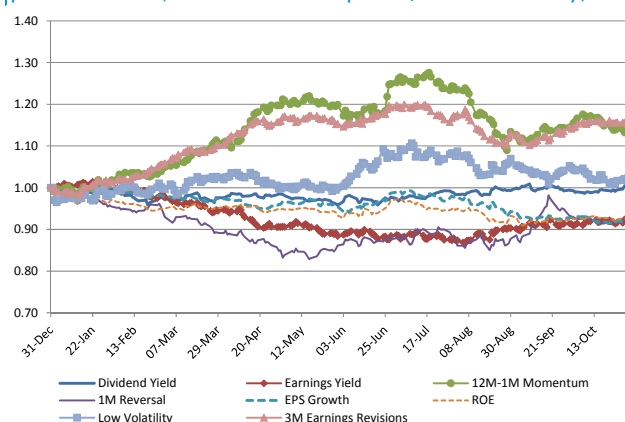

Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

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 17 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 17: Current QCD model stock recommendations

BEST BUY IDEAS (SECTOR NEUTRAL)					BEST SELL IDEAS (SECTOR NEUTRAL)				
Ticker	Name	CUSIP	GICS Sector	QCD Score (higher is better long)	Ticker	Name	CUSIP	GICS Sector	QCD Score (lower is better short)
LEA	LEAR CORP	521865204	Consumer Discretionary	25.7%	EOX	EMERALD OIL INC	29101U209	Energy	-14.0%
VC	VISTEON CORP	92839U206	Consumer Discretionary	24.1%	OMER	OMEROS CORP	682143102	Health Care	-12.4%
ANDE	ANDERSONS INC	034164103	Consumer Staples	21.3%	CLDX	CELLDEX THERAPEUTICS INC	15117B103	Health Care	-12.4%
AHL	ASPEN INSURANCE HOLDINGS LTD	G05384105	Financials	20.9%	UTL	UNITIL CORP	913259107	Utilities	-12.4%
SIGI	SELECTIVE INS GROUP INC	816300107	Financials	20.9%	CUBI	CUSTOMERS BANCORP INC	23204G100	Financials	-12.3%
LHCG	LHC GROUP INC	50187A107	Health Care	20.4%	AT	ATLANTIC POWER CORP	04878Q863	Utilities	-12.2%
NSR	NEUSTAR INC	64126X201	Information Technology	20.2%	MTG	MGIC INVESTMENT CORP/WI	552848103	Financials	-11.0%
AET	AETNA INC	00817Y108	Health Care	19.5%	MOSY	MOSYS INC	619718109	Information Technology	-10.6%
TIVO	TIVO INC	888706108	Information Technology	18.9%	RBCN	RUBICON TECHNOLOGY INC	78112T107	Information Technology	-10.3%
ABM	ABM INDUSTRIES INC	000957100	Industrials	17.8%	CECO	CAREER EDUCATION CORP	141665109	Consumer Discretionary	-9.6%
HLF	HERBALIFE LTD	G4412G101	Consumer Staples	17.8%	AMRS	AMYRIS INC	03236M101	Energy	-9.4%
AEGN	AEGION CORP	00770F104	Industrials	17.8%	JCP	PENNEY (J C) CO	708160106	Consumer Discretionary	-8.7%
ZEUS	OLYMPIC STEEL INC	68162K106	Materials	14.6%	MCP	MOLYCORP INC	608753109	Materials	-8.7%
NTLS	NTELOS HOLDINGS CORP	67020Q305	Telecommunication Services	13.3%	ACFN	ACORN ENERGY INC	004848107	Industrials	-8.3%
HCOM	HAWAIIAN TELCOM HOLDCO INC	420031106	Telecommunication Services	12.9%	TWER	TOWERSTREAM CORP	892000100	Telecommunication Services	-7.2%
SLGN	SILGAN HOLDINGS INC	827048109	Materials	12.9%	RGLD	ROYAL GOLD INC	780287108	Materials	-6.1%
WNR	WESTERN REFINING INC	959319104	Energy	12.3%	YRCW	YRC WORLDWIDE INC	984249607	Industrials	-4.7%
INT	WORLD FUEL SERVICES CORP	981475106	Energy	12.0%	NIHD	NII HOLDINGS INC	62913F201	Telecommunication Services	-4.7%
BKH	BLACK HILLS CORP	092113109	Utilities	3.2%	BNNY	ANNIE'S INC	03600T104	Consumer Staples	-2.3%
NVE	NV ENERGY INC	67073Y106	Utilities	2.5%	STSI	STAR SCIENTIFIC INC	85517P101	Consumer Staples	-2.2%

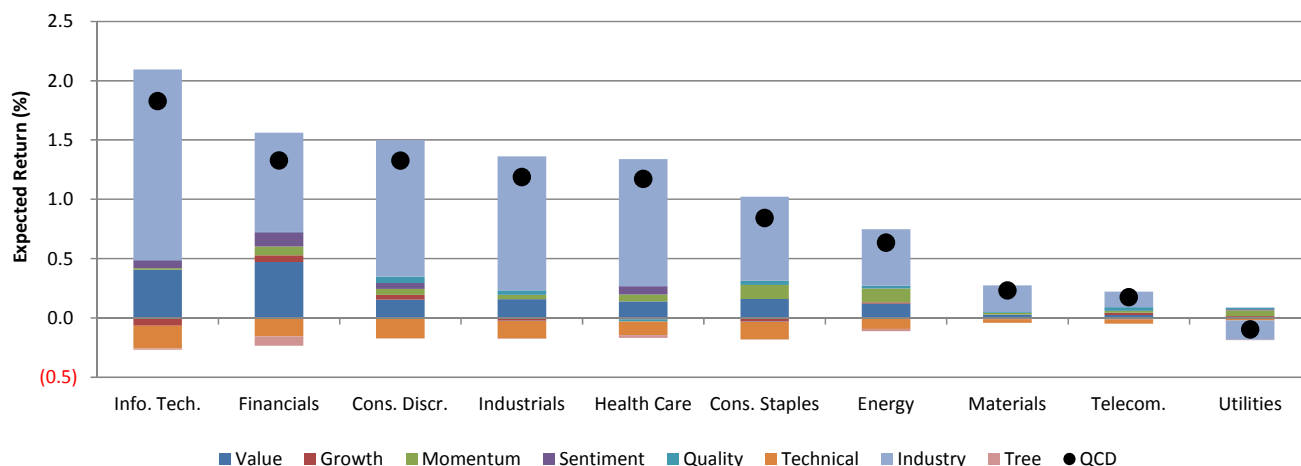*Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank*

Current sector recommendations

The QCD model also implicitly makes sector predictions. Figure 18 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 18: Current QCD sector recommendations

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

Model performance

The QCD model has performed well since inception. Figure 19 shows the pure signal performance, measured as a monthly sector-neutral rank information coefficient (IC). Figure 20 shows the performance of an actual model portfolio, after costs, based on a realistically optimized market-neutral strategy.

Figure 19: Model performance, sector-neutral rank IC
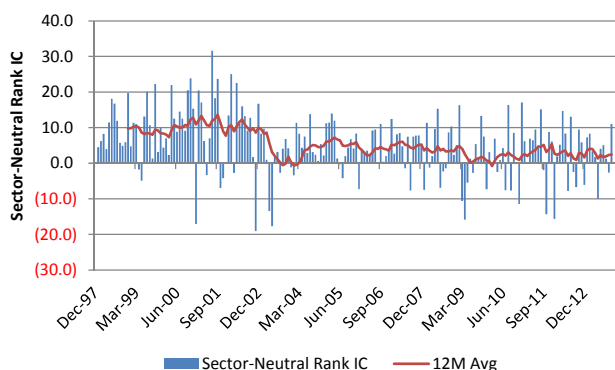
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 20: Model portfolio active return, after costs
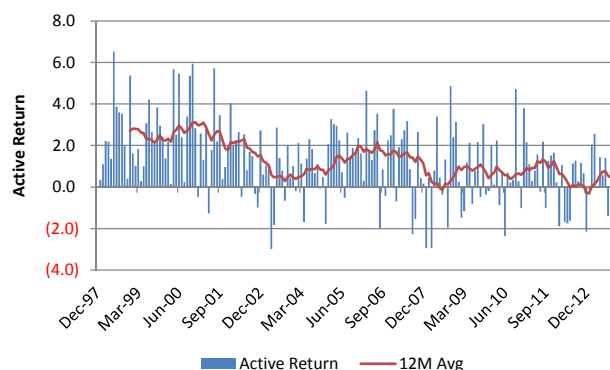
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 21 shows the cumulative performance of the optimized strategy, and Figure 22 shows the annualized Sharpe ratio (after costs) by calendar year.

Figure 21: Model portfolio cumulative, after costs

Figure 22: Annualized Sharpe ratio, after costs
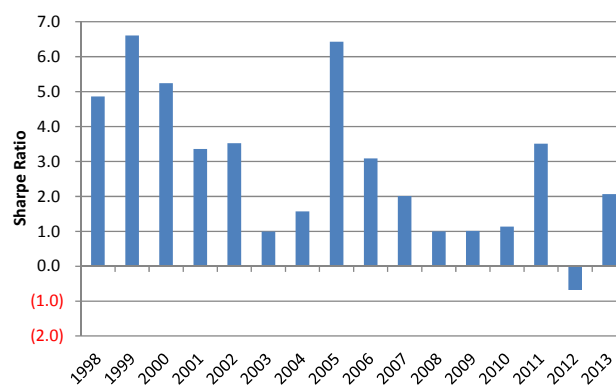
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Source: Bloomberg Finance LP, 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 23 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 23: Current N-LASR model stock recommendations

| BEST BUY IDEAS				N-LASR Score (higher is better long)	BEST SELL IDEAS				N-LASR Score (lower is better short)
Ticker	Name	SEDOL	County		Ticker	Name	SEDOL	County	
CYRE3 BS	Cyrela Brazil Realty S.A.	218985	Brazil	2.66	LLXL3 BS	LLX Logistica S.A.	B3BXMS	Brazil	-2.87
TEL	TE CONNECTIVITY LTD	B62B7C3	USA	2.50	ACHN	ACHILLION PHARMACEUTICALS	B17T9T8	USA	-2.84
TWX	TIME WARNER INC	B63QTN2	USA	2.45	TRQ.	TURQUOISE HILL RESOURCES LTD	B7WJ1F5	Canada	-2.76
CR	CRANE CO	2231897	USA	2.42	GMO	GENERAL MOLY INC	B01S2H3	USA	-2.49
ERICB SS	Ericsson L.M. Telefonaktie B	595937	Sweden	2.41	ALK AU	Alkane Resources Limited	601402	Australia	-2.47
2393 TT	Everlight Electronics Co Ltd	609492	Taiwan	2.37	IMI	INTERMOLECULAR INC	B5ZTLC5	USA	-2.41
WIN GY	Wincor Nixdorf AG	B012VF	Germany	2.33	INFI	INFINITY PHARMACEUTICALS INC	B1FCQS7	USA	-2.39
242 HK	Shun Tak Holdings Ltd.	680663	Hong Kong	2.29	4813 JT	Access Co Ltd	632430	Japan	-2.38
200581 CH	Weifu High-Technology Group Co Ltd B HKD	694495	China	2.26	OFM TB	OfficeMate PCL	B43D46	Thailand	-2.37
CW	CURTISS-WRIGHT CORP	2241205	USA	2.26	CNDO	CORONADO BIOSCIENCES INC	B6YRT78	USA	-2.36
LOW	LOWE'S COMPANIES INC	2536763	USA	2.24	SPPI	SPECTRUM PHARMACEUTICALS INC	2982924	USA	-2.31
TRELB SS	Trelleborg AB B	490238	Sweden	2.23	ARQL	ARQULE INC	2053994	USA	-2.31
IGT	INTL GAME TECHNOLOGY	2464972	USA	2.22	CORT	CORCEPT THERAPEUTICS INC	B00SCY1	USA	-2.30
L.	LOBLAW COMPANIES LTD	2521800	Canada	2.22	AB1 GY	Air Berlin	B128C0	Germany	-2.29
CNQ.	CANADIAN NATURAL RESOURCES	2171573	Canada	2.21	HOMEX* MM	Desarrolladora Homex SA De CV	B01RQ2	Mexico	-2.28
AZJ AU	Aurizon Holdings Limited	B87CVM	Australia	2.21	MAS MK	Malaysian Airline System Bhd	655668	Malaysia	-2.27
HCA	HCA HOLDINGS INC	B4MGBG6	USA	2.19	1101 HK	China Rongsheng Heavy Industry G	B5NSWF	China	-2.26
STE	STERIS CORP	2845113	USA	2.19	BLOOM PM	Bloomberry Resorts Corp.	B7RLFB	Philippines	-2.25
EDP PL	Electricidade de Portugal SA	410359	Portugal	2.18	HRTP3 BS	HRT Participacoes em Petroleo S.A.	B4LW4N	Brazil	-2.25
F	FORD MOTOR CO	2615468	USA	2.17	ODHN SW	Orascom Development Holdings A(	B2R90D	Switzerland	-2.24

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

Model performance

The N-LASR model has performed well since inception. Figure 24 shows the average pure signal performance, measured as a monthly rank information coefficient (IC), in different regions. Figure 25 shows the performance of a global model portfolio, after costs, based on a realistically optimized market-neutral strategy.

Figure 24: Regional model performance, average rank IC

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

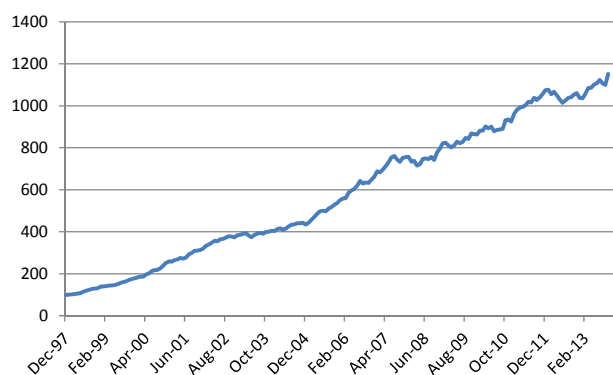### Figure 25: Global portfolio active return, after costs

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

Figure 26 shows the cumulative performance of the optimized strategy, and Figure 27
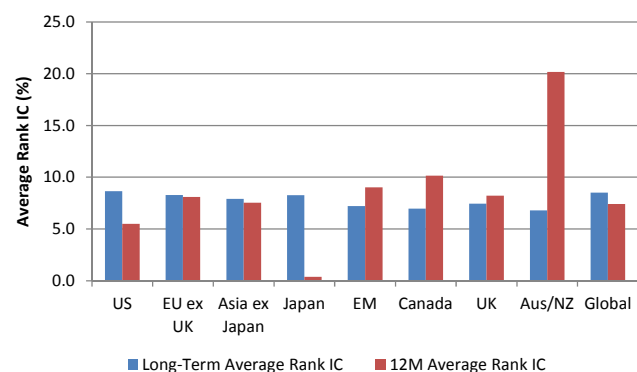shows the annualized Sharpe ratio (after costs) by calendar year.

Figure 26: Global portfolio cumulative, after costs

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

Figure 27: 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

Figure 28 and Figure 29 show the top and bottom third of countries, as ranked currently by our CCRM model. The bars show what is driving these calls.

Figure 28: Top tercile countries
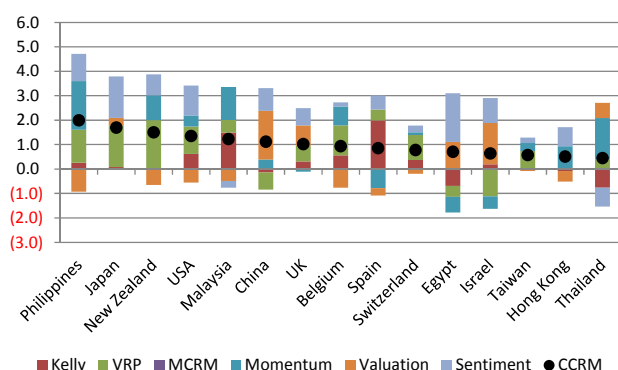
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 29: Bottom tercile countries
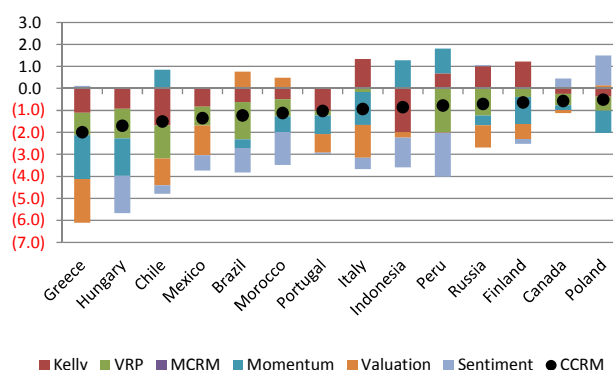
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Model performance

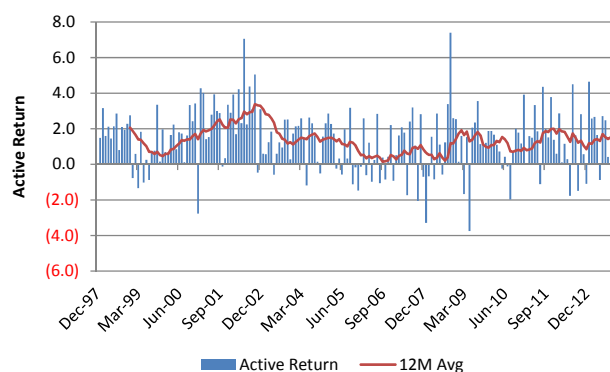Figure 30 and Figure 31 show the performance of the model over time.

Figure 30: Monthly returns

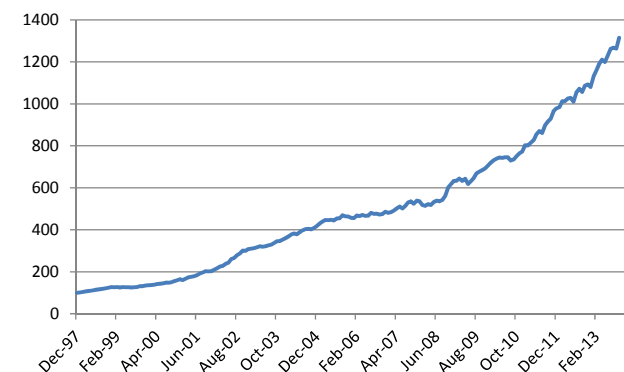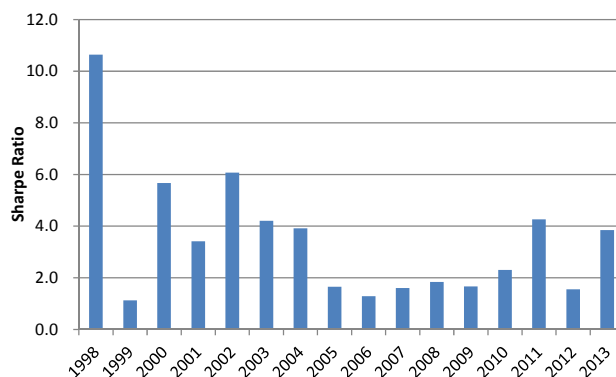Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 31: Cumulative performance

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

Figure 32 shows the current ranking of our six asset classes, ranked from best to worse in terms of month-ahead forecast returns. Figure 33 shows the monthly performance of the QTAA model over time.

Figure 32: Current QTAA forecasts
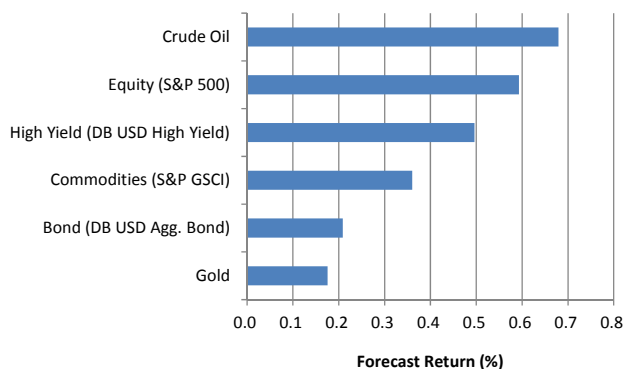
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 33: Performance of QTAA model
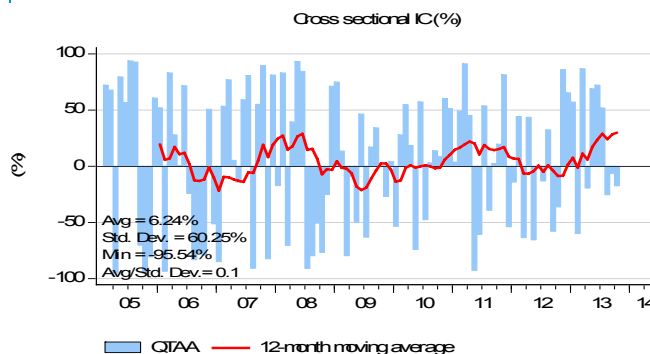
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

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 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 34 shows the current ranking of our 12 factors, ranked from best to worse in terms of month-ahead forecast performance. Figure 35 shows the monthly performance of the Style Rotation model over time.

Figure 34: Current style rotation forecasts

Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank
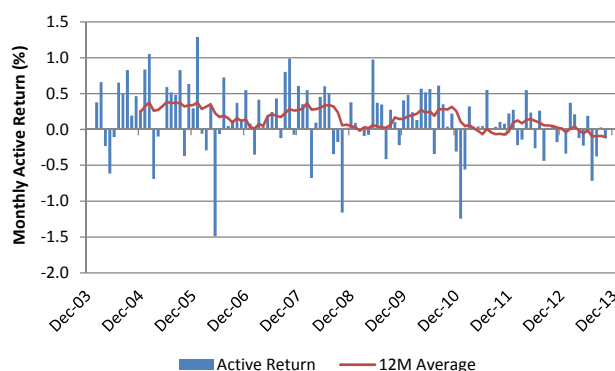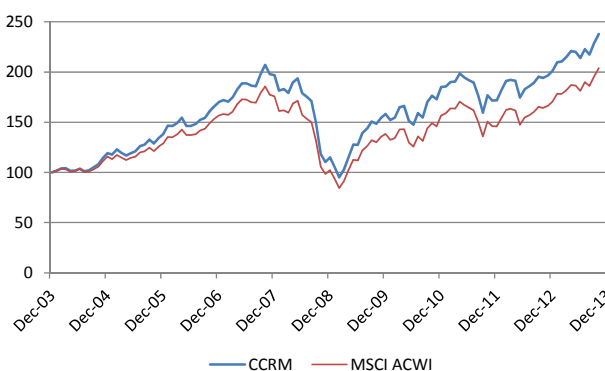
Figure 35: Performance of style rotation model
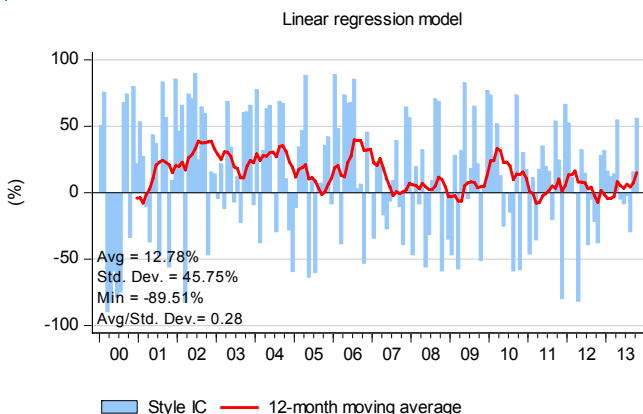
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Appendix A: Factor performance

Figure 36: US factor performance, measured as rank IC (Russell 3000 universe)

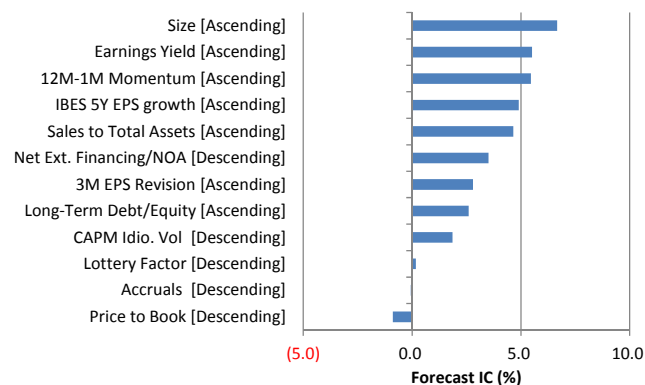| Factor Name	Direction[1]	Current # of Stocks	Average IC (%) Last M	12M Avg	3Y Avg	Avg	Std Dev	Avg / Std Dev	Max	Min	p-value[2]	# of Months	Avg # of Stocks	Hit Rate (%)	Serial Corr (%)[3]
1. Value															
1 Dividend yield, trailing 12M	Ascending	3,015	16.12	(1.65)	1.81	2.87	14.39	0.20	42.59	(33.26)	0.00	310	2,874	54.84	99.24
2 Expected dividend yield	Ascending	3,015	16.16	(1.36)	2.04	3.13	14.92	0.21	44.46	(33.89)	0.00	310	2,874	54.19	99.31
3 Price-to-operating EPS, trailing 12M, Basic	Descending	2,335	3.67	3.12	1.32	2.80	10.33	0.27	30.82	(32.28)	0.00	234	2,354	59.83	95.26
4 Operating earnings yield, trailing 12M, Basic	Ascending	2,947	13.09	4.36	4.05	4.88	12.92	0.38	47.24	(33.30)	0.00	234	2,873	62.39	96.46
5 Earnings yield, forecast FY1 mean	Ascending	2,786	12.51	4.32	3.37	4.42	12.28	0.36	48.88	(34.61)	0.00	310	2,540	62.90	95.00
6 Earnings yield, forecast FY2 mean	Ascending	2,779	11.13	4.77	2.64	3.89	11.88	0.33	47.02	(34.31)	0.00	310	2,441	63.55	94.39
7 Earnings yield x IBES 5Y growth	Ascending	1,622	(2.06)	4.80	1.84	1.84	10.41	0.18	41.11	(26.63)	0.01	234	1,922	58.97	93.49
8 Sector-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,947	10.89	4.11	3.61	4.34	8.30	0.52	28.96	(14.90)	0.00	234	2,871	69.23	96.04
9 Hist-rel Operating earnings yield, trailing 12M, Basic	Ascending	2,587	(2.29)	(0.53)	0.12	1.54	6.85	0.22	20.73	(18.74)	0.01	140	2,023	60.71	96.90
10 Operating cash flow yield (income stmt def)	Ascending	3,015	14.61	4.40	3.20	4.12	10.82	0.38	47.14	(32.67)	0.00	310	2,874	65.16	96.05
11 Cash flow yield, FY1 mean	Ascending	1,620	17.63	3.89	1.02	2.79	17.50	0.16	66.06	(54.29)	0.01	280	768	58.57	95.76
12 Free cash flow yield	Ascending	2,869	8.13	5.29	4.19	4.91	7.86	0.63	31.93	(22.64)	0.00	273	2,514	75.46	94.67
13 Price-to-sales, trailing 12M	Descending	2,918	6.57	5.23	1.74	1.85	10.90	0.17	30.02	(41.46)	0.00	310	2,799	56.77	99.12
14 Price-to-book	Descending	2,883	7.20	(0.73)	(0.56)	0.79	10.64	0.07	26.28	(35.75)	0.19	310	2,764	49.03	97.66
15 EBITDA/EV	Ascending	2,972	14.84	3.82	2.75	4.18	9.66	0.43	39.32	(27.15)	0.00	310	2,820	68.06	95.57
16 Price-to-book adj for ROE, sector adj	Descending	2,661	2.13	1.59	(0.42)	0.47	8.69	0.05	22.50	(33.21)	0.35	310	2,435	49.35	95.63
2. Growth															
17 Hist 5Y operating EPS growth	Descending	2,874	7.21	1.65	2.29	1.09	8.64	0.13	30.58	(22.70)	0.06	222	2,734	53.15	97.28
18 Hist 5Y operating EPS acceleration	Ascending	2,874	2.47	2.03	0.76	0.83	6.62	0.13	25.31	(16.13)	0.06	222	2,734	54.50	94.78
19 IBES 5Y EPS growth	Ascending	2,444	0.69	1.76	1.84	0.95	8.08	0.12	21.65	(27.86)	0.04	310	2,299	54.52	98.29
20 IBES 5Y EPS growth/stability	Ascending	2,444	1.47	2.16	2.09	1.38	7.69	0.18	20.64	(19.20)	0.00	310	2,298	57.10	98.63
21 IBES LTG EPS mean	Descending	1,862	8.66	(3.20)	(0.94)	1.61	15.78	0.10	37.64	(52.38)	0.07	310	2,149	49.35	97.74
22 IBES FY2 mean DPS growth	Ascending	2,181	13.81	(0.19)	1.35	0.91	8.55	0.11	24.12	(21.96)	0.22	137	1,502	50.36	87.94
23 IBES FY1 mean EPS growth	Ascending	2,726	3.43	1.74	1.93	1.08	7.46	0.14	20.76	(24.42)	0.01	310	2,519	61.61	88.85
24 Year-over-year quarterly EPS growth	Ascending	2,992	7.23	2.23	3.22	2.54	7.00	0.36	23.85	(21.12)	0.00	234	2,877	66.67	81.64
25 IBES FY1 mean CFPS growth	Descending	1,450	3.09	(3.91)	(1.27)	0.36	11.13	0.03	38.08	(42.07)	0.62	237	537	50.21	92.75
26 IBES SUE, amortized	Ascending	2,636	3.57	1.72	1.72	0.83	6.46	0.13	20.62	(16.30)	0.04	249	1,105	54.62	74.09
3. Price Momentum and Reversal															
27 Total return, 1D	Descending	3,015	1.48	2.81	2.54	4.97	7.17	0.69	15.52	(33.75)	0.00	310	2,874	77.74	1.59
28 Total return, 21D (1M)	Descending	3,014	(0.93)	0.62	0.35	1.84	10.87	0.17	29.03	(43.69)	0.00	310	2,874	58.06	0.46
29 Maximum daily return in last 1M (lottery factor)	Descending	3,011	12.50	0.64	3.26	5.07	14.89	0.34	39.13	(56.07)	0.00	310	2,747	64.19	54.18
30 21D volatility of volume/price	Descending	3,015	10.43	1.91	1.96	0.27	6.58	0.04	24.16	(16.78)	0.47	310	2,864	51.29	56.31
31 Total return, 252D (12M)	Ascending	2,876	2.34	1.98	3.05	3.26	14.03	0.23	39.62	(57.00)	0.00	310	2,792	64.84	89.95
32 12M-1M total return	Ascending	2,876	1.83	2.18	3.38	4.10	13.14	0.31	37.65	(49.06)	0.00	310	2,792	65.48	88.46
33 Price-to-52 week high	Ascending	2,878	5.69	0.69	3.49	3.17	17.69	0.18	49.63	(62.50)	0.00	310	1,952	62.26	83.22
34 Total return, 1260D (60M)	Ascending	2,506	(2.91)	(0.42)	1.83	1.15	10.92	0.11	25.63	(35.41)	0.07	298	2,237	56.71	97.46
4. Sentiment															
35 IBES LTG Mean EPS Revision, 3M	Ascending	1,856	0.91	0.12	0.99	0.86	3.74	0.23	11.16	(12.06)	0.00	310	2,121	61.94	59.76
36 IBES FY1 Mean EPS Revision, 3M	Ascending	2,747	2.51	(0.08)	1.82	2.91	8.41	0.35	29.96	(33.00)	0.00	310	2,479	66.77	75.34
37 IBES FY1 EPS up/down ratio, 3M	Ascending	2,723	3.76	0.18	1.93	3.08	7.83	0.39	27.54	(24.41)	0.00	310	2,343	67.74	79.58
38 Expectation gap, short-term - long-term	Descending	2,171	2.43	1.11	1.42	1.19	5.19	0.23	9.60	(19.91)	0.00	310	2,124	57.74	91.14
39 IBES FY1 Mean CFPS Revision, 3M	Ascending	1,532	3.29	1.55	1.89	2.02	15.89	0.13	69.38	(75.04)	0.03	279	700	62.37	64.50
40 IBES FY1 Mean SAL Revision, 3M	Ascending	2,721	3.98	0.67	1.97	1.11	7.81	0.14	27.43	(24.32)	0.04	209	2,177	60.29	71.60
41 IBES FY1 Mean FFO Revision, 3M	Ascending	144	(3.01)	(0.75)	2.50	2.85	20.96	0.14	71.43	(80.00)	0.02	282	84	57.45	69.55
42 IBES FY1 Mean DPS Revision, 3M	Ascending	1,276	0.34	2.60	1.60	0.79	5.19	0.15	14.91	(17.55)	0.08	134	1,004	58.96	62.65
43 IBES FY1 Mean ROE Revision, 3M	Ascending	2,173	3.01	(0.19)	0.82	0.70	6.56	0.11	23.70	(22.19)	0.22	134	1,722	59.70	66.29
44 Recommendation, mean	Descending	2,803	(4.04)	2.83	1.93	0.85	7.52	0.11	21.85	(19.41)	0.08	239	2,678	56.90	94.41
45 Mean recommendation revision, 3M	Descending	2,801	1.18	(0.07)	0.45	1.22	4.07	0.30	19.86	(11.55)	0.00	236	2,665	63.14	59.96
46 Target price implied return	Ascending	2,747	(0.95)	2.43	(0.01)	0.09	16.69	0.01	60.74	(39.59)	0.94	175	2,465	53.14	80.01
47 Mean target price revision, 3M	Ascending	2,744	0.32	1.18	1.98	2.40	12.57	0.19	30.14	(41.94)	0.01	172	2,451	63.37	75.03
5. Quality															
48 ROE, trailing 12M	Ascending	2,844	12.14	3.54	3.40	3.91	10.02	0.39	33.42	(29.52)	0.00	234	2,863	64.96	96.50
49 Return on invested capital (ROIC)	Ascending	2,936	11.85	3.56	3.75	4.24	10.18	0.42	33.02	(31.24)	0.00	234	2,856	69.23	98.22
50 Sales to total assets (asset turnover)	Ascending	2,911	(0.61)	4.67	2.09	1.64	8.66	0.19	22.78	(22.02)	0.00	310	2,814	56.13	99.46
51 Operating profit margin	Ascending	2,906	0.01	(1.42)	0.46	1.19	5.46	0.22	16.98	(14.17)	0.00	310	2,719	59.68	98.45
52 Current ratio	Descending	2,312	12.11	1.34	1.33	1.85	10.18	0.18	31.95	(38.66)	0.00	310	2,239	54.19	97.92
53 Long-term debt/equity	Ascending	2,870	11.11	1.57	1.98	0.81	9.58	0.08	35.65	(28.14)	0.14	310	2,748	48.39	98.52
54 Altman's z-score	Ascending	2,227	(4.53)	0.55	1.67	0.32	9.15	0.04	31.74	(30.44)	0.53	310	2,159	49.35	98.35
55 Merton's distance to default	Ascending	2,478	3.45	0.40	2.68	3.33	11.73	0.28	33.03	(41.45)	0.00	310	2,337	65.81	95.05
56 Ohlson default model	Descending	2,241	7.02	0.43	1.67	2.33	6.33	0.37	16.95	(18.63)	0.00	273	2,126	68.50	98.30
57 Accruals (Sloan 1996 def)	Descending	2,204	0.47	(0.33)	(0.22)	0.53	4.16	0.13	12.07	(15.48)	0.02	310	2,139	55.16	88.57
58 Firm-specific discretionary accruals	Descending	1,595	5.28	(0.01)	0.02	0.51	3.21	0.16	7.82	(10.87)	0.01	250	2,116	56.00	79.44
59 Hist 5Y operating EPS stability, coef of determination	Ascending	2,874	(1.07)	1.64	0.73	0.85	5.00	0.17	20.01	(12.27)	0.01	222	2,734	52.70	96.91
60 IBES 5Y EPS stability	Descending	2,444	(0.34)	0.28	1.36	1.19	8.58	0.14	25.00	(34.33)	0.02	310	2,299	53.87	96.06
61 IBES FY1 EPS dispersion	Descending	2,786	(3.72)	1.07	2.89	1.58	9.05	0.17	31.67	(25.17)	0.00	310	2,540	60.32	84.24
62 Payout on trailing operating EPS	Ascending	2,231	12.23	(4.58)	(0.39)	0.71	13.49	0.05	38.55	(30.91)	0.35	310	2,211	49.35	99.23
63 YoY change in # of shares outstanding	Descending	2,898	10.57	3.22	3.16	2.63	8.84	0.30	19.53	(46.21)	0.00	310	2,770	60.97	94.32
64 YoY change in debt outstanding	Descending	2,195	(5.56)	(1.24)	(0.32)	0.24	4.08	0.06	10.40	(10.40)	0.30	310	2,220	55.48	89.55
65 Net external financing/net operating assets	Ascending	2,995	11.79	2.77	2.84	2.48	8.42	0.30	44.61	(21.76)	0.00	310	2,837	61.61	94.71
66 Piotroski's F-score	Ascending	3,015	10.69	4.57	3.18	2.95	8.06	0.37	29.20	(27.83)	0.00	310	2,876	67.74	88.29
67 Mohanram's G-score	Ascending	546	4.19	(1.11)	1.33	2.62	10.52	0.25	35.27	(32.14)	0.00	222	387	56.76	95.49
6. Technicals															
68 # of days to cover short	Descending	2,983	7.72	1.69	1.74	2.17	7.29	0.30	33.80	(25.16)	0.00	310	2,029	58.39	91.40
69 CAPM beta, 5Y monthly	Descending	3,002	(3.60)	(3.72)	(0.28)	0.95	13.70	0.07	40.19	(42.70)	0.27	251	2,909	51.00	97.71
70 CAPM idiosyncratic vol, 1Y daily	Descending	3,015	20.07	1.47	4.96	5.18	18.05	0.29	42.60	(60.80)	0.00	298	2,881	62.08	99.18
71 Realized vol, 1Y daily	Descending	2,878	17.76	0.94	4.62	5.02	18.66	0.27	42.69	(59.63)	0.00	310	2,792	61.29	99.16
72 Skewness, 1Y daily	Descending	2,878	4.70	0.43	0.54	1.25	5.33	0.23	13.93	(22.86)	0.00	310	2,792	57.10	89.77
73 Kurtosis, 1Y daily	Descending	2,878	12.75	0.43	1.31	1.43	5.51	0.26	15.28	(15.82)	0.00	310	2,792	62.26	91.53
74 Idiosyncratic vol surprise	Descending	2,971	12.10	2.61	1.66	2.89	7.97	0.36	22.66	(33.71)	0.00	297	2,862	66.67	87.84
75 Normalized abnormal volume	Ascending	2,985	11.34	2.45	2.72	2.28	6.37	0.36	23.10	(16.38)	0.00	310	2,867	65.81	64.17
76 Float turnover, 12M	Descending	3,011	7.60	(1.22)	0.26	0.26	10.70	0.02	23.53	(26.97)	0.68	299	2,786	48.16	99.77
77 Moving average crossover, 15W-36W	Ascending	2,884	(4.26)	1.26	0.97	2.20	13.13	0.17	46.29	(55.07)	0.00	310	2,531	60.32	90.77
78 Log float-adj capitalization	Ascending	3,008	7.58	1.90	3.34	3.46	10.93	0.32	29.53	(40.68)	0.00	310	2,871	61.29	99.41
79 # of month in the database	Ascending	3,015	11.05	0.76	1.73	2.20	8.78	0.25	35.61	(23.86)	0.00	310	2,874	57.10	99.99
80 DB composite options factor	Ascending	2,049	(3.72)	(0.85)	0.77	1.38	3.66	0.38	13.99	(13.88)	0.00	147	2,026	65.31	23.55

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

Factor Name	Direction[1]	Current # of Stocks	Average IC (%) Last M	Average IC (%) 12M Avg	Average IC (%) 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	10,121	8.31	0.68	3.13	4.26	10.50	0.41	36.88	(23.89)	0.00	286	8,023	64.69	97.98
2 Dividend yield, FY1	Ascending	7,853	8.82	0.32	2.52	4.31	10.82	0.40	32.17	(22.90)	0.00	229	5,263	63.76	98.18
3 Dividend yield, FY2	Ascending	7,818	10.64	0.34	2.17	4.21	10.87	0.39	33.19	(24.39)	0.00	219	5,223	63.93	98.16
4 Price/Earnings	Descending	8,318	4.97	0.26	0.04	4.01	13.07	0.31	39.66	(50.73)	0.00	279	6,313	62.01	96.31
5 Price-to-FY0 EPS	Descending	7,910	4.75	0.97	(0.76)	2.90	10.25	0.28	28.98	(37.08)	0.00	286	6,038	62.59	96.40
6 Earnings yield, FY0	Ascending	9,049	8.42	2.13	1.33	4.01	9.15	0.44	31.67	(18.68)	0.00	286	7,021	64.69	96.32
7 Earnings yield, forecast FY1 mean	Ascending	8,501	9.99	2.39	1.70	4.73	10.84	0.44	35.35	(22.20)	0.00	286	6,470	63.99	95.67
8 Earnings yield, forecast FY2 mean	Ascending	8,407	10.09	2.13	0.55	4.34	11.84	0.37	37.31	(31.50)	0.00	286	6,296	62.94	95.72
9 Cash flow yield, FY0	Ascending	7,027	5.37	2.98	1.48	4.06	6.33	0.64	26.42	(11.80)	0.00	162	4,977	75.93	97.12
10 Cash flow yield, FY1 mean	Ascending	5,995	6.26	2.43	(0.36)	2.07	9.68	0.21	31.42	(32.01)	0.00	218	4,488	58.72	96.01
11 Price/Sales	Descending	9,470	(0.51)	3.54	0.75	1.51	9.55	0.16	26.48	(31.59)	0.01	286	7,500	55.94	99.23
12 Price/Book	Descending	9,572	(0.97)	(0.27)	(0.90)	1.17	10.46	0.11	31.56	(37.54)	0.06	286	7,549	56.64	98.34
13 Est Book-to-price, median	Ascending	7,443	1.55	(0.26)	(1.65)	1.16	9.82	0.12	30.37	(26.29)	0.12	170	5,424	52.94	98.08
14 EBITDA to EV	Ascending	7,765	9.53	5.26	5.73	3.98	10.83	0.37	36.69	(26.20)	0.00	286	4,689	62.59	95.60
15 Sales/EV	Ascending	9,400	(2.93)	4.43	2.06	1.99	7.87	0.25	24.81	(20.06)	0.00	286	7,466	61.19	98.99
2. Growth															
16 IBES 5Y EPS growth	Ascending	8,415	1.42	(0.58)	0.98	1.08	6.12	0.18	19.09	(21.86)	0.00	286	6,225	58.74	98.06
17 EPS Growth	Ascending	9,071	3.21	0.95	1.69	2.05	6.85	0.30	29.72	(28.97)	0.00	270	6,898	64.07	88.43
18 IBES LTG EPS mean	Descending	4,813	0.86	(1.23)	0.46	1.33	12.07	0.11	28.22	(40.36)	0.06	286	4,174	53.15	96.74
19 IBES FY1 mean EPS growth	Ascending	8,006	1.75	0.76	0.46	0.39	6.05	0.06	14.44	(20.10)	0.28	286	6,376	54.90	88.56
20 IBES FY1 mean CFPS growth	Descending	5,325	4.71	1.25	1.34	1.74	4.21	0.41	7.47	(11.39)	0.00	162	3,924	64.81	91.79
21 IBES FY2 mean DPS growth	Ascending	7,798	10.25	0.16	(0.56)	2.46	10.96	0.22	38.85	(31.49)	0.00	228	5,104	59.65	88.09
22 Asset growth	Descending	9,436	(0.91)	3.92	2.12	0.67	8.49	0.08	21.57	(27.36)	0.19	286	7,293	52.45	93.68
3. Price Momentum and Reversal															
23 Total return, 1D	Descending	10,128	1.14	2.20	4.40	3.61	7.42	0.49	21.94	(41.58)	0.00	286	8,135	70.98	2.01
24 Weekly Total Return	Descending	10,128	0.58	1.39	3.13	2.98	8.70	0.34	30.60	(33.64)	0.00	286	8,134	64.69	1.43
25 Total return, 21D (1M)	Ascending	10,125	(0.24)	1.25	0.68	0.11	11.41	0.01	27.69	(44.07)	0.87	286	8,129	52.80	4.10
26 Total return, 252D (12M)	Ascending	9,850	0.64	5.55	5.19	4.42	14.48	0.31	41.64	(46.50)	0.00	286	7,937	66.78	90.66
27 12M-1M total return	Ascending	9,850	0.32	5.42	5.54	5.03	13.95	0.36	40.96	(42.52)	0.00	286	7,937	68.88	88.76
28 Total return, 1260D (60M)	Ascending	8,778	3.42	(0.72)	0.70	1.43	14.03	0.10	40.32	(44.84)	0.09	286	6,436	58.04	97.77
4. Sentiment															
29 IBES LTG Mean EPS Revision, 1M	Ascending	4,793	1.20	0.71	0.57	0.67	2.56	0.26	7.26	(8.59)	0.00	286	4,136	63.29	0.59
30 IBES LTG Mean EPS Revision, 3M	Ascending	4,765	1.83	1.21	0.92	0.87	3.32	0.26	11.05	(10.26)	0.00	286	4,080	61.89	60.14
31 IBES FY1 EPS up/down ratio, 1M	Ascending	5,605	3.54	3.02	3.61	3.69	5.41	0.68	17.76	(13.76)	0.00	286	4,359	76.57	34.72
32 IBES FY1 EPS up/down ratio, 3M	Ascending	7,741	4.20	3.23	4.01	3.65	5.80	0.63	17.92	(12.36)	0.00	286	5,843	75.17	78.51
33 IBES FY1 Mean EPS Revision, 1M	Ascending	8,260	3.36	2.61	2.92	2.89	5.06	0.57	16.50	(12.79)	0.00	286	6,322	72.38	24.11
34 IBES FY1 Mean EPS Revision, 3M	Ascending	8,157	4.08	2.87	3.87	3.37	6.63	0.51	19.37	(20.12)	0.00	286	6,230	73.43	74.19
35 IBES FY1 Mean CFPS Revision, 3M	Ascending	5,658	1.75	1.71	2.59	2.49	5.53	0.45	15.81	(23.83)	0.00	208	4,309	76.92	63.95
36 IBES FY1 Mean DPS Revision, 1M	Ascending	6,206	1.60	1.93	2.62	1.75	4.37	0.40	12.65	(16.63)	0.00	227	4,354	71.81	10.97
37 IBES FY1 Mean DPS Revision, 3M	Ascending	6,139	2.49	3.15	3.67	2.20	5.84	0.38	19.08	(24.51)	0.00	225	4,294	72.44	65.70
38 IBES FY1 Mean FFO Revision, 1M	Ascending	7,560	2.90	2.75	3.32	2.26	4.05	0.56	11.73	(8.89)	0.00	154	4,086	77.27	13.57
39 IBES FY1 Mean FFO Revision, 3M	Ascending	7,388	4.98	3.61	4.27	2.83	5.77	0.49	16.27	(14.53)	0.00	151	3,992	74.17	67.88
40 IBES FY1 Mean ROE Revision, 1M	Ascending	8,291	4.15	1.78	2.03	1.78	4.07	0.44	13.70	(10.51)	0.00	206	5,397	69.42	14.38
41 IBES FY1 Mean ROE Revision, 3M	Ascending	8,163	6.14	2.00	2.32	2.18	5.01	0.44	13.57	(13.58)	0.00	204	5,267	69.12	68.54
42 Target price implied return	Descending	8,453	(0.40)	1.17	1.25	0.90	14.53	0.06	55.58	(36.25)	0.42	170	6,307	52.94	82.33
43 Recommendation, mean	Descending	8,699	2.19	1.86	1.95	1.77	6.79	0.26	17.41	(16.84)	0.00	239	7,204	65.27	94.47
44 Mean recommendation revision, 3M	Descending	8,650	3.58	1.43	1.49	1.89	2.92	0.65	10.01	(10.13)	0.00	236	7,182	75.42	60.13
5. Quality															
45 Return on Equity	Ascending	9,352	11.60	1.64	3.04	4.20	10.11	0.42	30.68	(34.69)	0.00	238	7,685	66.39	97.12
46 return on capital	Ascending	9,323	9.78	4.38	2.62	4.44	12.25	0.36	49.47	(34.02)	0.00	286	6,979	64.69	97.96
47 Return on Assets	Ascending	9,521	8.17	3.98	5.24	4.74	13.24	0.36	44.20	(30.31)	0.00	286	7,082	63.64	98.16
48 Asset Turnover	Ascending	9,488	(1.99)	6.05	5.09	2.63	16.27	0.16	44.64	(51.55)	0.01	286	7,562	57.69	99.85
49 Gross margin	Ascending	8,790	1.69	0.47	2.25	1.84	5.84	0.31	16.60	(13.45)	0.00	286	6,877	62.94	98.89
50 EBITDA margin	Ascending	9,603	7.00	3.51	4.27	3.97	13.78	0.29	42.97	(41.30)	0.00	286	7,581	59.44	96.81
51 Berry Ratio	Ascending	7,349	11.84	(1.62)	(0.14)	2.84	9.29	0.31	29.57	(20.79)	0.00	286	5,320	59.44	97.71
52 IBES FY1 EPS dispersion	Descending	8,501	(2.28)	2.71	4.07	0.46	9.54	0.05	32.68	(25.37)	0.42	286	6,470	50.35	87.94
53 IBES 5Y EPS growth/stability	Ascending	8,415	3.64	(0.22)	1.39	1.42	5.97	0.24	18.66	(20.47)	0.00	286	6,224	58.39	98.30
54 YoY change in debt outstanding	Descending	7,833	(3.00)	0.91	0.68	0.25	3.91	0.06	11.51	(11.34)	0.27	286	6,297	53.50	91.50
55 Current ratio	Descending	7,850	5.67	0.05	0.37	0.62	8.87	0.07	27.86	(27.01)	0.24	286	6,164	49.65	98.51
56 Long-term debt/equity	Ascending	9,410	8.67	2.20	1.11	0.80	6.45	0.12	22.37	(18.17)	0.04	286	7,474	54.55	98.89
57 Merton's distance to default	Ascending	8,179	(0.55)	1.14	3.77	2.61	11.12	0.24	31.19	(31.18)	0.00	286	6,476	59.79	93.26
58 Capex to Dep	Descending	7,680	(3.40)	5.68	3.73	1.51	6.48	0.23	22.38	(19.93)	0.00	286	5,150	61.19	96.92
6. Technicals															
59 Realized vol, 1Y daily	Descending	9,853	11.35	2.80	5.00	5.08	15.32	0.33	29.45	(44.64)	0.00	286	7,944	61.19	98.96
60 Skewness, 1Y daily	Descending	9,853	3.86	1.19	2.30	1.64	5.31	0.31	15.03	(32.98)	0.00	286	7,944	63.64	90.02
61 Moving average crossover, 15W-36W	Ascending	9,609	2.18	2.93	2.10	2.97	14.53	0.20	37.15	(45.46)	0.00	286	6,943	62.59	91.36
62 Normalized abnormal volume	Ascending	10,081	3.89	3.40	3.34	2.27	6.52	0.35	20.47	(14.71)	0.00	286	7,899	61.19	66.24

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

Appendix 1

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