# Q-Series®

## What crowded positions are bubbling up in equity markets?

Equities

Global Quantitative

**Shanle Wu, PhD**
Analyst
shanle.wu@ubs.com
+852-2971 7513

**Josh Holcroft**
Analyst
josh.holcroft@ubs.com
+852-2971 7705

**Paul Winter**
Analyst
paul-j.winter@ubs.com
+61-2-9324 2080

**Nick Nelson**
Strategist
nick.nelson@ubs.com
+44-20-756 81960

**Julian Emanuel**
Strategist
julian.emanuel@ubs.com
+1-212-713-3845

**Matthew Gilman**
Strategist
matthew.gilman@ubs.com
+852-2971 8173

**David Cassidy**
Strategist
david.cassidy@ubs.com
+61-2-9324 3721

**Tomohiro Okawa**
Strategist
tomohiro.okawa@ubs.com
+81-3-5208 6291

**Oliver Antrobus, CFA**
Analyst
oliver.antrobus@ubs.com
+61-3-9242 6467

**Pieter Stoltz**
Analyst
pieter.stoltz@ubs.com
+61-2-9324 3779

**David Jessop**
Analyst
david.jessop@ubs.com
+44-20-7567 9882

**Nick Baltas, PhD**
Analyst
nick.baltas@ubs.com
+44-20-7568 3072

**The storm clouds are gathering**

Unprecedented capital market conditions, quantitative easing and divergence in monetary policies have led to large flows of cheap money into equity markets globally, inflating thematic investment bubbles and increasing the risk of trade-crowding, in our view. We think key questions at the forefront of investors' minds are: where are these crowded trades forming and for how much longer can they be sustained?

**A new investor toolkit**

We introduce our new toolkit for reading the barometric pressure of these bubbles. This extends our earlier research and consolidates several data sets to give a more complete picture of crowding. Institutional holdings, return correlations within peer groups and sell-side sentiment combine to provide new insights into the short- and long-term effects of crowding.

**Where are the bubbles and how much longer can they be sustained?**

Purely from a quantitative point of view, our crowding barometer suggests that overbought bubbles have formed in US healthcare, Japan telecoms, Asia ex-Japan information technology and positive exposure to the US dollar; there have been consistent inflows and elevated sell-side sentiment in all these segments. Conversely, we see crowded selling occurring in energy sectors globally, with large active underweight positions and sell-side sentiment at their historical lows.

**From a fundamental top-down view, UBS strategists agree with the findings**

Our US strategist expects the trades on US dollar and US healthcare to start to unwind. Our Japan strategist believes there is limited upside potential for Japan telecoms. On the flip side, we think potential oil-price stabilisation plus substantial short covering, or improving commodity-related sentiment, could trigger a rebound in the energy sector.

# Contents

**Executive summary** ........................................ **3**

**The elements of crowding** ........................................ **5**

Active holdings ........................................ 5

Performance-based Crowding Indicator (PCI) ........................................ 6

Sell-side sentiment ........................................ 7

**Timing the cycle** ........................................ **8**

Short-term effects ........................................ 8

Long-term effects ........................................ 10

**Where are the storm clouds gathering?** ........................................ **12**

Developed markets versus emerging markets ........................................ 13

Other popular investment themes ........................................ 16

Sectors ........................................ 18

Investment styles ........................................ 30

**Appendix** ........................................ **32**

Construction of the active trading portfolio ........................................ 32

PCI ........................................ 32

Coverage-weighted aggregated ratings ........................................ 33

Supplementary charts ........................................ 34

**Shanle Wu, PhD**
Analyst
shanle.wu@ubs.com
+852-2971 7513

**Josh Holcroft**
Analyst
josh.holcroft@ubs.com
+852-2971 7705

**Paul Winter**
Analyst
paul-j.winter@ubs.com
+61-2-9324 2080

**Nick Nelson**
Strategist
nick.nelson@ubs.com
+44-20-756 81960

**Julian Emanuel**
Strategist
julian.emanuel@ubs.com
+1-212-713-3845

**Matthew Gilman**
Strategist
matthew.gilman@ubs.com
+852-2971 8173

**David Cassidy**
Strategist
david.cassidy@ubs.com
+61-2-9324 3721

**Tomohiro Okawa**
Strategist
tomohiro.okawa@ubs.com
+81-3-5208 6291

**Oliver Antrobus, CFA**
Analyst
oliver.antrobus@ubs.com
+61-3-9242 6467

**Pieter Stoltz**
Analyst
pieter.stoltz@ubs.com
+61-2-9324 3779

**David Jessop**
Analyst
david.jessop@ubs.com
+44-20-7567 9882

**Nick Baltas, PhD**
Analyst
nick.baltas@ubs.com
+44-20-7568 3072

# Executive summary

## Why should we care about crowded trades?

We are in a world of artificially low interest rates. Given ample liquidity, cheap money has flooded into equity markets, leading to a microcosm of crowding within equity markets—trade positioning on the basis of a similar investment thesis. We believe the risk of crowded trades has become more imminent. Once these trades reach their critical value, or an exogenous shock occurs, we expect a sharp price reversal as investors unwind their exposure in tandem. In this report, we investigate crowding with regions (see page 12), popular investment themes (page 16), sectors (page 18) and styles (page 30).

## How can we measure this?

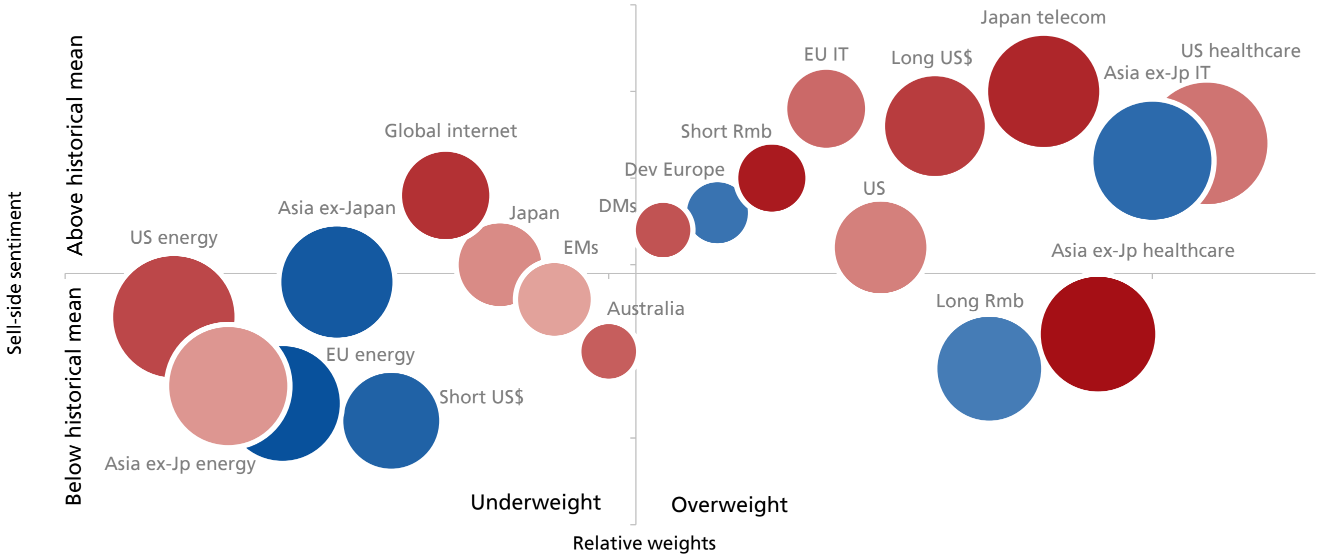
This report outlines our new quantitative framework for measuring crowding. This extends our earlier work on crowded trades by complementing several data sources and analysis techniques:

- **Active holdings.** We can directly measure whether asset managers are overweight or underweight investment themes[1], and whether their positions are increasing or decreasing, effectively capturing buy-side sentiment.
- **Market signal.** While active holdings are arguably the 'purest' source of buy-side sentiment, there are severe limitations to the real-world data: they are reported neither comprehensively, nor in a timely manner. Accordingly, we augment the holdings data with proxies inferred from market data, essentially looking at abnormal return correlations within peer groups to capture the stock co-movement caused by crowded trades.
- **Sell-side sentiment.** The relationship between sell-side sentiment and stock performance is not as direct as many analysts would like to believe. However, sell-side sentiment is still a strong driver of stock returns across global markets. The third component to our crowding toolkit is aggregate sentiment.

[1] This can be any region, country, sector, investment-style portfolio, or any other portfolio that we want to monitor.

## Which positions are most crowded now?

**Figure 1: Where are the bubbles?**




Note: The size of the bubbles represents the transformed relative weights; their colour represents the crowdedness in the past quarter measured by PCI; blue means sell and red means buy. The darker the colour, the more crowded the investment theme.
Source: MSCI, IBES, FactSet, UBS Quantitative Research

We see overbought bubbles forming in US healthcare, Japan telecoms, Asia ex-Japan information technology and portfolios with positive exposure to the US dollar; we have observed consistent inflows and elevated sell-side sentiment in all these segments.

Conversely we see crowded selling occurring in energy sectors globally; active underweight positions and sell-side sentiment are at their historical lows.

Fundamentally, our US strategist suggests that the trades on the US dollar and US healthcare may start to unwind. Our Japan strategist believes there is limited upside potential for Japan telecoms. On the flip side, we believe potential oil-price stabilisation plus substantial short covering, or an improvement in commodity-related sentiment, could trigger a rebound in the energy sector.

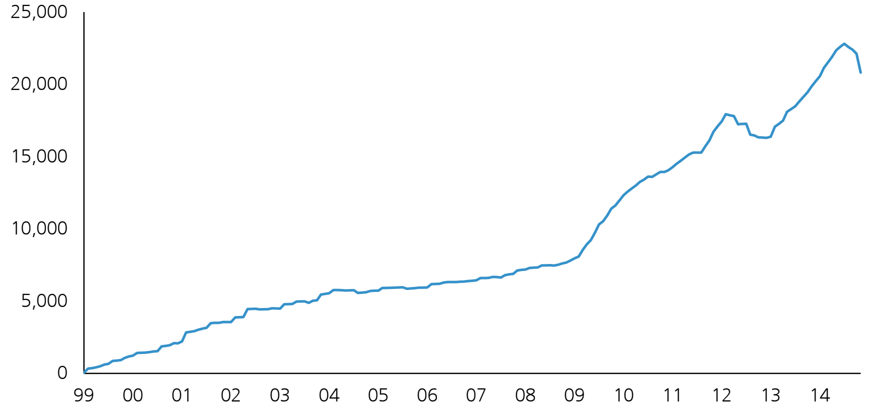
# The elements of crowding

## Active holdings

FactSet's ownership database provides information on active fund managers' holdings. It collects institutional investors' ownership data globally, which includes both terminated and active global equity securities. This data set starts from 1999 and currently covers about 37,800 funds globally.

**We observe fund holdings on the FactSet database**

**Figure 2: Number of funds that reported holdings each month**




Source: FactSet, UBS Quantitative Research

Each month we form an **active trading portfolio** by aggregating positions across global active managers. Essentially, we sum up all the holdings in dollar value across all the active managers and calculate the weights of stocks in this active trading portfolio. We then aggregate the weights across different groupings, eg, regions, countries, sectors, investment styles. We then compare this weight with the relevant MSCI benchmark to form the relative weight.

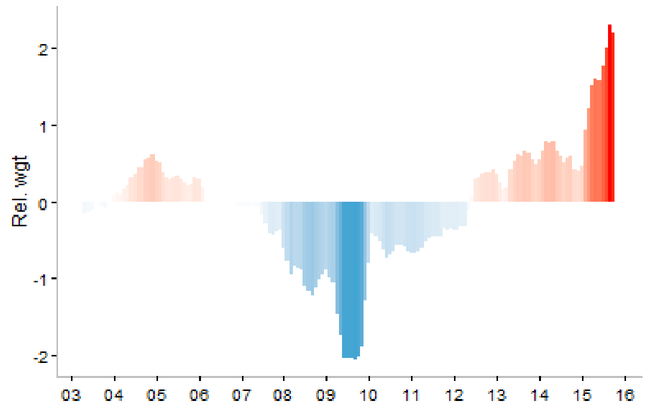
**We aggregate holdings across global managers to form an active trading portfolio and compare it with the benchmark**

Figure 3 shows the weight of the US healthcare sector in the active trading portfolio. Figure 4 compares this weight with the weight of the sector in the MSCI US index. From late 2008 to early 2009, the absolute weight shot up to the roof, while the weight relative to the benchmark only increased marginally. Unlike last time, currently both the absolute and relative weights have reached historical highs—which rings a warning bell.

**Figure 3: Weight of the US healthcare sector in the active trading portfolio**


Source: MSCI, FactSet, UBS Quantitative Research

**Figure 4: Weight of the US healthcare sector in the active trading portfolio relative to the benchmark**




Source: MSCI, FactSet, UBS Quantitative Research

## Performance-based Crowding Indicator (PCI)

Active holdings are arguably the 'purest' source of buy-side sentiment. However, there are severe limitations to the real-world data: it is neither comprehensively reported, nor reported in a timely fashion. Accordingly, we augment our holdings data with proxies inferred from the correlation among price returns.

**Holdings data is ideal in theory, but is delayed/incomplete in practice**

The intuition behind this is straightforward; as investors crowd into an investment theme *on the basis of a similar information set*, stock peers exposed to the same theme tend to track together, which we could observe via increasing correlation of the price returns among them—dubbed their *average pairwise correlation*.

**Increased return correlation among comparable stocks**

This concept forms the basis of our **PCI** (see Appendix for more details):

1) We scale the average pairwise price correlation by its dispersion. While the average measures the tendency of these stocks to move together, their dispersion captures the strength of this accord.

**First, we scale average pairwise price correlation by dispersion**

2) Changes in this correlation should be considered relative to the overall market level, which often fluctuates due to dynamics among other asset classes. For important (but dull) statistical reasons, we form a baseline correlation level using randomly generated portfolios containing the same number of stocks.

**An uncorrelated baseline level**

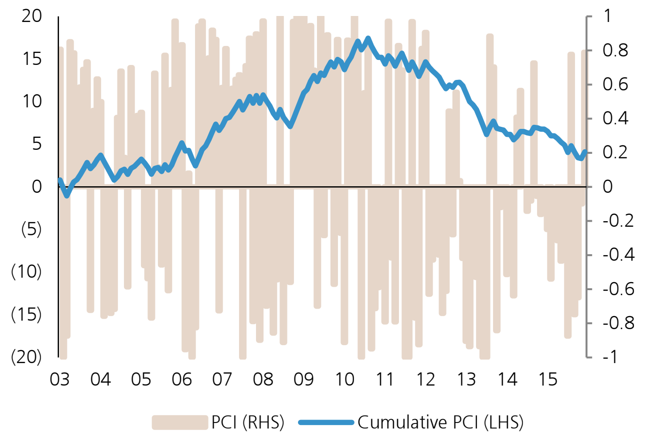
3) Some groupings may still have a consistently higher correlation than others. For example, the Hong Kong equity market is dominated by financials and experiences a higher 'base level' of correlation; a more diverse market like Japan experiences lower correlation. Accordingly, we also frame the indicator within its historical context.

**Framed in historical context**

4) We still need to capture the *direction* of the crowding—whether investors are rushing for the entrance or the exit. We extend our previous work by combining these correlations with the target portfolio's cross-sectional hit rates to estimate the direction of trading.

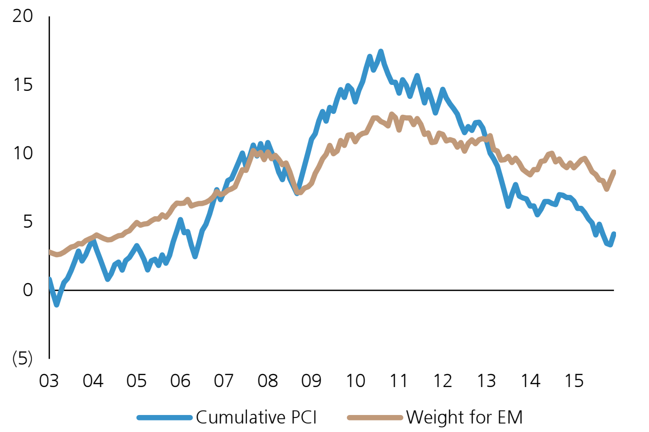
**Are investors rushing for the entrance or the exit?**

**Figure 5: Performance-based Crowding Indicator (PCI)**




Source: MSCI, UBS Quantitative Research

**Figure 6: Cumulative PCI relative to weight in active trading portfolio**




Source: MSCI, FactSet, UBS Quantitative Research

Above is the example for investment in emerging markets. We use the MSCI Emerging Markets index as a proxy. The cumulative PCI is a good supplement to holding data. It captures the peak in weights for EMs around the end of 2010 and the subsequent sell-off. Moreover, the monthly PCI can be used to time short-term performance reversal, which we will discuss in the Timing the cycle section.

## Sell-side sentiment

The relationship between sell-side ratings and stock performance is perhaps not as direct as many analysts would like to believe. However, sell-side sentiment remains a strong driver of many return phenomena across global markets.

**Accuracy aside, sell-side ratings are a useful indicator…**

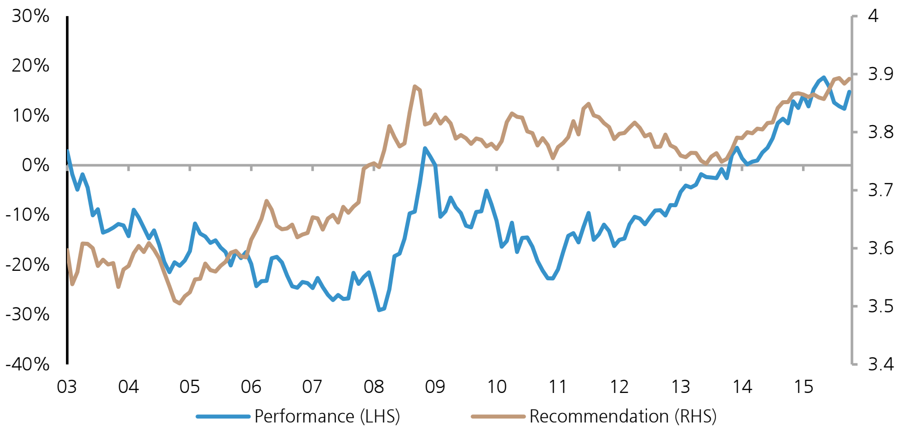
The third component in our crowding toolkit is coverage-weighted aggregate ratings[2]—consensus recommendation for each stock, aggregated at the portfolio level and weighted by the number of covering analysts.

This is interpreted as a contrarian indicator; when consensus recommendations are unanimous, there is essentially no further room to upgrade/downgrade, and we expect to see reversion to the mean again. So, while not a 'smoking gun', coverage-weighted aggregate ratings serve as a useful and transparent overlay.

**…of contrarian sentiment**

Figure 7 shows the US healthcare sector as an example. Recommendations peaked in late 2008, followed by a peak in relative performance roughly two months later; this was then followed by a two-year downward cycle. Currently, the indicator has reached a historical high, which could cause concern.

**Figure 7: Aggregate rating and relative performance of US healthcare**




Note: Recommendation ranks from 1 to 5, with 1 indicating strong sell and 5 indicating strong buy.
Source: MSCI, IBES, UBS Quantitative Research

[2] Refer to Appendix for details on the calculation.

# Timing the cycle

Timing the investment cycle is an elusive target of any investment process, and a particular shortcoming of systematic investment processes.

## Short-term effects

**Our active trading portfolio captures long-term effects**

The weights in our active trading portfolio represent a gradual, longer-term trend in positioning, as the holdings change relatively infrequently. Conversely, the PCI is a shorter-term signal that is useful for capturing mean-reversion effects.

**Conversely the PCI captures short-term effects**

In our earlier research[3], we discussed how to use the PCI to time such short-term performance reversals. We showed that when the PCI breached a critical level, ie, when an investment style became too crowded, it tended to underperform in the subsequent month, which worked particularly well for price momentum strategies.

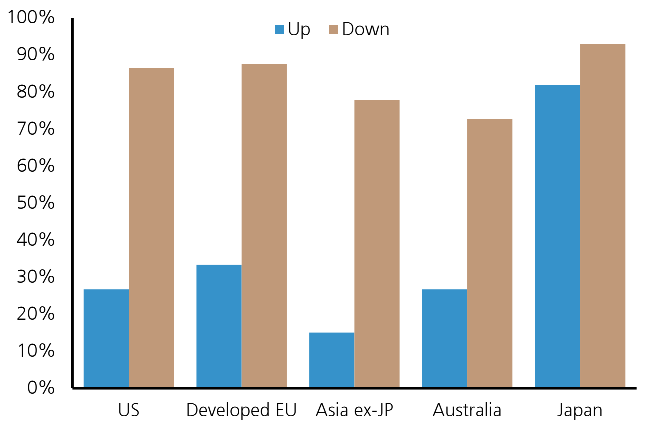
**We now condition the PCI on asset managers' positioning**

Here we further explore these effects. By overlaying the PCI with the cycle of active managers' positioning, we believe we could improve our ability to time this short-term reversal. For each target group of stocks, we divide the historical time period to distinct phases: an upward cycle when active managers increase their positions in target portfolio, and a downward cycle when active managers reduce their positions.

**Buy-crowding amid a long-term divestment trend is likely to fizzle**

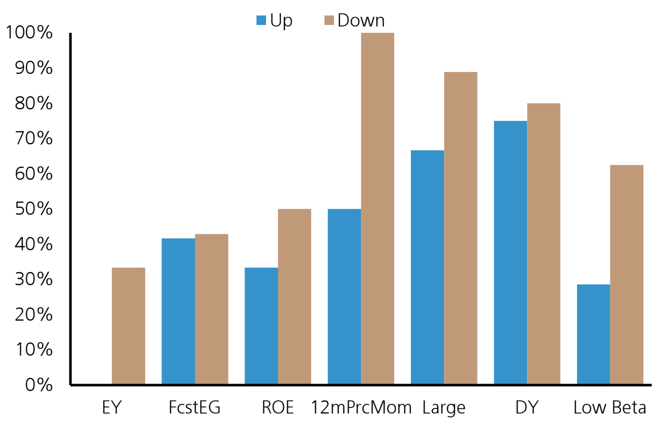
We find that buy-crowding within the divestment cycle (ie, reducing exposure to an investment theme), results in a much higher likelihood of a price reversal than during an investment cycle. Conversely, sell-crowding is much more likely to trigger a rebound in price during the upward cycle than the downward cycle.

**Figure 8: Likelihood of underperformance following buy-crowding, by region/country**




Source: MSCI, UBS Quantitative Research

**Figure 9: Likelihood of underperformance following buy-crowding, by investment style**




Note: EY = Earnings yield; FcstEG = Forecast earnings growth; 12mPrcMom = 12-month price momentum; DY = Dividend yield.
Source: MSCI, IBES, UBS Quantitative Research

Figure 8 shows the likelihood of country-level underperformance in the subsequent three months after the associated PCI score indicates buy-crowding[4], conditioned on the investment (up) or divestment (down) part of the positioning cycle.

[3] Asia Quantitative General Research: Where are the crowded trades?, 16 January 2015.
[4] We quantify this as the PCI breaching the 0.8 threshold.

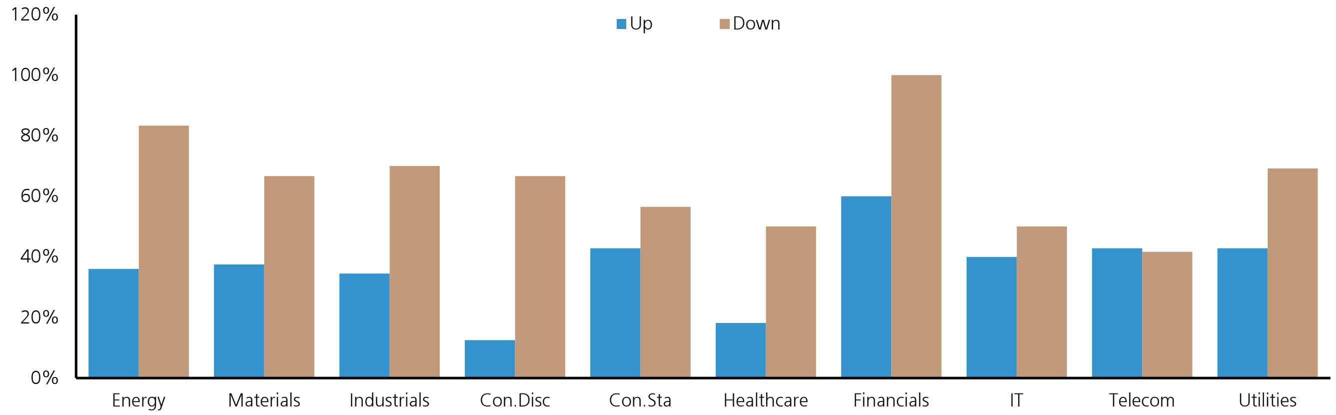
Take for example the US market: it underperformed the global benchmark only 27% of the time when the PCI indicated buy-crowding during periods in which asset managers were increasing their US exposure. However, when the PCI signal indicated buy-crowding during periods of divestment from US market exposure, the subsequent underperformance occurred 86% of the time.

**Cyclical styles/sectors benefit the most from overlaying crowding with the positioning cycle**

Figure 9 shows the interacting effects of the crowding indicators within style baskets in the MSCI ACWI. Long-term momentum and low-beta exposure appear to benefit the most from conditioning within the positioning cycle; perhaps not surprising considering these are the typical trading exposure during risk-reversals.

Figure 10 shows similar effects within US sectors. The cyclical sectors—energy, industrials and consumer discretionary—all benefit from conditioning the higher-frequency crowding indicator within the context of its long-term positioning.

**Figure 10: Likelihood of underperformance following buy-crowding, by US sector**

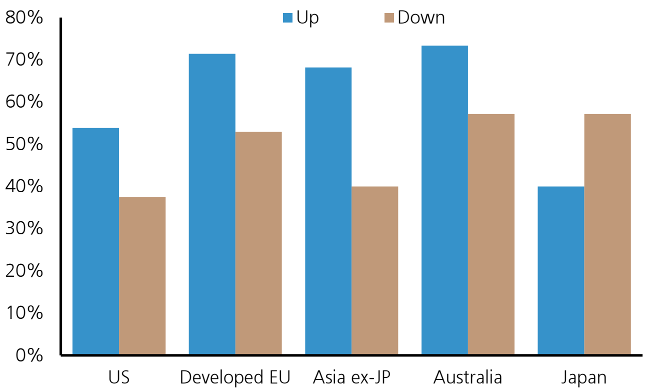



Source: MSCI, UBS Quantitative Research

**Crowded selling amid a longer-term investment trend is likely to revert**

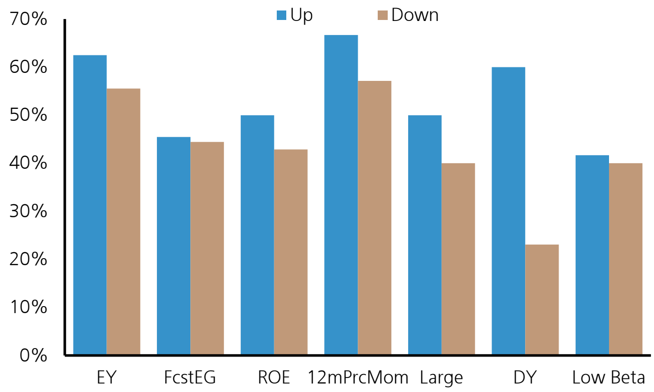
On the flip side, we find a symmetric relationship in crowded selling. When the PCI indicates that crowded selling is occurring[5], a 'relief rally' is far more likely during a period of increasing exposure to the investment theme.

**Figure 11: Likelihood of outperformance following sell-crowding, by region/country**




Source: MSCI, UBS Quantitative Research

**Figure 12: Likelihood of outperformance following sell-crowding, by investment style**

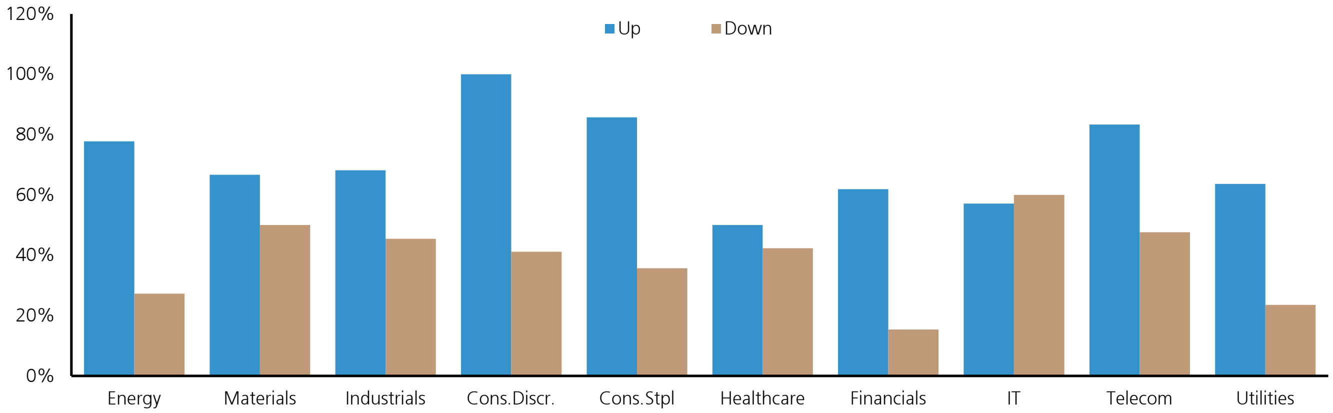



Source: MSCI, IBES, UBS Quantitative Research

[5] We quantify this as the PCI breaching the -0.7 threshold, due to data coverage.

These effects are largely consistent globally, with the exception of Japan. As shown in Figure 11, the chance of subsequent outperformance following sell-crowding in Japan increases during a divestment trend, ie, short-term negative sentiment is trend-following.

**Figure 13: Likelihood of outperformance following sell-crowding, by US sector**




Source: MSCI, UBS Quantitative Research

## Long-term effects

**Range-bound indicators can provide context to long-term trends, in our view**

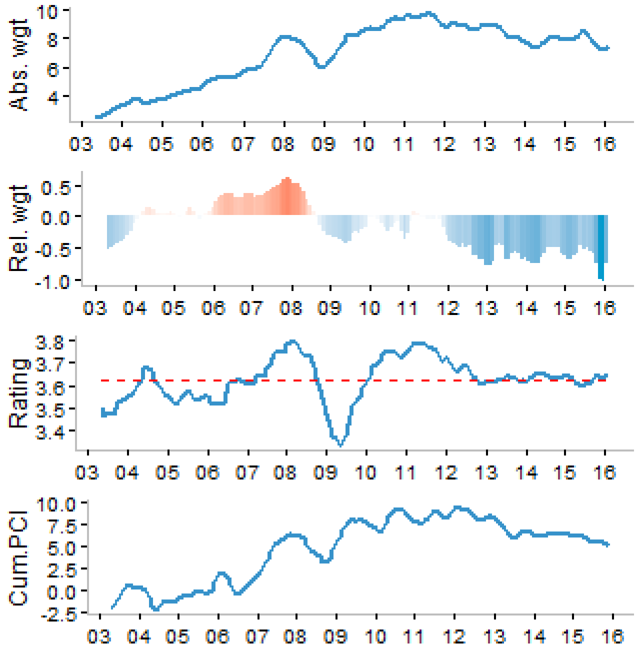
Short-term crowding effects aside, we think our crowding toolkit provides a useful indicator of longer-term reversals, as many of the indicators are inherently range-bound; their presence at extreme levels typically results in a structural reversal.

Figure 14 shows these effects in Asia ex-Japan. The top chart indicates that Asia became a more significant component of institutional portfolios from the time the data started until 2011. Essentially, this captures flows into Asia.

**Active positioning, sell-side sentiment and portfolio correlations at a glance**

The second chart shows the extent of this positioning, in excess of the MSCI ACWI benchmark. In the years leading up to the GFC, there was significant overweight positioning in Asia. This has since reversed and investors have maintained largely underweight exposure, which is currently at a historical low. We believe the middling ratings for Asia stocks are of no great interest, but the PCI indicates that sustained overcrowded selling has occurred.

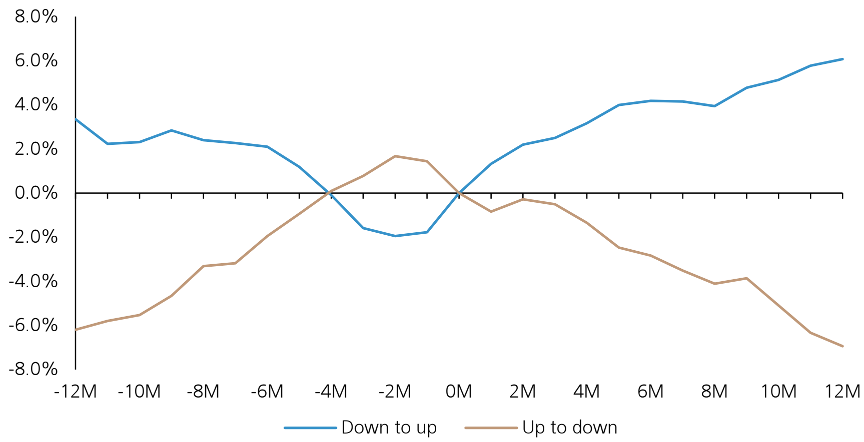
**Figure 14: Asia ex-Japan**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

The event study in Figure 15 shows the 12-month performance around the inflexion point of the investment cycle. Due to the delay in holdings data in the real world, the performance actually started to turn about two months before the inflexion we define. Yet, the outperformance (underperformance) continues to run for at least 12 months after the inflexion point.

**Figure 15: 12-month relative performance around the inflexion point**




Source: MSCI, FactSet, UBS Quantitative Research

# Where are the storm clouds gathering?

Putting all the measures together, we look for the investment themes that are close to the inflexion point of an investment cycle.

**Figure 16: Are we close to the inflexion point of an investment cycle?**

| | | Relative weight | Relative weight (z-score) | Sell-side rating against long-term average | Cumlative PCI (z-score) | Last month's PCI | Close to inflexion point? |
|---|---|---|---|---|---|---|---|
| Regions | Developed markets | 1.38 | -0.51 | 0.4% | 1.48 | -0.39 | |
| | Emerging markets | -1.38 | 0.51 | -0.1% | -1.43 | 0.79 | |
| | US | 3.72 | 0.50 | 0.3% | 1.71 | 0.24 | |
| | Developed Europe | 1.76 | -0.45 | 0.5% | 0.96 | -0.24 | |
| | Asia ex-Japan | -0.70 | -0.91 | -0.1% | -1.36 | -0.35 | |
| | Australia | -1.26 | 1.21 | -1.7% | 0.52 | -0.03 | |
| | Japan | -3.18 | 0.41 | 0.2% | -0.19 | -0.58 | |
| Themes | Internet | -0.52 | 0.16 | 0.6% | 1.37 | -0.10 | |
| | Long US$ | 0.97 | 0.78 | 3.1% | 2.06 | 0.15 | Y (Down) |
| | Short US$ | -0.30 | -0.26 | -8.7% | -1.40 | 0.74 | Y (Up) |
| | Long Rmb | 0.53 | 0.84 | -3.7% | -0.64 | 0.00 | |
| | Short Rmb | 0.20 | -0.44 | 0.9% | 1.12 | 0.45 | |
| Sectors | US energy | -1.02 | -1.61 | -0.1% | 0.19 | 0.38 | Y (Up) |
| | US materials | 0.09 | -1.74 | 4.7% | 1.12 | -0.37 | |
| | US industrials | 0.48 | 0.70 | -2.7% | 1.35 | 0.31 | |
| | US consumer staples | 1.68 | -0.04 | 0.2% | 1.73 | 0.38 | |
| | US consumer discretionary | -1.70 | 1.27 | -2.4% | 0.37 | 0.09 | |
| | US healthcare | 1.70 | 1.59 | 1.7% | 1.64 | -0.79 | Y (Down) |
| | US financials | 0.88 | -1.12 | 1.9% | 1.75 | -0.12 | |
| | US IT | -1.29 | -0.85 | -0.5% | 1.81 | -0.26 | |
| | US telecoms | -0.52 | -0.12 | 4.6% | 0.20 | 0.50 | |
| | US utilities | -0.29 | -0.05 | 2.4% | 0.99 | 0.03 | |
| | Dev Europe energy | -1.43 | -1.02 | -6.1% | -1.73 | 0.24 | Y (Up) |
| | Dev Europe materials | -0.59 | -1.14 | 0.4% | -1.11 | -0.08 | |
| | Dev Europe industrials | 0.89 | -1.25 | -0.2% | 1.32 | 0.21 | |
| | Dev Europe consumer staples | 1.67 | 1.42 | -2.2% | 1.96 | -0.48 | |
| | Dev Europe consumer discretionary | -0.42 | -1.53 | 3.2% | 0.52 | 0.62 | |
| | Dev Europe healthcare | 0.55 | -0.25 | -3.4% | 1.19 | -0.96 | |
| | Dev Europe financials | -0.54 | 1.01 | 3.0% | 1.46 | -0.30 | |
| | Dev Europe IT | 0.68 | 0.16 | 8.3% | 1.72 | -0.38 | |
| | Dev Europe telecoms | -0.35 | 1.37 | 0.9% | 0.90 | 0.69 | |
| | Dev Europe utilities | -0.48 | -0.76 | 0.6% | -1.35 | 0.67 | |
| | Asia ex-Jp energy | -0.75 | -1.60 | -3.7% | -1.19 | 0.42 | Y (Up) |
| | Asia ex-Jp materials | -1.23 | 0.73 | -2.3% | -1.22 | 0.42 | |
| | Asia ex-Jp industrials | -1.96 | 0.75 | -0.6% | -0.87 | -0.31 | |
| | Asia ex-Jp consumer staples | 1.89 | -0.18 | 0.5% | -0.91 | -0.35 | |
| | Asia ex-Jp consumer discretionary | 0.42 | -1.62 | 0.5% | -1.17 | 0.30 | |
| | Asia ex-Jp healthcare | 0.62 | 1.37 | -1.6% | 1.62 | 0.79 | Y (Down) |
| | Asia ex-Jp financials | -1.27 | -0.60 | 0.5% | -0.75 | -0.70 | |
| | Asia ex-Jp IT | 2.66 | 1.46 | 1.7% | 0.55 | -0.09 | Y (Down) |
| | Asia ex-Jp telecoms | 0.12 | 0.10 | 0.9% | -0.43 | 0.50 | |
| | Asia ex-Jp utilities | -0.50 | -0.09 | -1.8% | -1.55 | -0.75 | |
| | Australia resources | 4.20 | -0.28 | -5.2% | -0.55 | -0.03 | |
| | Australia financials | -10.08 | -0.70 | 4.1% | -0.94 | -0.25 | |
| | Australia industrials | 5.88 | 0.92 | -3.2% | 1.81 | 0.18 | |
| | Japan energy | 0.23 | 0.06 | 4.5% | -0.34 | -0.53 | |
| | Japan materials | -1.65 | 0.09 | -0.5% | -0.79 | -0.41 | |
| | Japan industrials | -2.35 | -1.15 | -2.3% | -1.53 | -0.44 | Y (Up) |
| | Japan consumer staples | -0.54 | -0.27 | 2.7% | 0.15 | 0.70 | |
| | Japan consumer discretionary | 0.38 | 0.23 | 0.9% | -0.59 | 0.87 | |
| | Japan healthcare | -0.33 | 1.30 | 2.6% | -1.10 | -0.69 | |
| | Japan financials | 0.89 | -0.19 | -1.3% | -0.45 | 0.00 | |
| | Japan IT | 2.00 | -0.91 | -0.6% | -0.50 | -0.55 | |
| | Japan telecoms | 2.84 | 1.24 | 9.5% | 1.36 | 0.63 | Y (Down) |
| | Japan utilities | -1.47 | 0.95 | -3.9% | -0.06 | 1.00 | |
| Styles | High earnings yield | -1.63 | -0.54 | -0.1% | -1.53 | -0.37 | |
| | High dividend yield | -4.47 | -1.42 | 0.1% | -1.38 | 0.29 | |
| | High forecast earnings growth | 1.77 | 0.87 | 0.9% | 0.50 | -0.11 | Y (Down) |
| | High 12M price momentum | 2.74 | 0.85 | -0.1% | 1.31 | -0.38 | |
| | High ROE | 1.80 | 0.81 | -0.2% | -0.01 | 0.39 | |
| | Large caps | -2.97 | -0.46 | 0.5% | 1.19 | 0.97 | |
| | Low volatility | -2.71 | -0.24 | 0.2% | 0.07 | 0.11 | |
| | Low beta | -0.19 | 0.57 | 0.4% | 0.57 | 0.20 | |

Source: MSCI, IBES, FactSet, UBS Quantitative Research

## Developed markets versus emerging markets

**DMs have been clear beneficiaries of flows**

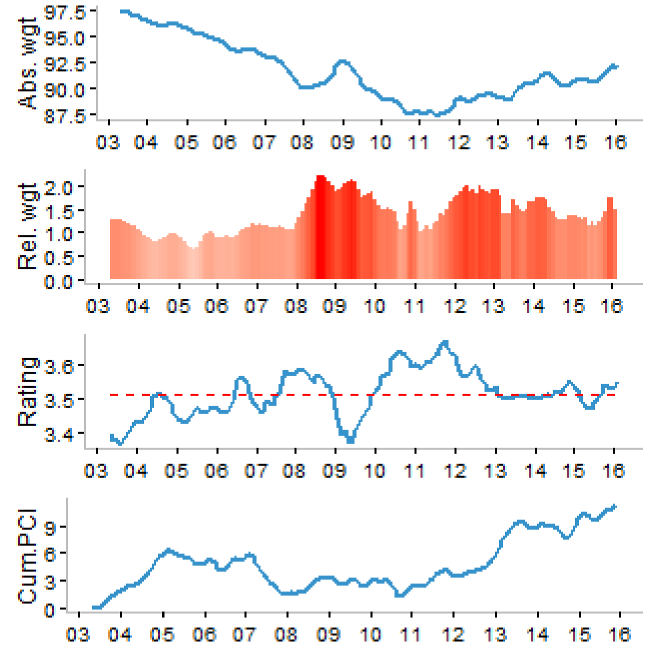
Developed markets (DMs) have been clear beneficiaries of flows, given the fallout from the end of the commodity super-cycle, global growth slowdown headlined by the potential for a 'dark skies' scenario in China[6] and the divergence in central-bank policies. According to our strategy team, there have been flows out of commodity-exporting emerging markets (EMs), such as Brazil and Russia, while China has dealt with a more difficult transition to a consumer-driven economy.

**EM sell-off appears consistent with structural divestment**

The cumulative PCI in Figure 18 shows the extent of crowded selling in EMs since the Fed initiated Operation Twist, which also coincided with the underperformance of EMs during the same period. However, because this sustained crowded selling has been occurring within the context of a prolonged divestment from EMs, we believe this indicates that the EM sell-off is far from 'overdone'.

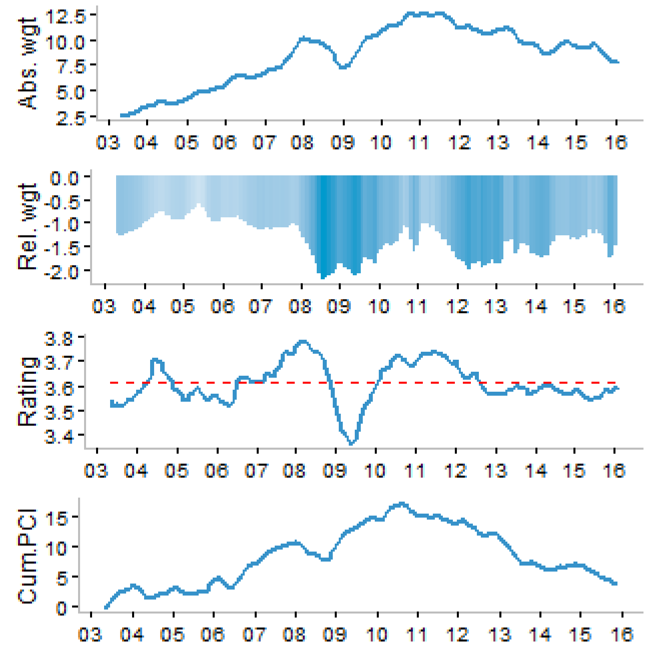
Also worth noting is that in both cases, middling sell-side ratings indicate that sell-side forecasts are erring on the side of caution.

**Figure 17: Developed markets**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 18: Emerging markets**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Data coverage may explain systematic DM overweighting**

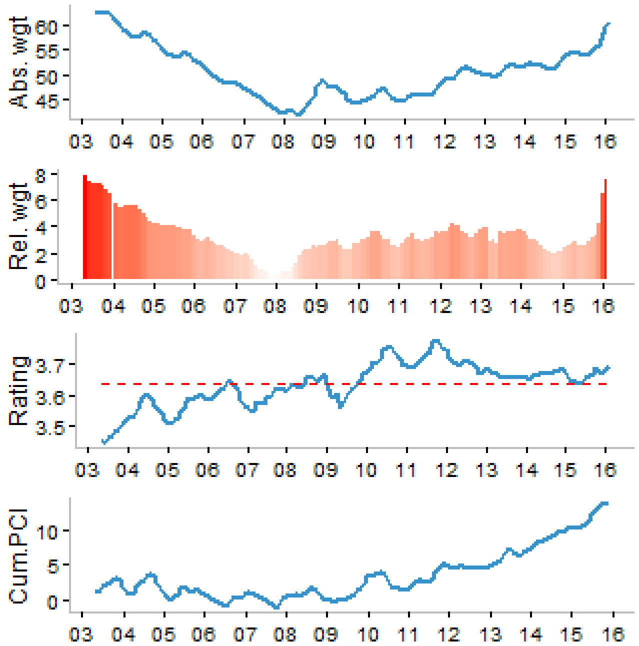
We note consistent relative overweight in DMs throughout the history of the data, likely a limitation of fund holdings coverage and benchmark weights. DM funds are disproportionately represented within the holdings data, and we think the free-float component of their MSCI weights may be more conservative than the holdings belie, which might systematically overstate their relative weight.

## Divergence within developed markets

Within DMs, we see a clear preference. With the divergence in global central-bank policies, the US has seen consistent equity inflows. Yet, positioning in Europe, Japan and Australia have been more bearish (Figure 19-Figure 22).

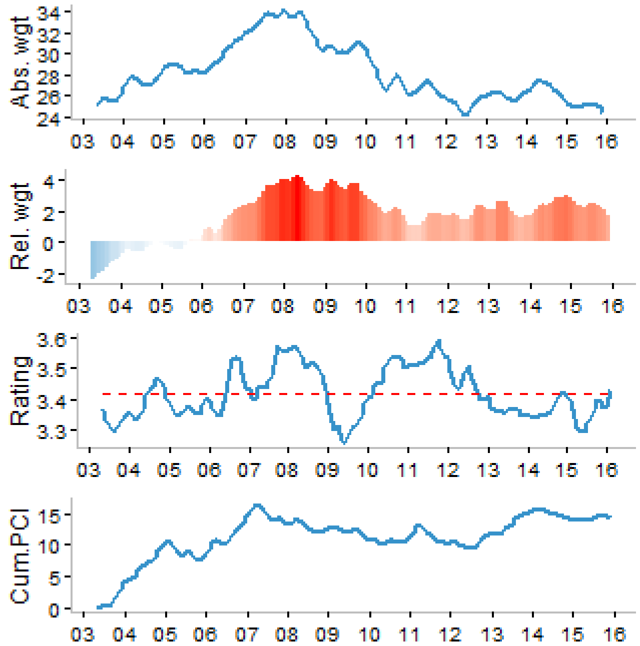
[6] Q-Series®: The Dragon's Tail: What Would a 4% China Do to World's Markets?, 21 December 2015.

**Figure 19: US**



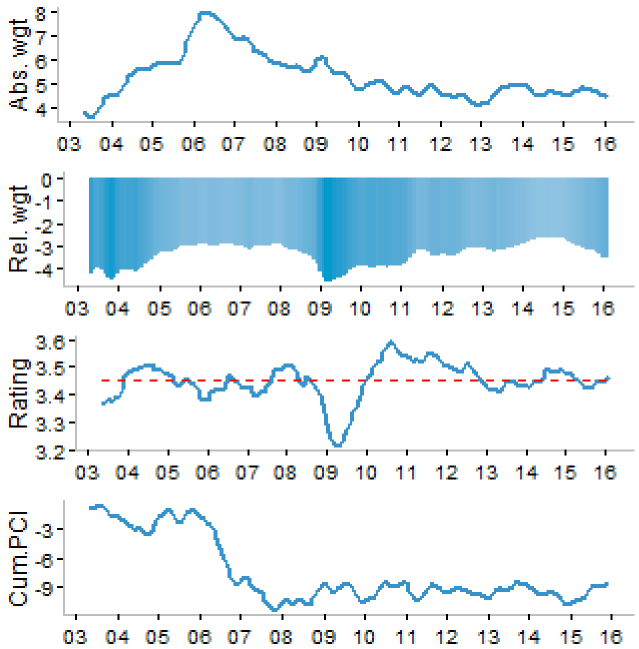

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 20: Developed Europe**



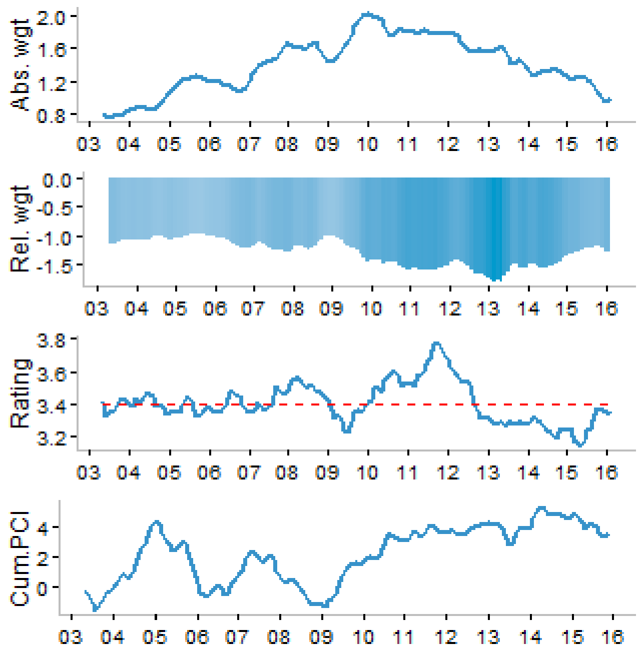

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 21: Japan**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 22: Australia**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

## US-dollar appreciation

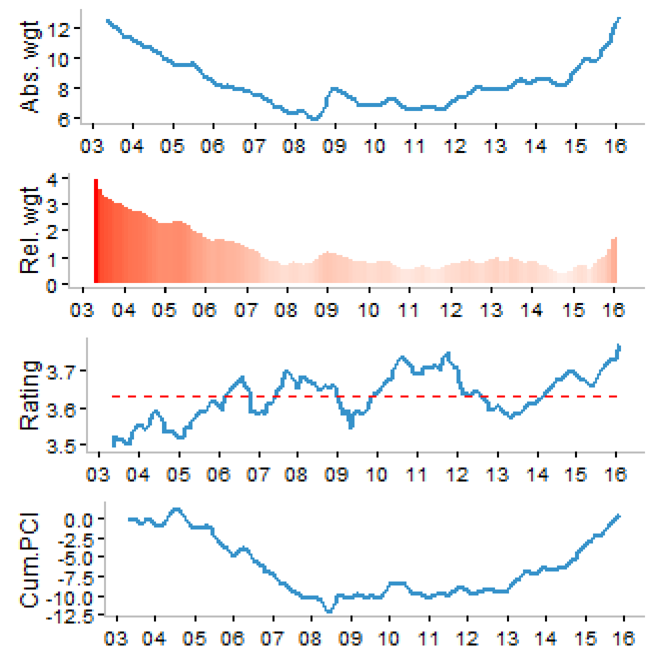
To model the effects associated with the US-dollar depreciation trade, we build two portfolios consisting of stocks with the highest and lowest betas to a trade-weighted US-dollar index.

**Positioning in positive US-dollar exposure is at extreme levels and subject to material crowding**

Figure 23 shows strong inflows into long US-dollar equity exposure since 2008; however, this has been offset by an increased weighting in the benchmark. Net of the benchmark, the active positioning remained largely unchanged until 2015 and has seen a sharp upturn since. Conversely, negative exposure to the US dollar has declined steadily following the GFC and is materially underweight currently.

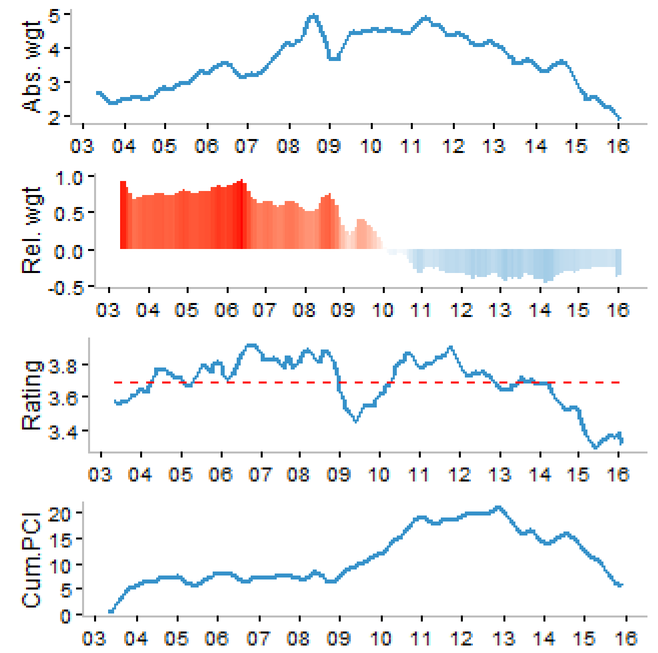
Perhaps a cause for concern, all indicators here are near the top of their historical ranges; sell-side ratings of names with positive US-dollar exposure are at an all-time high, while negative exposure has all-time low recommendations. The PCI shows that positive US-dollar exposure has been subject to prolonged buy-crowding and, conversely, negative exposure has been subject to prolonged sell-crowding.

**Figure 23: Positive beta against the US dollar**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 24: Negative beta against the US dollar**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Fed's dovish rhetoric and the selloff in the dollar in recent weeks may trigger DM underperformance relative to EM**

From a fundamental perspective, the view that the US economic recovery was further along than the remainder of the DM world, and the expectation of sustained Fed tightening, likely resulted in an influx of capital into names that traded favourably in a strong US-dollar environment. However, the Fed's recent dovish rhetoric, and the selloff in the US dollar over the past several weeks, has likely provided the catalyst for DM equities to underperform their EM peers—a view that our EM equity strategist shares[7].

In other words, our crowding indicator and fundamental evidence suggest that arguably one of the most popular macro trades (DMs over EMs) may have begun to unwind.

---

[7] *Macro Keys: EM Equities Outperforming! Can This Be True?*, 9 February 2016.

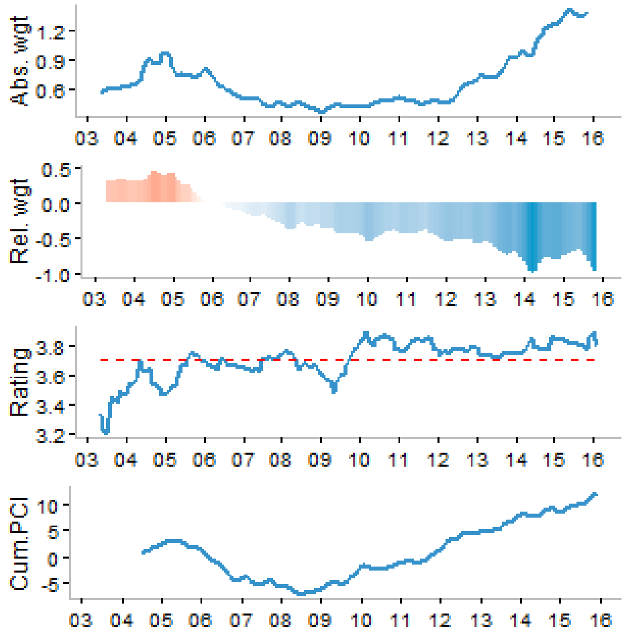
# Other popular investment themes

## Tech frenzy

The global technology sector has seen re-rating and heavy inflows, as shown in Figure 25. However, this positioning has been underweight net of the benchmark; active (institutional) managers appear more bearish than the recent rally suggests.

Sell-side sentiment has been pinned near the top of its historical range since 2010 and is otherwise not noteworthy, in our view. However, we believe the extent of crowded buying suggests that this sector is racing ahead of its long-term positioning, which has historically resulted in a pull-back.

**Figure 25: Internet stocks**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

## Short energy

Crude oil's precipitous price decline has been the source tremendous investor attention, but this has been reflected in equity markets. Trends in Europe energy (Figure 28), Asia ex-Japan energy (Figure 34) and US energy (Figure 49) all indicate divestment from global energy sectors, on both a gross and net basis.

In Asia ex-Japan and particularly in Europe, this positioning has been accompanied by severe sell-crowding in recent history. The US has seen a relatively more benign rush towards the exits, though the relative price decline has been globally comparable.

## Renminbi depreciation

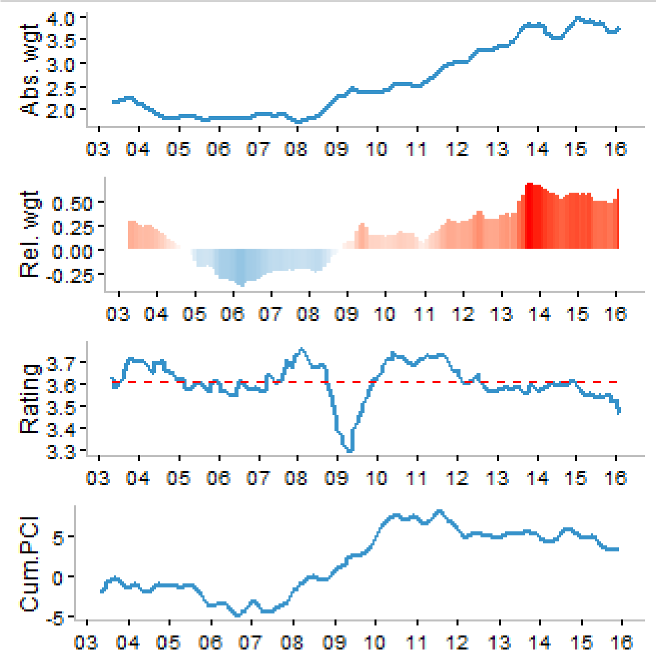
To model how equity investors position under the pressure of renminbi depreciation, we build two portfolios consisting of the highest and lowest betas to the Rmb/US$ exchange rate. Figure 26 shows strong inflows into stocks with high positive correlation with renminbi since 2008, which was consistent with an increase in their weights relative to MSCI AC World. This trend started to reverse in 2015, amid concerns over a China slowdown and renminbi depreciation.

**Long-term positive positioning trend started to turn in 2015…**

Sell-side sentiment declined significantly during the GFC and rebounded sharply subsequently. However, it has been sliding downward since 2011, which largely coincided with panic-selling during the period.

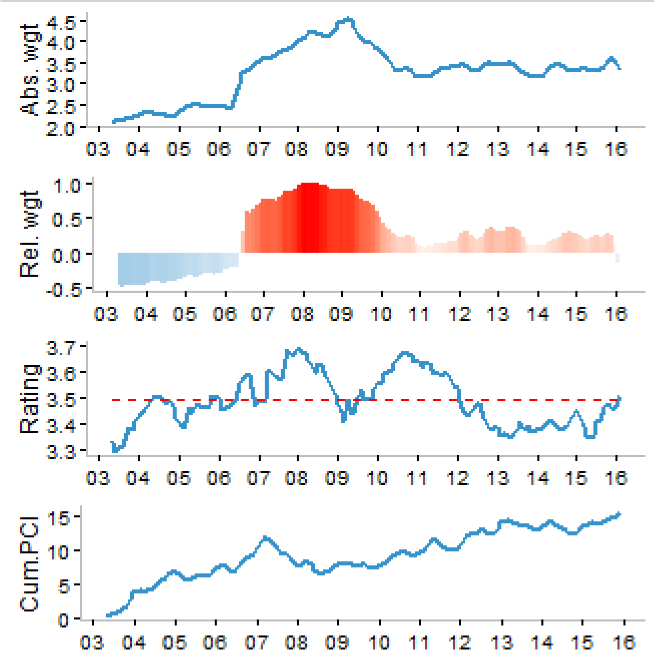
**…and sell-side sentiment and performance have been trending down since 2011**

**Figure 26: Positive beta against Rmb**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 27: Negative beta against Rmb**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

Conversely, bearish positioning on the stocks with large negative correlation with the renminbi peaked during the GFC and has largely flat-lined since. Sell-side sentiment was negative (on renminbi downside) for a long time and started to pick up in 2015. The PCI indicates a trend of buy-crowding on names with negative exposure to the renminbi.

Putting everything together, we believe the crowded trade on stocks with high positive correlation with the renminbi has started to unwind, and the crowded trade on stocks with large negative correlation with the renminbi has just started to gather pace.

# Sectors

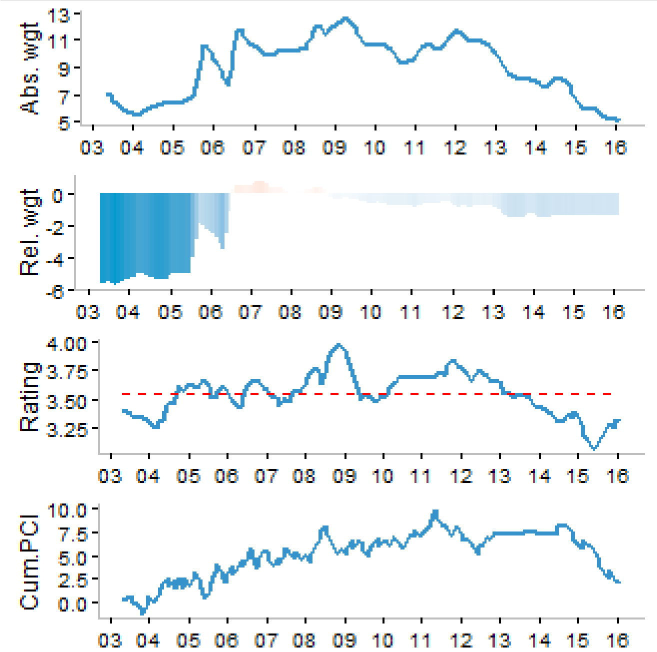
## Developed Europe

**Nick Nelson, Head of European Equity Strategy**

**Karen Olney, Head of Thematic Strategy**

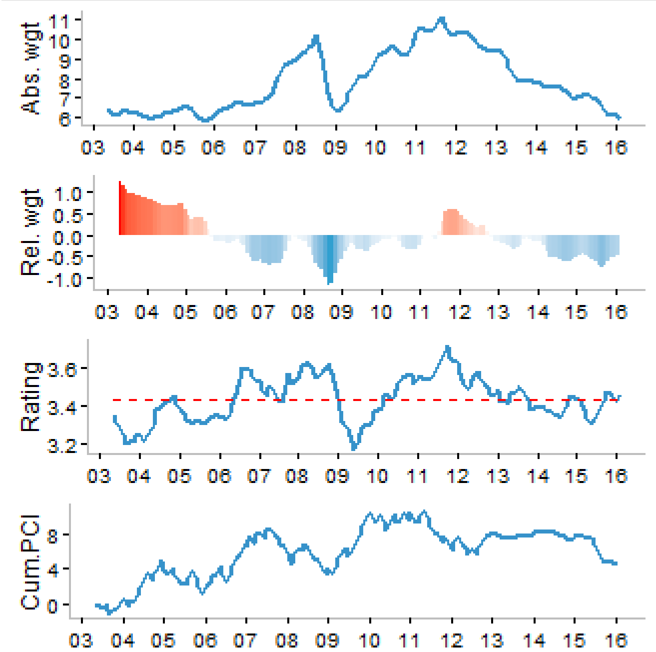
From a fundamental perspective, we would agree that most European investors appear to be underweight energy and materials as EM commodity plays. The same seems true for utilities, but to a far lesser degree, given the sector's less direct exposure to commodity prices and the comparatively stable and regulated nature of its business.

**Figure 28: Energy**



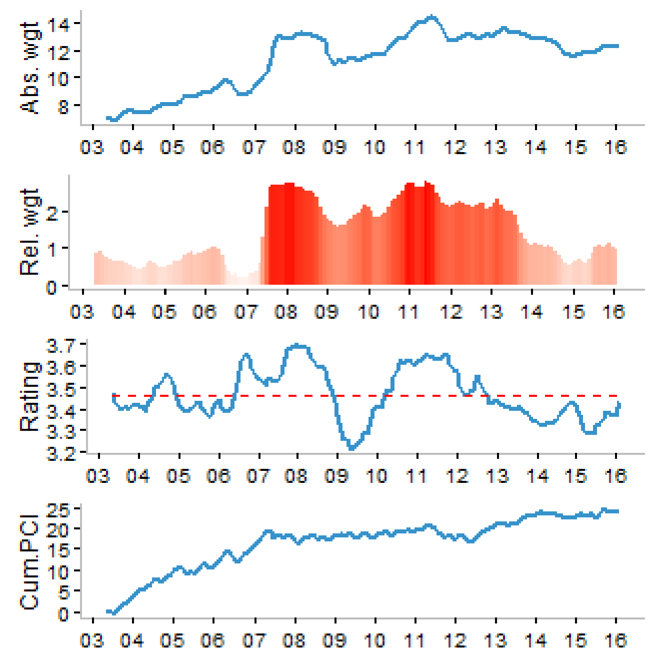

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 29: Materials**



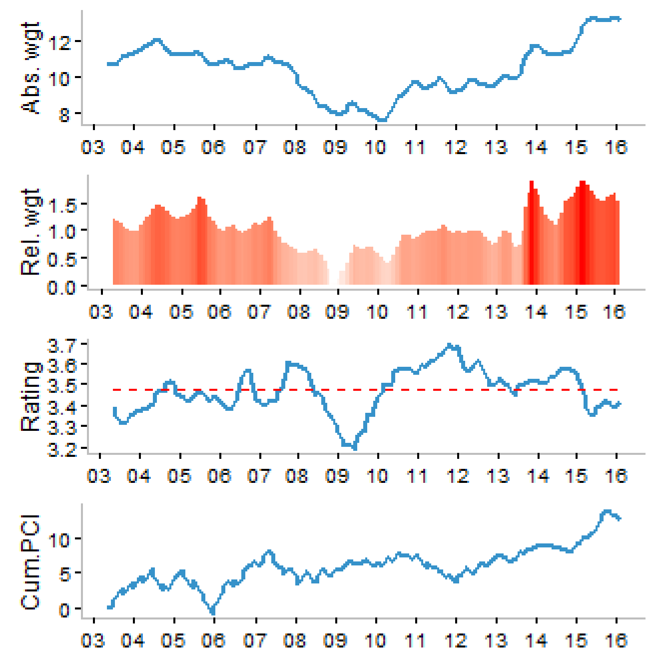

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 30: Industrials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 31: Consumer discretionary**



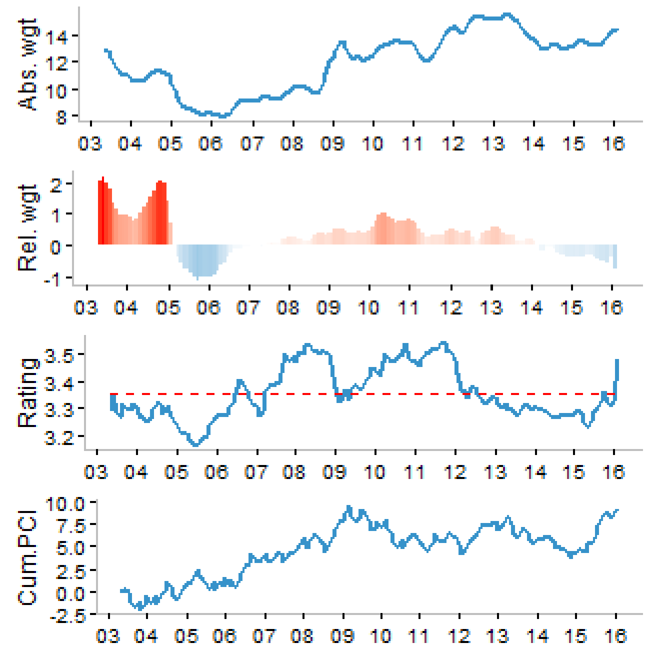

Source: MSCI, IBES, FactSet, UBS Quantitative Research

Consumer discretionary has fared better than industrial cyclicals, as service-sector data has held up better than industrial surveys, and some sub-sectors, such as media, have performed well.

**Underweight in consumer staples—a popular cash flow safe-haven for investors—is surprising**

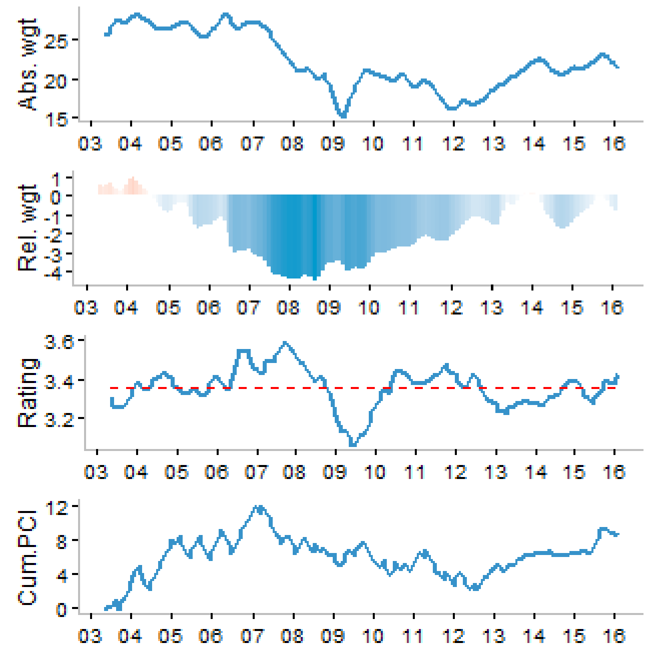
We are surprised by the data suggesting underweight in consumer staples, albeit marginally. Anecdotally, many investors have been hiding in this space for the relatively predictable cash flow and, until recently, dividend yields.

**Figure 32: Consumer staples**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 33: Financials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

It is interesting to see the gap in underweight within financials closing so rapidly, as this is different to the message we have been getting from investors. Also, given banks have been the worst performing sector in Europe YTD, with a sharp fall in the last two weeks of January, we wonder if this data captures the most recent positioning. Within financials, many investors have expressed a preference for the insurance sector over the banks, which may not be reflected in these figures.

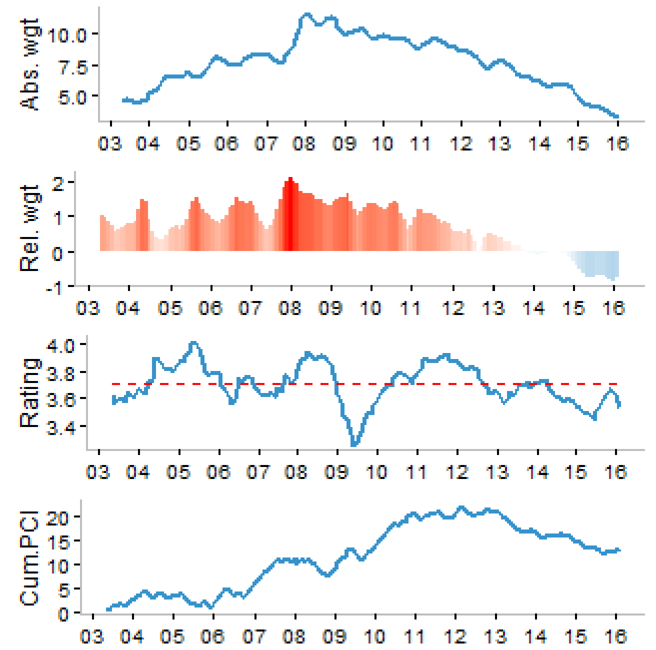
**The underweight in financials is surprising; contrary to investor sentiment, albeit anecdotally**

## Asia ex-Japan

In Asia ex-Japan, investors have cut their energy holdings, as the oil price has come down. Positioning has been trending lower since the oil-price peak in 2008, but investor selling accelerated in 2015 on renewed oil-price pressure.

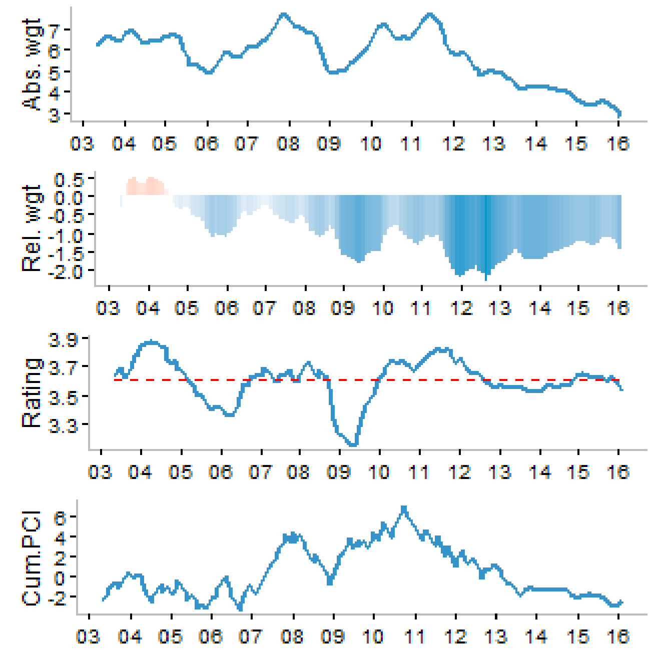
Matthew Gilman, Asia equity strategy

**Figure 34: Energy**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

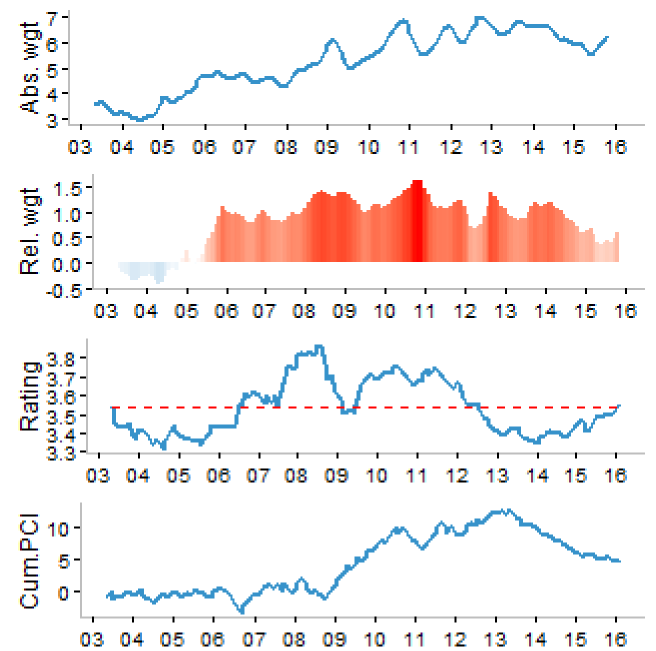
**Figure 35: Materials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

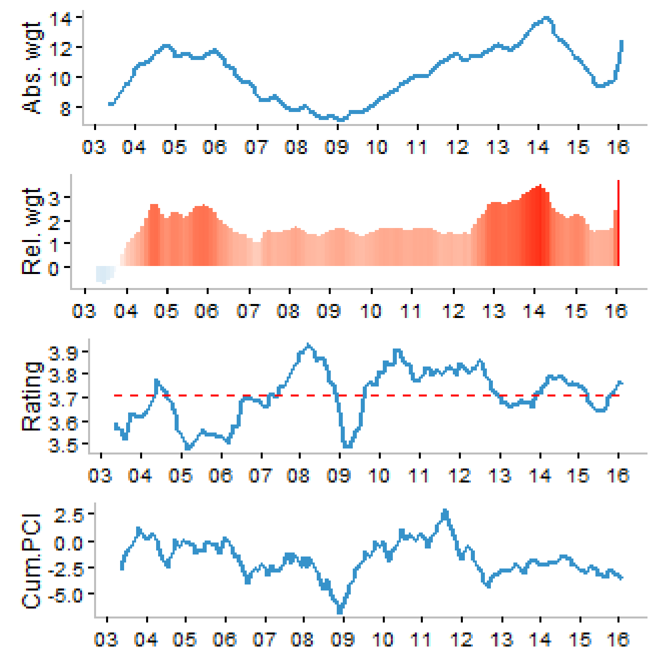
Similarly, investors have been running underweight positions in materials and industrials in recent years, as oversupply concerns and a slowdown in China's investment spending came to the fore.

**Figure 36: Consumer staples**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 37: Consumer discretionary**

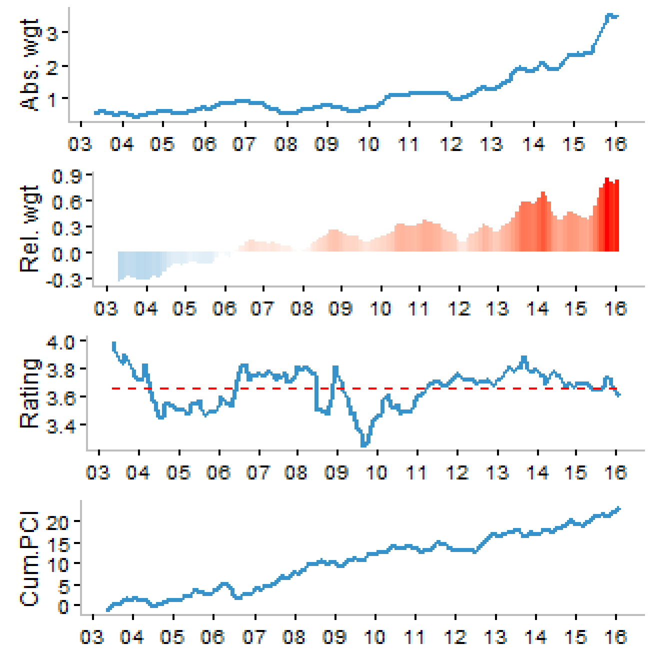



Source: MSCI, IBES, FactSet, UBS Quantitative Research

Instead, consumer stocks were favoured as structural growth stories in the slow-growth and low-yield environment after the GFC. Though more recently, as we approached an end to zero rates in the US and credit growth has begun to slow at the end of an Asian credit cycle, investors have reduced their positioning in the consumer sectors. China's anti-corruption clampdown has also contributed to slower growth in Macau gaming and luxury goods stocks in the consumer discretionary sector.

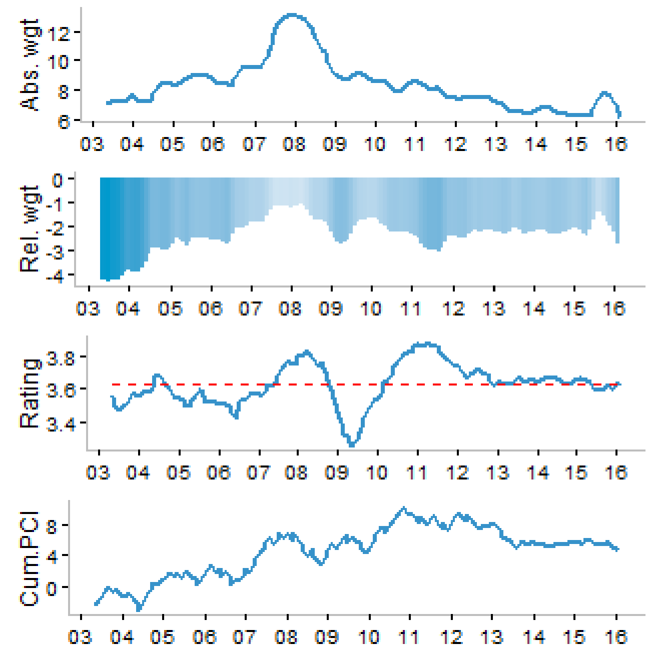
**Divestment of consumer stocks at tail-end of Asian credit cycle**

**Figure 38: Healthcare**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 39: Industrials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

Healthcare is now investors' preferred sector in the region, given that it is relatively insulated from Asia's growth slowdown and provides structural growth from demographic trends—ageing population, urbanisation and increased affordability.

**Healthcare preferred, owing to demographic tailwinds**

## Japan

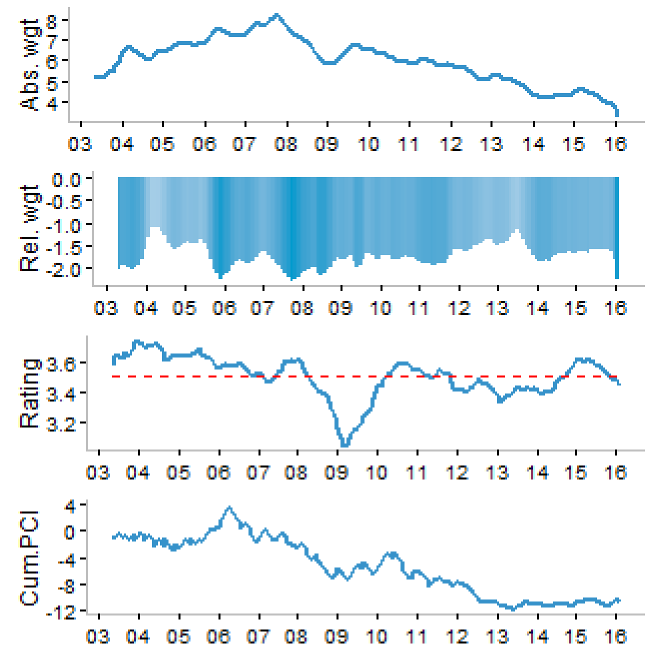
Tomohiro Okawa, Japan equity strategy

Investors' preferences for Japanese stocks are similar to the trends in other industrialised markets; investors are clearly underweight in manufacturing sectors and overweight in domestic demand-oriented sectors. However, we think the outlook that is apparent from factor levels and trends is interesting.

For example, Figure 40 shows the absolute weighting for materials has been trending down for a long time, but the relative weighting has rebounded slightly from a 2014 bottom, although it appears that momentum since 2015 picked up owing to the decline in oil prices.

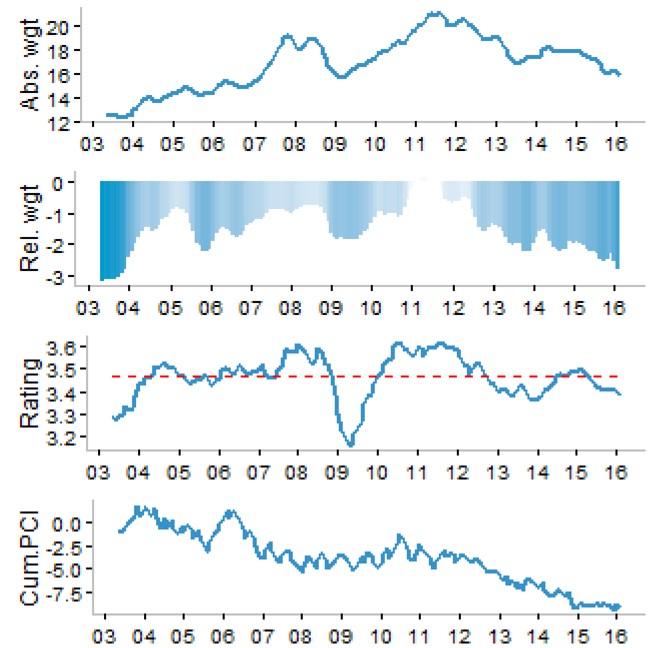
In addition, with the PCI hovering at all-time lows, quantitatively it has been a 'stay away' situation, but the downside risk looks lower than for other sectors, in our view. Meanwhile, the relative weighting of industrials, another cyclical sector, is at a record low and trending downward, and the outlook is not positive based on other figures also. Among sectors with similar characteristics, differences in investors' preferences are apparent.

**Figure 40: Materials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

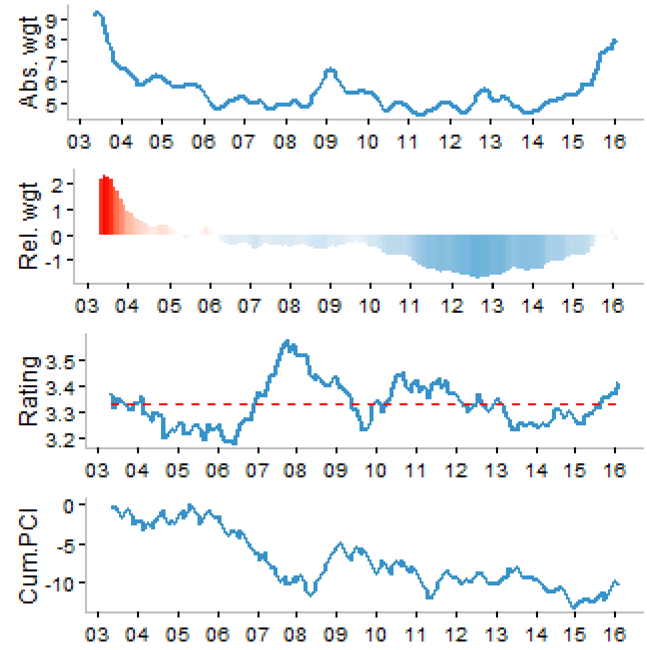
**Figure 41: Industrials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

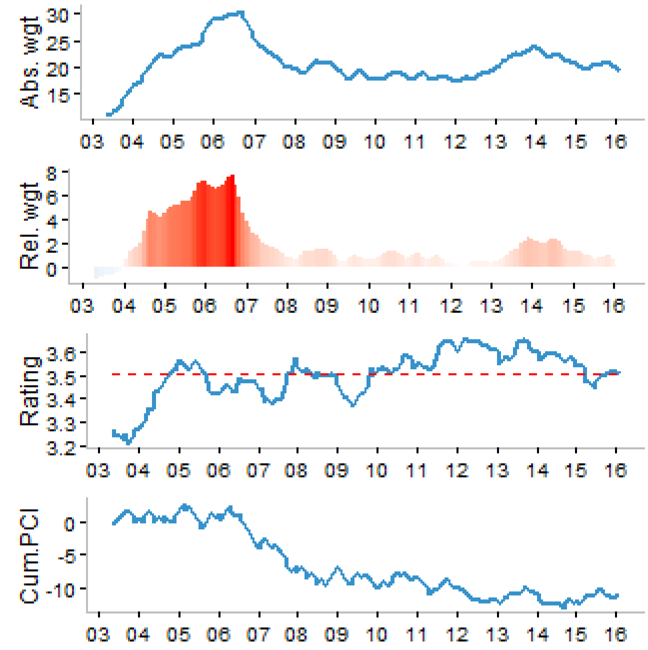
Domestic demand-oriented sectors have done well. Healthcare (Figure 42) has rebounded from a 2013 bottom, in terms of various factors. Healthcare is known for its high dividends, and we believe high expectations for capital returns to shareholders since the start of Abenomics in 2013 have probably attracted investors.

**Figure 42: Healthcare**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

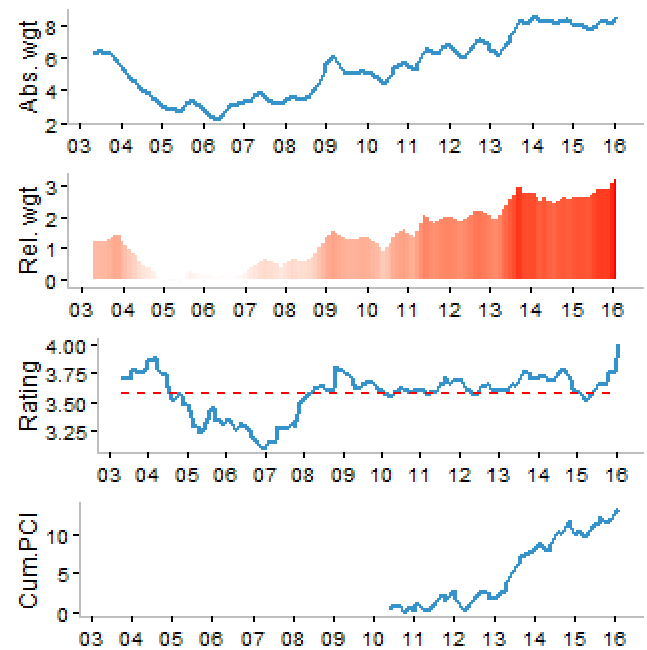
**Figure 43: Financials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

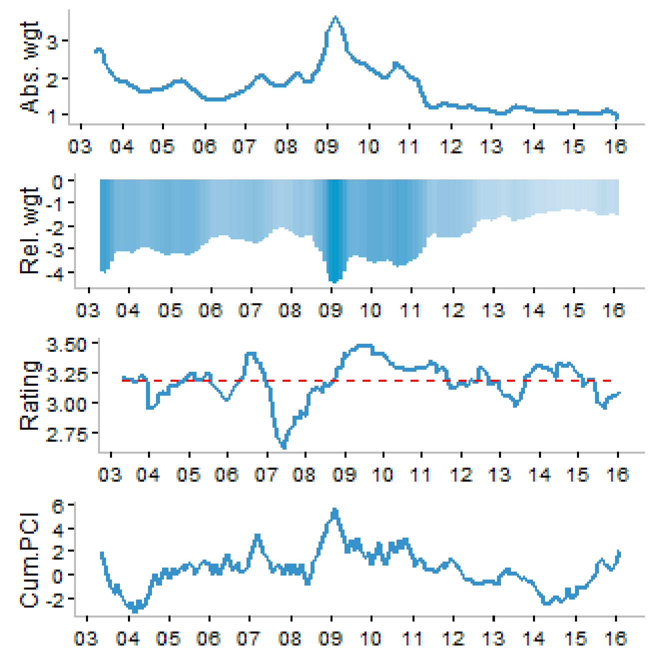
Figure 43 confirms that financials have been losing momentum with a post-financial crisis overweight peak in 2014, and we expect moves to avoid the sector to pick up, owing to the Bank of Japan's decision to adopt a negative interest rate policy. The overweight in telecom services continues, but all the figures are stronger than past levels, suggesting limited upside potential, in our view. However, given current market conditions, and telecom companies' sharp increases in share buybacks, we would not be surprised if the overweight in telecom continues in the short term.

**Figure 44: Telecom services**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 45: Utilities**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

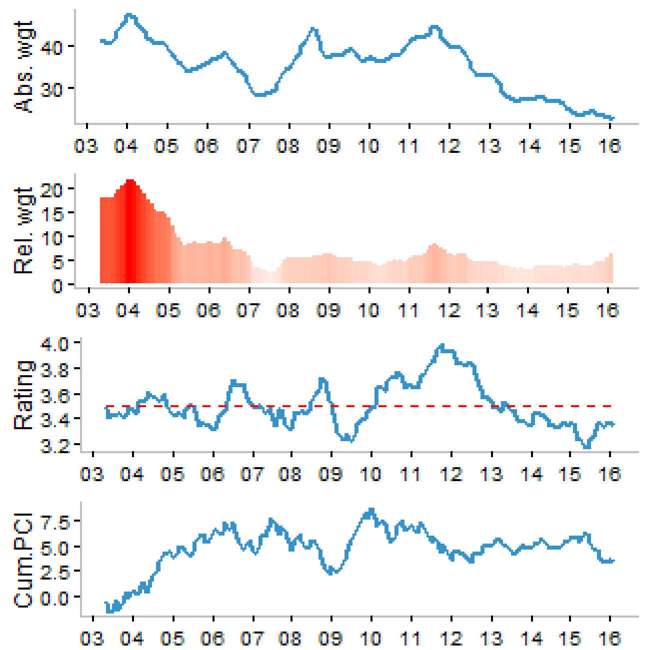
## Australia

David Cassidy, Chief Strategist, Australia

The resource sector has been under pressure for several years now, as commodity prices continue their reversion back to pre-boom levels, driving big earnings downgrades. In the past 12 months, performance of almost all mining and energy stocks has been poor, with the gold segment the only bright spot.

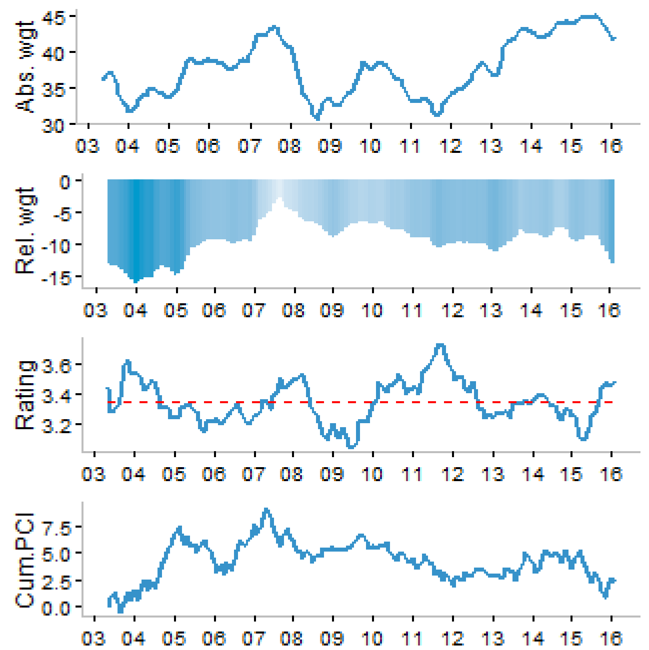
Performance in the Australian financials sector over the past year has been mixed. REITs have been the standout, as investors sought earnings safety and income security. After previous strong performance, the Australian banks have struggled in the past year, due to regulatory capital-based equity issuance and, more recently, the impact of the global banking sell-off. Diversified financials had a surprisingly good 2015, despite the disappointing equity-market return. Individually, strong earnings performance drove a number of stocks in the sector, although the industry has succumbed to selling pressure YTD.

**Figure 46: Resources**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

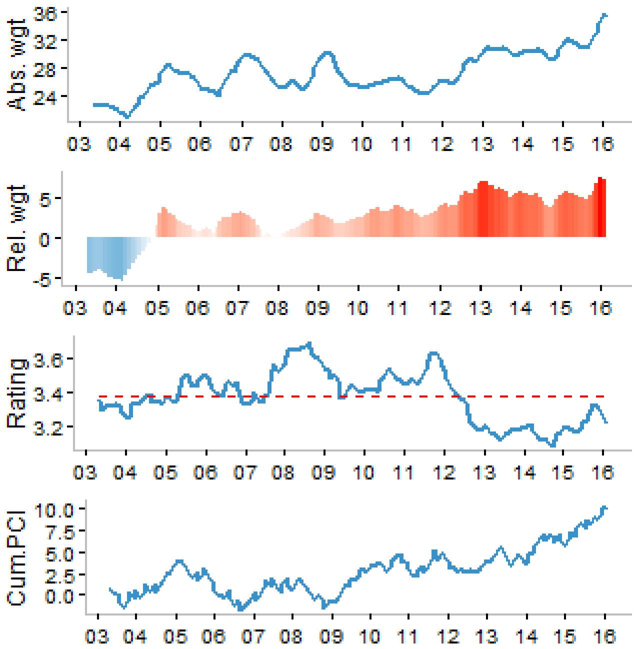
**Figure 47: Financials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

The industrials ex-financials sector has outperformed over the past year, with investors seeking defensive growth and selected earnings momentum stories. While there has been some earnings pressure in pockets of the industrials sector (eg, consumer staples), generally profitability conditions have remained reasonably benign with the lower Australian dollar assisting a number of the big foreign-currency earners.

**Figure 48: Industrials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

## US

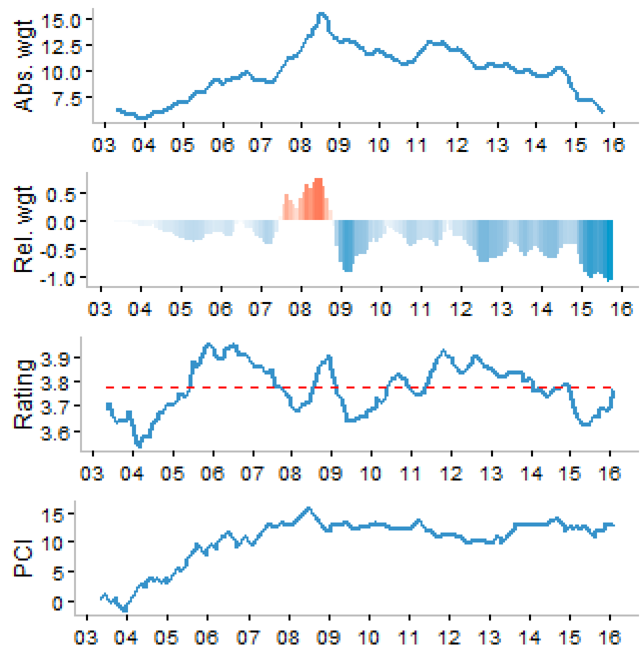
**Julian Emanuel and Omar Elangbawy, US Equity and Derivatives Strategy**

From a fundamental perspective, we would agree that heading into 2016, underweight energy and overweight healthcare appeared to be the two most crowded trades among US investors, albeit for varying reasons. While sentiment/exposure to commodity-related sectors has been tied to the precipitous decline in oil prices, sectors such as healthcare and consumer discretionary have benefitted from the ability to generate top-line growth in a slow-growth economic environment. Meanwhile, we believe a historically low-interest-rate environment and a strong US dollar affect the relative crowdedness of higher-yielding and FX-sensitive sectors, as utilities, telecom, consumer staples and industrials.

Given the collapse in oil prices over the past two years, and a significant amount of high-yield debt issuance in the energy space, the energy sector has been, unsurprisingly, the most 'crowded' short among US investors. However, the potential for oil-price stabilisation plus substantial short covering, or an improvement in commodity-related sentiment, could cause this trade to unwind rather quickly, in our view. Despite persistent pressure on oil prices YTD, the energy sector has outperformed the broader S&P500 index by 80bp.

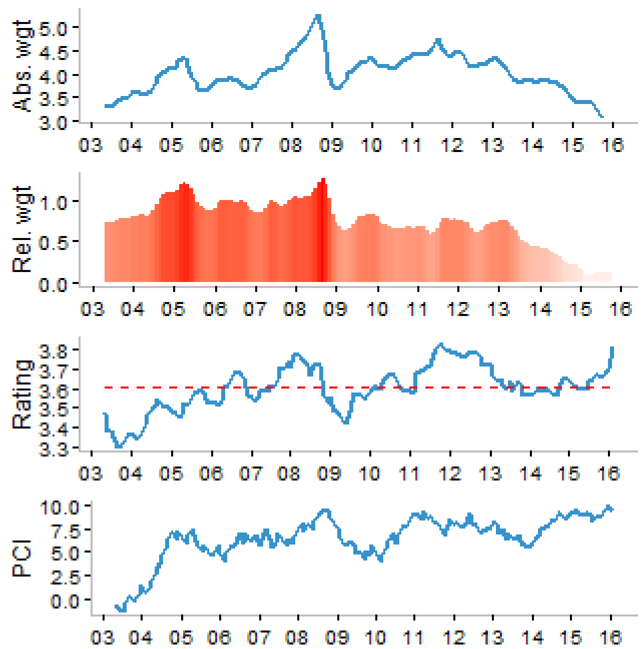
While the materials sector has also been impacted by commodity-price pressures, the rise in our sell-side indicator is potentially related to the mining and metals exposure of the sector, particularly gold, given the recent flight to safety in a volatile trading environment.

**Figure 49: Energy**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 50: Materials**

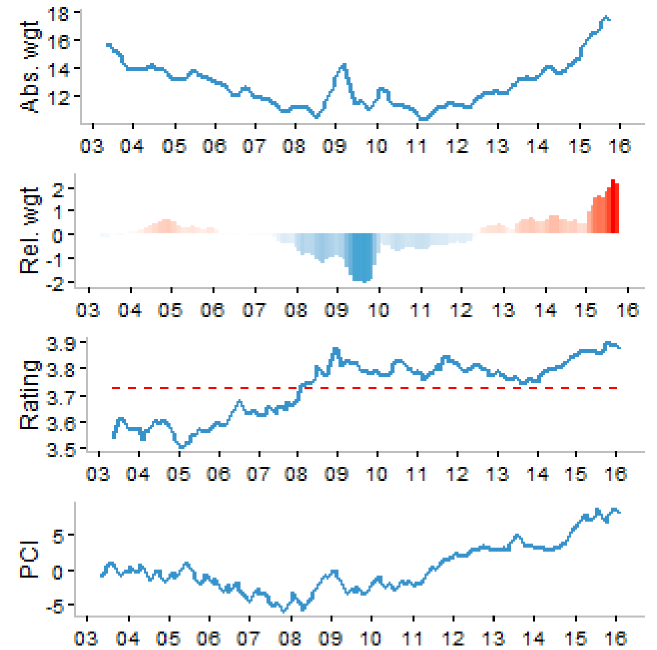



Source: MSCI, IBES, FactSet, UBS Quantitative Research

On the long side, healthcare has been the most crowded long but showed the first signs of reversal in August last year. Broadly speaking, we believe the sector benefitted from an ageing population, increased regulation (driving volumes higher), healthy corporate balance sheets (which drove M&A activity) and, perhaps most importantly, pricing power that resulted in ample top-line growth (in an environment characterised by limited revenue growth potential). However, as political rhetoric increased, with a substantial degree of attention focused on potential predatory pricing tactics in the pharma/biotech spaces, the healthcare sector has underperformed by more than 200bp since the start of the year.

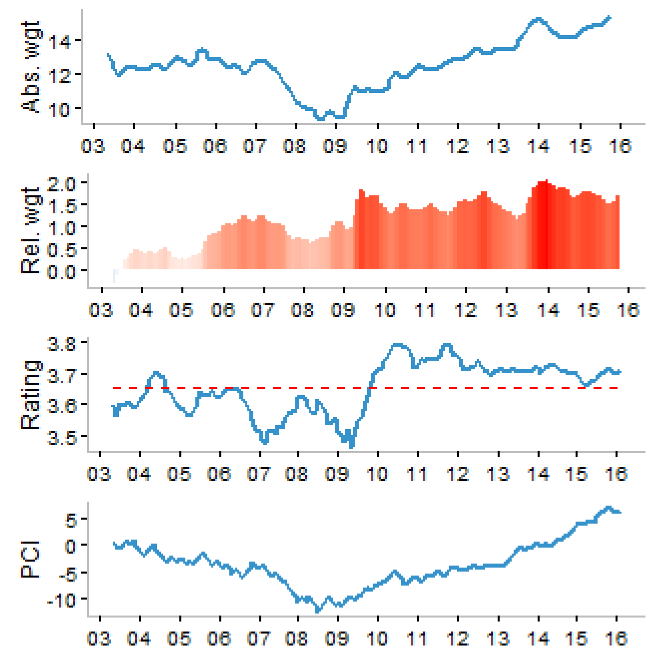
Like healthcare, we believe the relative overweight in consumer discretionary is due to its attractive top-line growth profile, particularly relative to the rest of the index. Nonetheless, in the face of rising volatility, US investors have been willing sellers of previous winners, likely explaining why the sector has underperformed the S&P500 by more than 150bp YTD, in our view.

**Figure 51: Healthcare**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 52: Consumer discretionary**

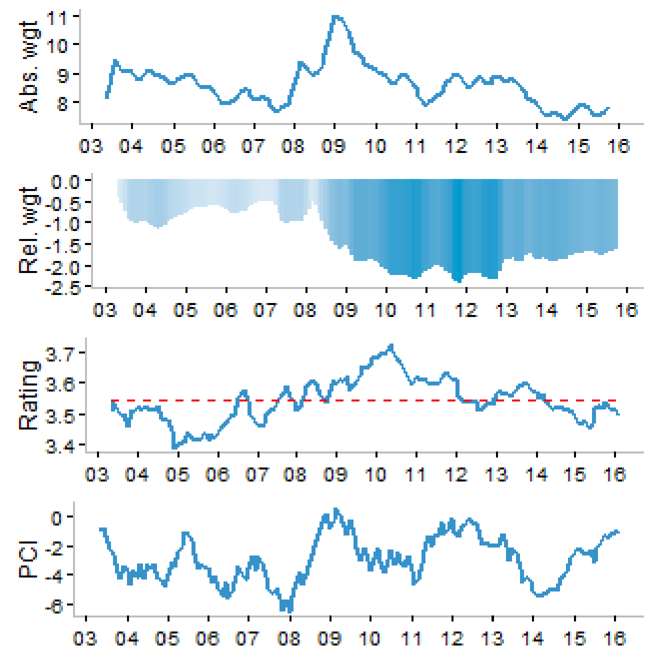



Source: MSCI, IBES, FactSet, UBS Quantitative Research

We think the ongoing US economic recovery since the financial crisis and the strength of the US dollar (given the headwind to multinational corporate earnings) largely explain the relative underweight in consumer staples over time. However, given the defensive nature of the sector, we would have expected this to have reduced/reversed in the current environment (the sector has outperformed by nearly 700bp YTD).

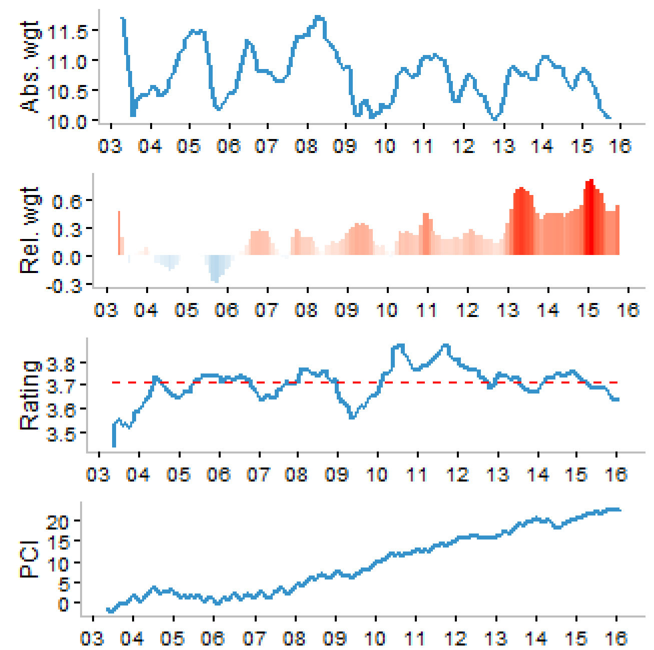
On the other hand, given dollar strength and oil-price weakness, the relative overweight in industrials also is not anecdotally apparent, in our view. This could be due to the degree of energy/materials underweight, or expectations for a reversal in US-dollar pressures and a cyclical recovery as oil prices stabilise.

**Figure 53: Consumer staples**



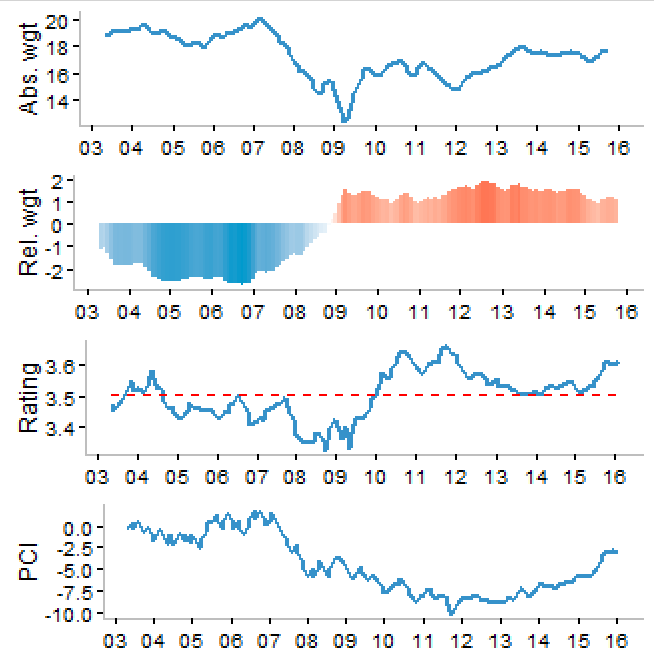

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 54: Industrials**



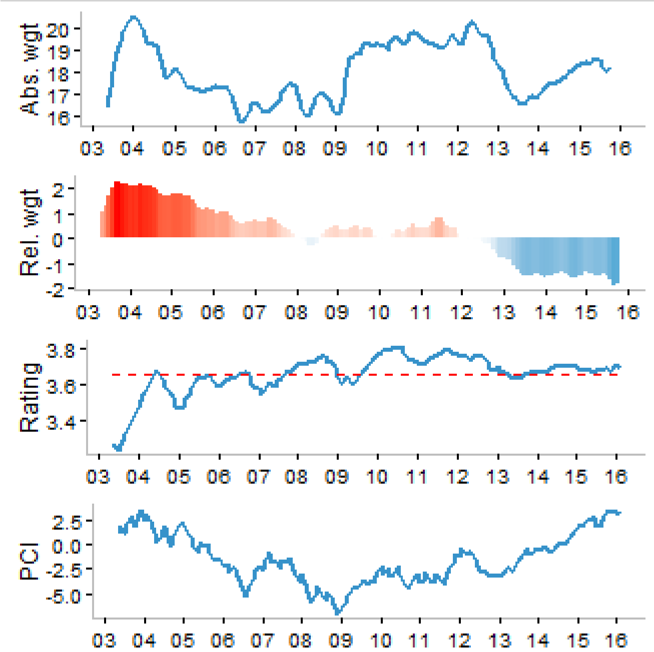

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 55: Financials**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

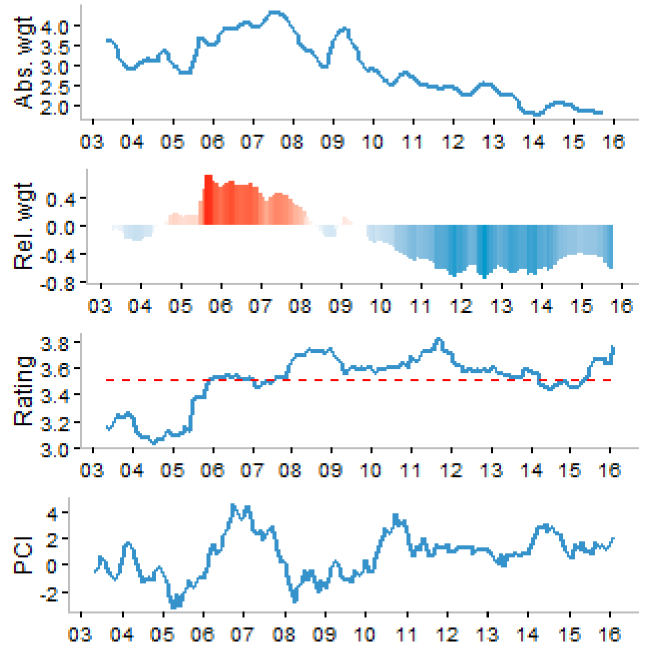
**Figure 56: IT**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

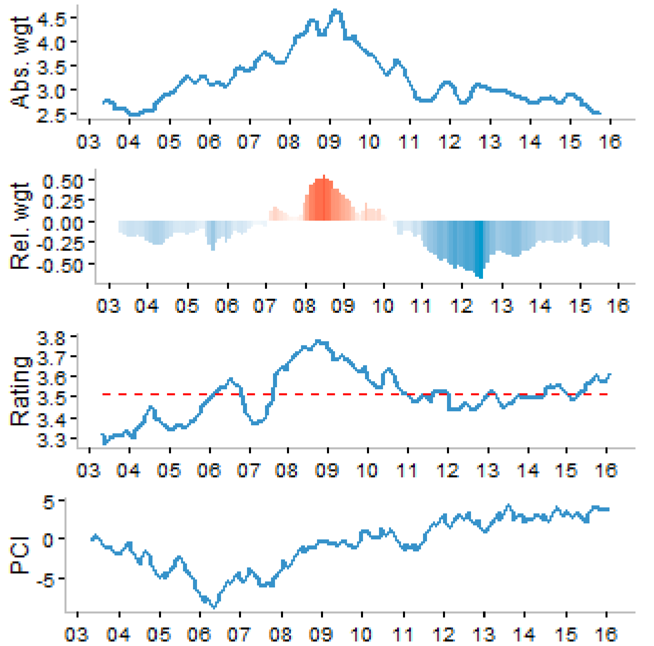
In an environment in which the US 10-year yield is below 1.8%, the defensive characteristics (ie, stability) and yields of the telecom and utilities sectors would lead us to expect a larger relative overweight in the current market. They have been the two strongest performing sectors YTD, outperforming the S&P500 index by nearly 14% and 12%, respectively.

**Figure 57: Telecom services**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 58: Utilities**

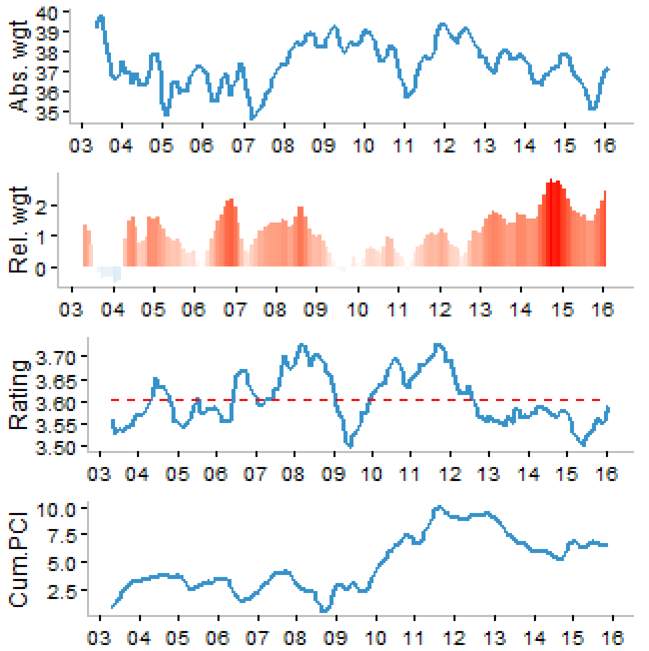



Source: MSCI, IBES, FactSet, UBS Quantitative Research

## Investment styles

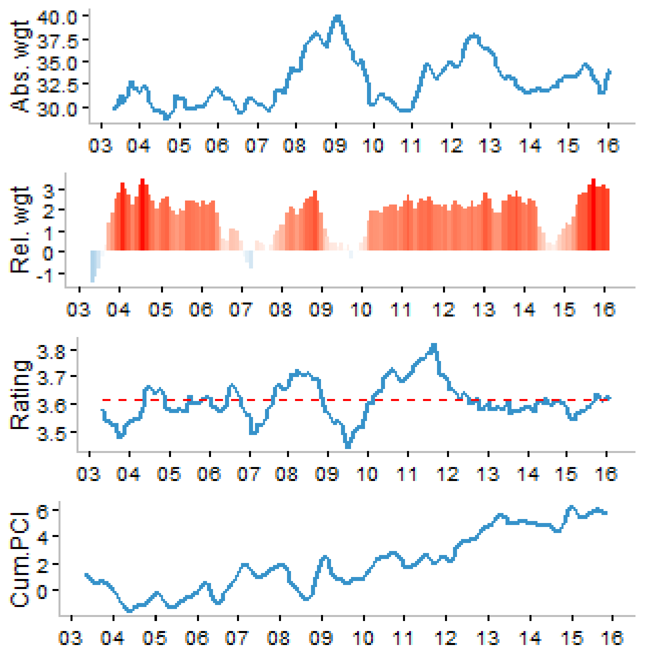
Investors have consistently favoured stocks with high ROE, strong price momentum and robust forecast earnings growth over value stocks throughout most of the history of the data set. The outperformance of these strategies during the past decade appears to justify this preference.

**Figure 59: High ROE**



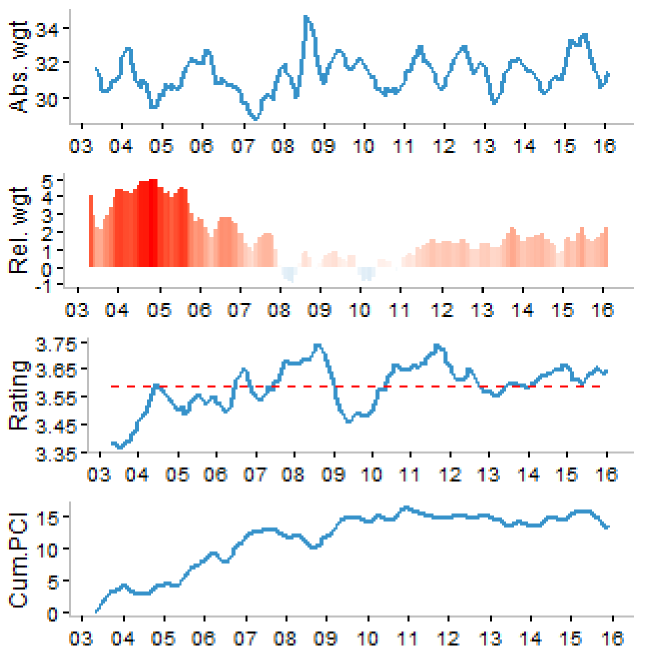

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 60: High 12-month price momentum**



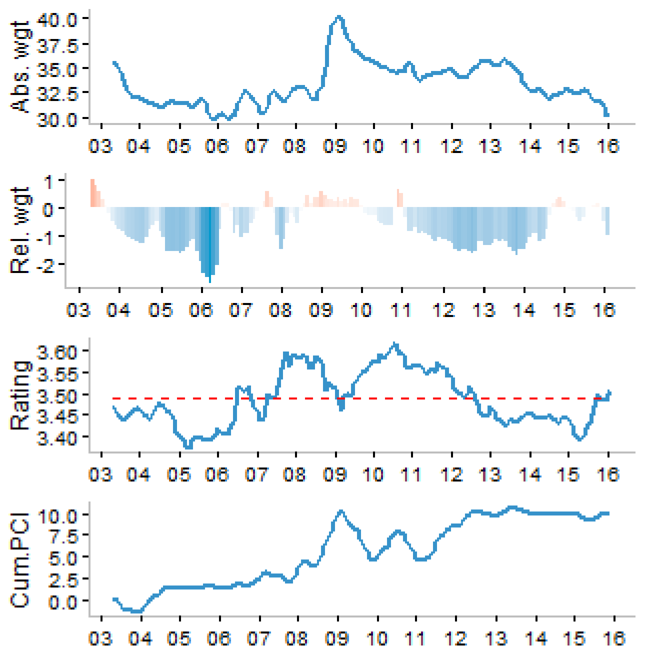

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 61: Forecast earnings growth**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

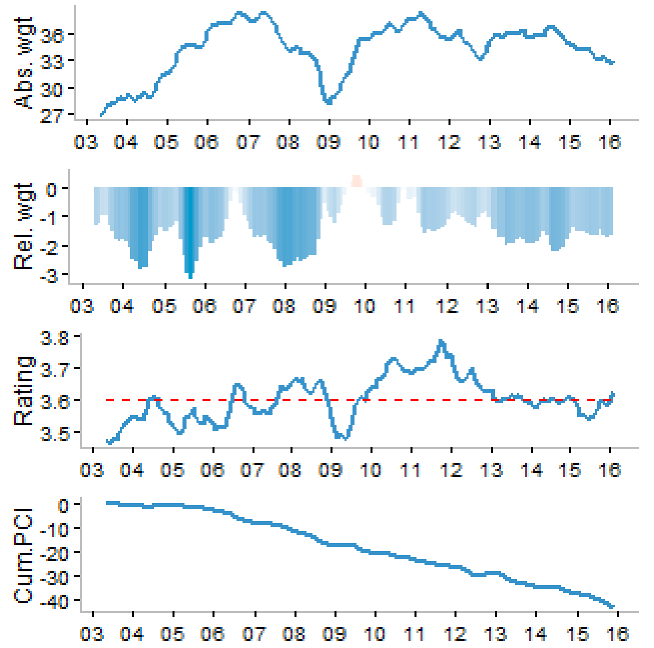
**Figure 62: Low beta**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

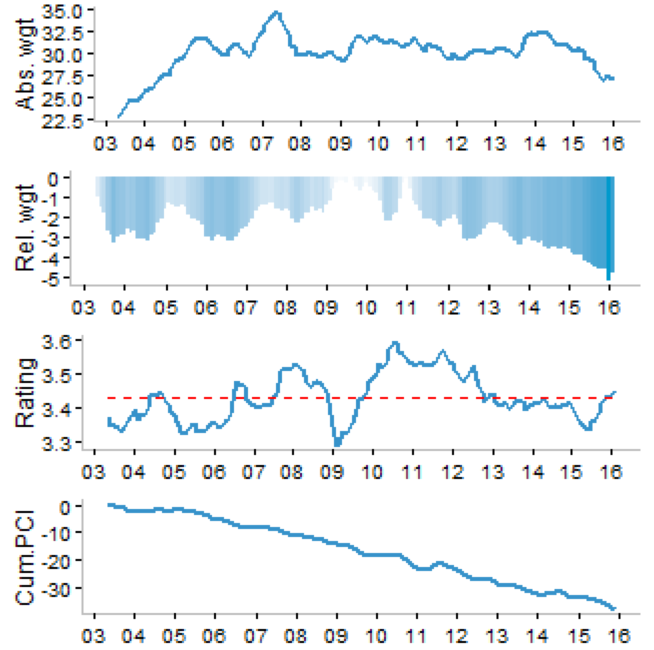
Low-beta stocks were neglected before the GFC and became popular during the crisis. As the market rebounded at the beginning of 2009, investors wound down their positions, but the style has returned to favour in the past few years.

**Figure 63: High earnings yield**



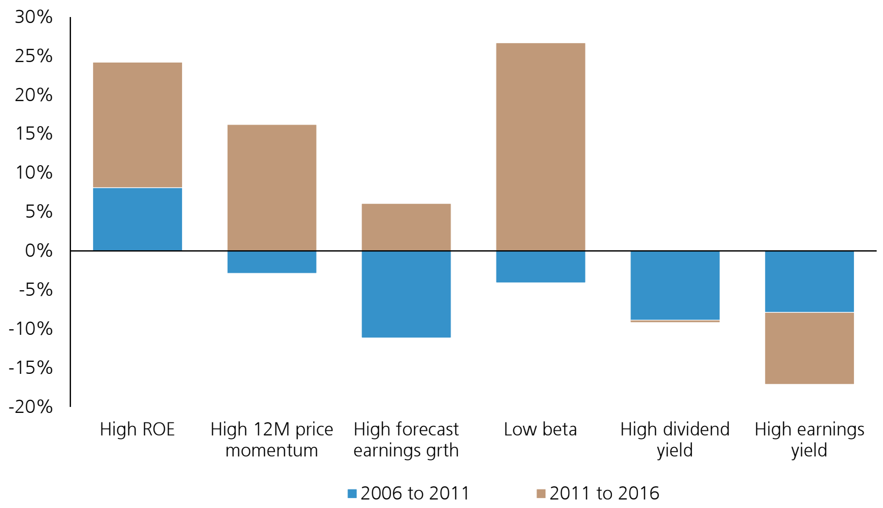

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 64: High dividend yield**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 65: Style performance over the past 10 years**




Source: MSCI, IBES, UBS Quantitative Research

# Appendix

## Construction of the active trading portfolio

Specifically, the weight of stock $i$ trading at price $p$ in this portfolio at month $t$ is:

$$w_{it} = \frac{p_{it} * \sum_j \# \, shares \; held \; by \; fund \; j}{\sum_i \left(p_{it} * \sum_j \# \, shares \; held \; by \; fund \; j\right)}$$

This essentially represents the total amount of the stock held by institutional asset managers, as a percentage of their total holdings (or more precisely, the managers whose holdings are captured in the ownership database).

## PCI

At the end of each month, we calculate the PCI for each of the target basket in the following steps:

1. At the end of month $t$, we calculate the pairwise correlation for the basket (denoted as $r_{ti}$, where $i = 1, 2, \dots, n$, and $n$ is the number of pairs), using the past one month's daily relative returns (relative to benchmark)

2. Apply the Fisher transformation to the correlations

$$R_{ti} = \operatorname{arctanh}(r_{ti}) = 0.5 * \ln\left(\frac{1 + r_{ti}}{1 - r_{ti}}\right)$$

3. Compute the mean of the transformed correlations, $R_{ti}$, across all pairs of stocks in the target basket and adjusted the mean by dispersion of the transformed correlations (denoted as $FMPC_t$)

$$FMPC_t = \frac{mean(R_{ti})}{stdev(R_{ti})}$$

4. Generate 1,000 random portfolios with the same number of stocks as the target basket, and repeat steps 1 to 3 for these 1,000 random portfolios (denote as $MMPC_{tj}$, where $j = 1, 2, \dots, 1000$)

5. Calculate the market relative z-score:

$$Z_t = \frac{\left(FMPC_t - mean\left(MMPC_{tj}\right)\right)}{stdev\left(MMPC_{tj}\right)}$$

6. Calculate the monthly hit rate, $H_t$, of the target basket as the percentage of stocks in the basket that outperformed the market during the month. Define months with $H_t \geq 50\%$ as buy and $H_t < 50\%$ as sell.

7. Calculate the percentile of the monthly $Z_t$ using its past 60 months' history, conditioned on the directions of the trades, which finally forms the Performance-based Crowding Indicator, $PCI_t$. More precisely, if it is buy at month $t$, calculate the percentile of $Z_t$ with respect to all the $Z_{t-i}, i \in 1, 2, \dots 59$ where $t - i$ months were also defined as buy. Likewise when month $t$ is defined as sell.

## Coverage-weighted aggregated ratings

At the end of month $t$, we calculate the coverage-weighted aggregated ratings for a portfolio as:

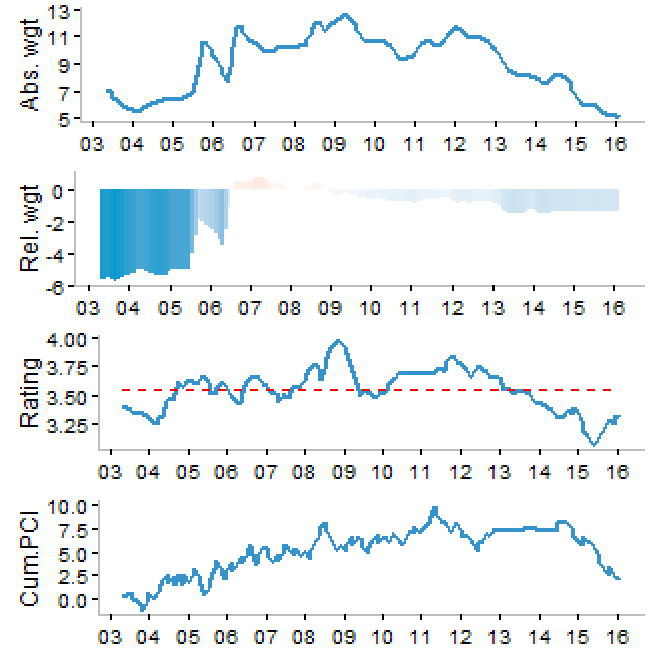
$$R_t = \frac{n_{ti} * r_{ti}}{\sum_i (n_{ti} * r_{ti})}$$

where $r_{ti}$ is the consensus rating for stock $i$ in month $t$; $n_{ti}$ is the number of analysts contribute to the consensus rating for stock $i$ in month $t$.

# Supplementary charts

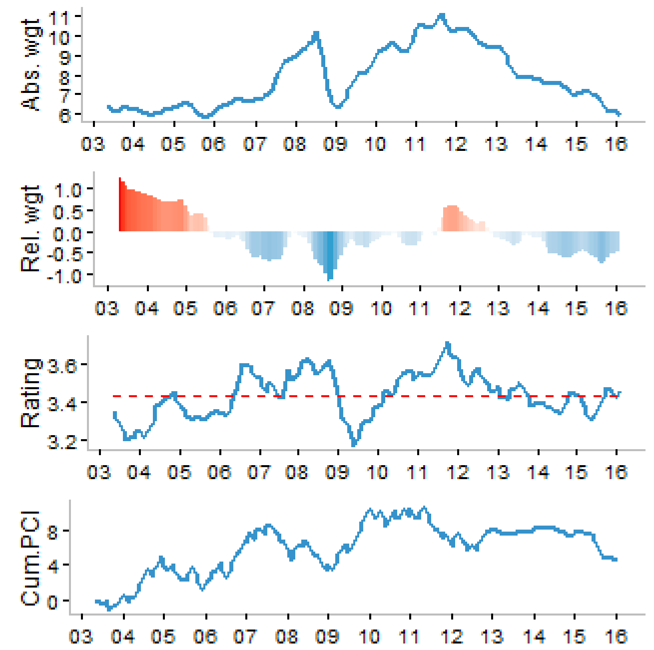
## Developed Europe

### Figure 66: Energy



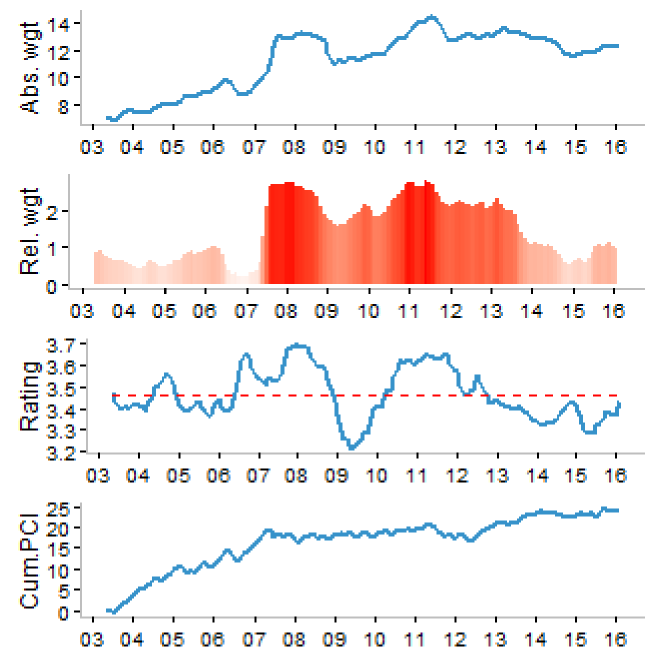

Source: MSCI, IBES, FactSet, UBS Quantitative Research

### Figure 67: Materials



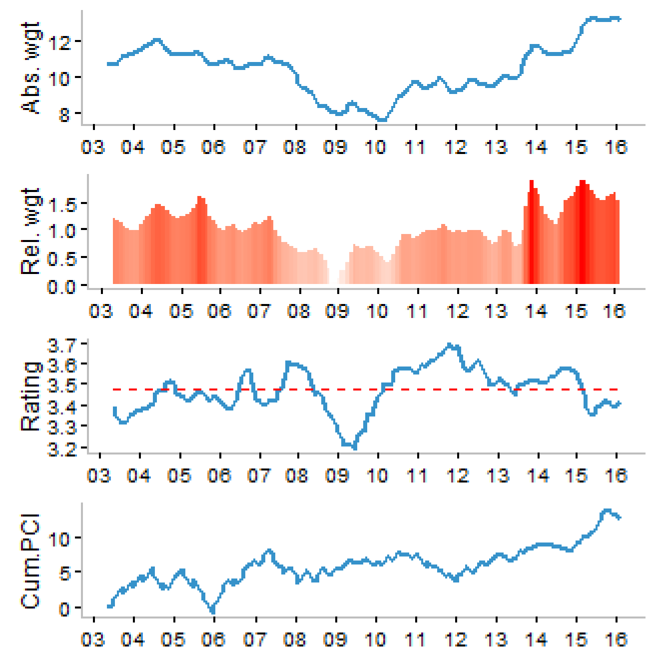

Source: MSCI, IBES, FactSet, UBS Quantitative Research

### Figure 68: Industrials



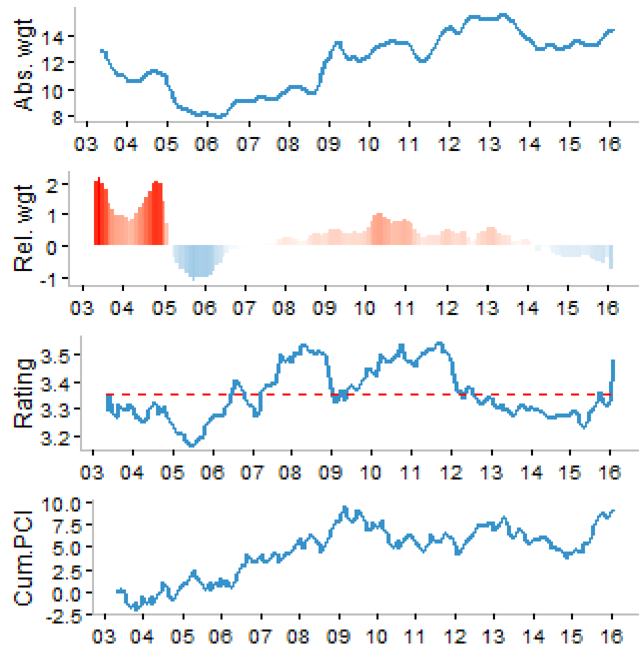

Source: MSCI, IBES, FactSet, UBS Quantitative Research

### Figure 69: Consumer discretionary



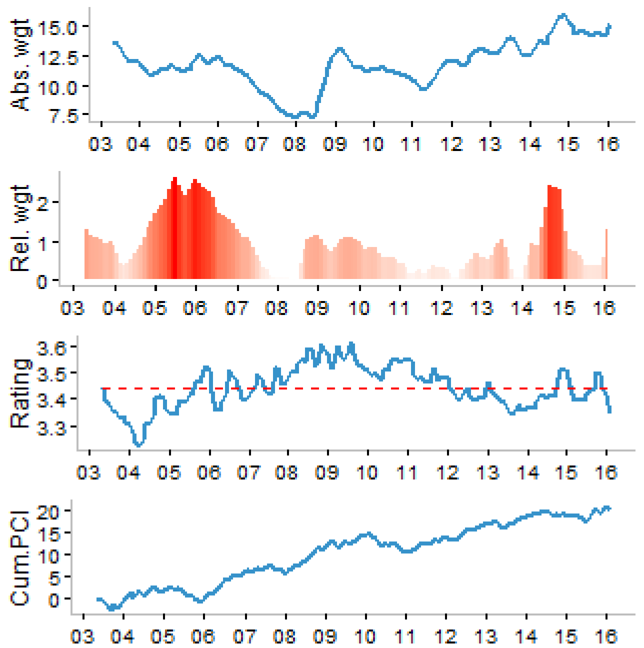

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 70: Consumer staples**



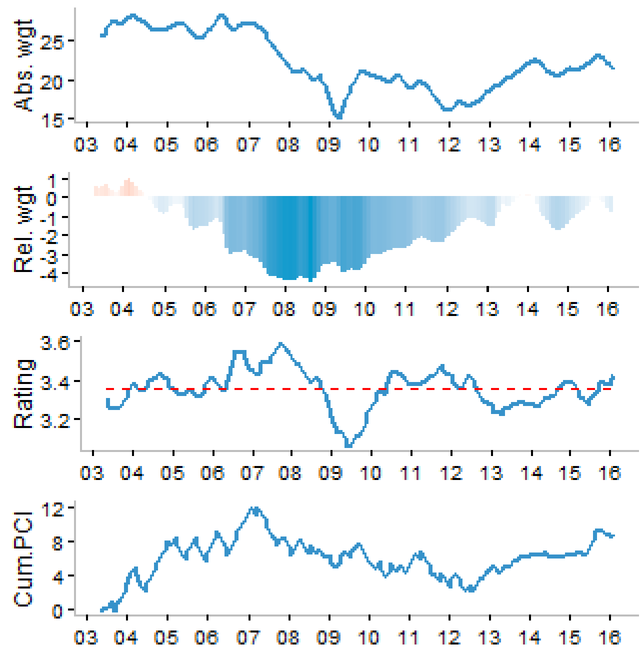

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 71: Healthcare**



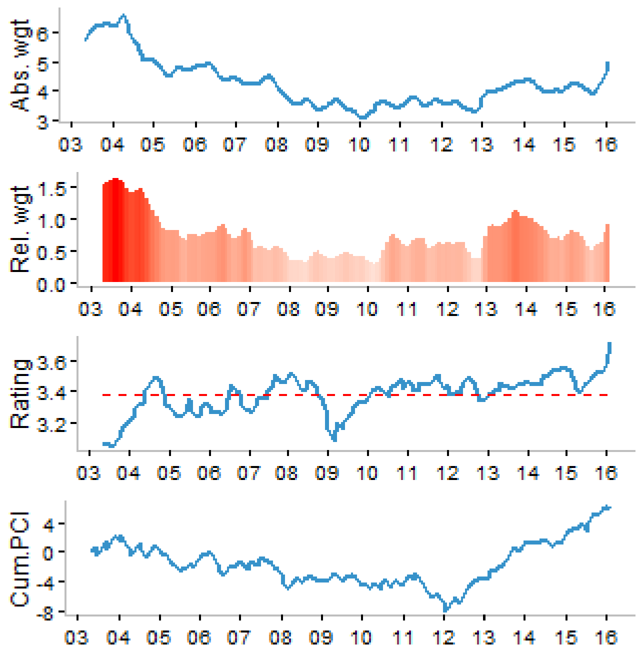

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 72: Financials**



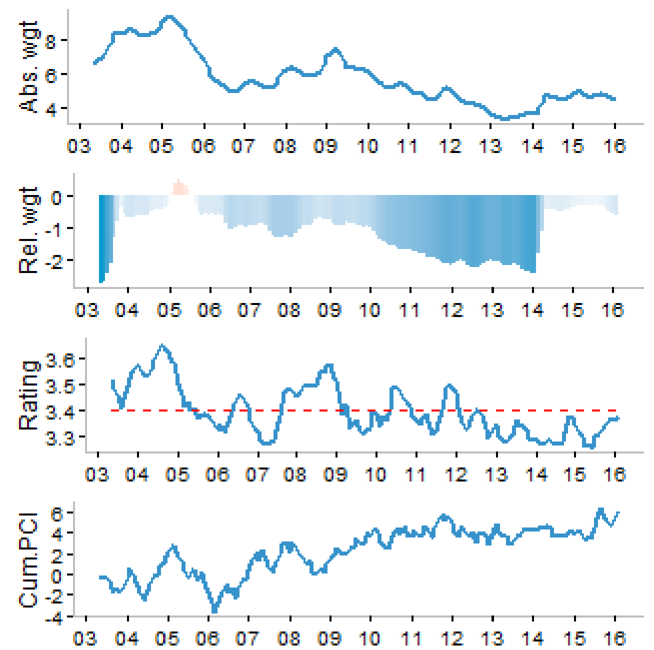

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 73: IT**



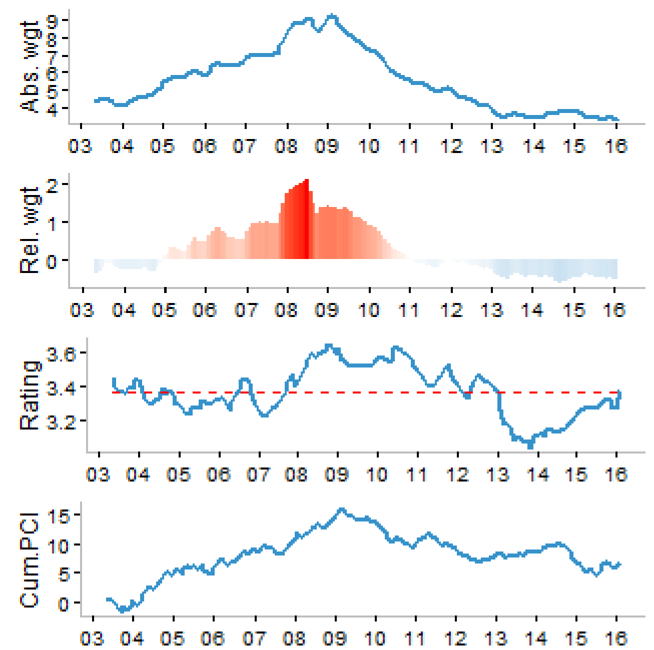

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 74: Telecom services**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

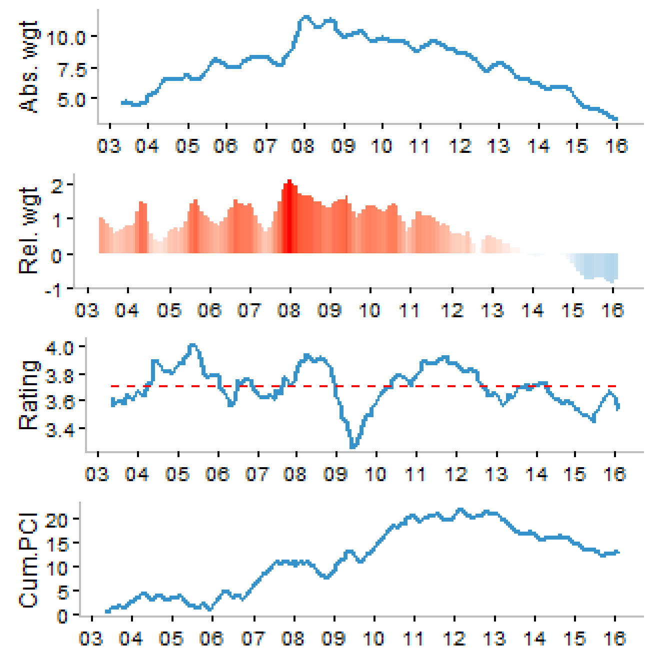
**Figure 75: Utilities**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

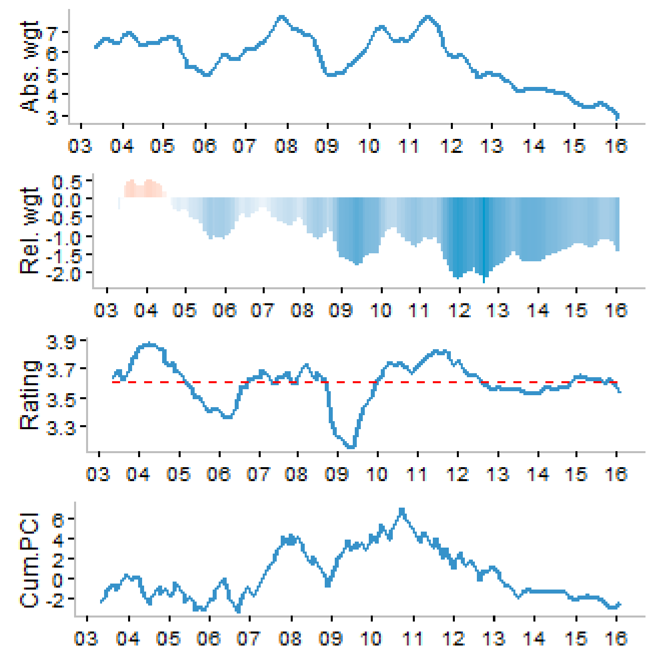
## Asia ex-Japan

**Figure 76: Energy**



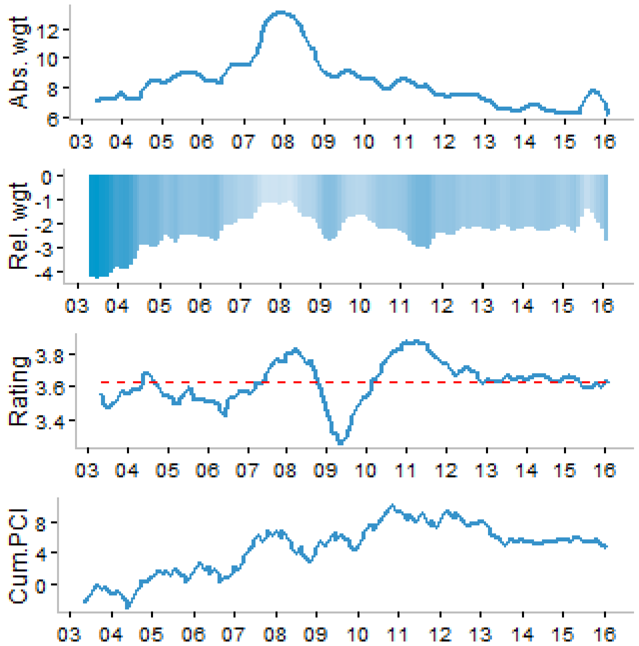

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 77: Materials**



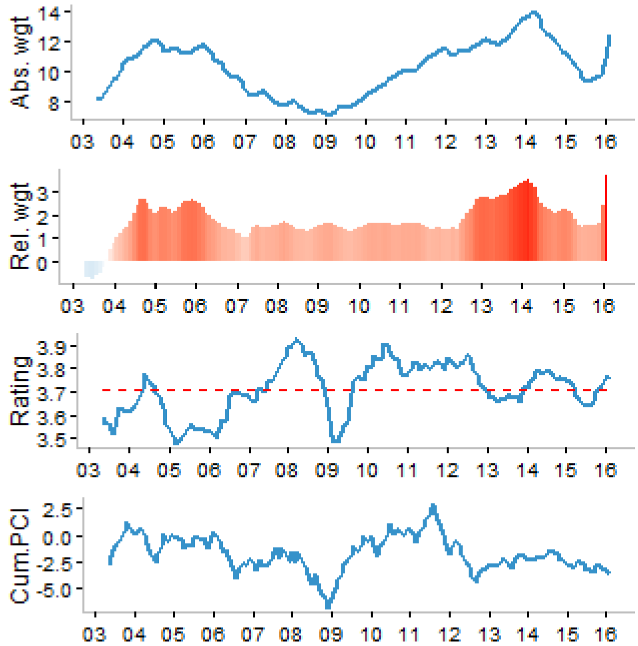

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 78: Industrials**



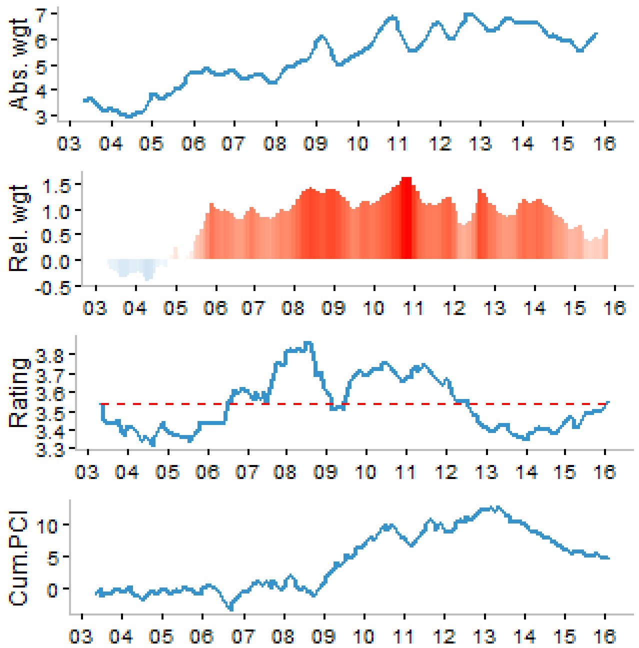

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 79: Consumer discretionary**



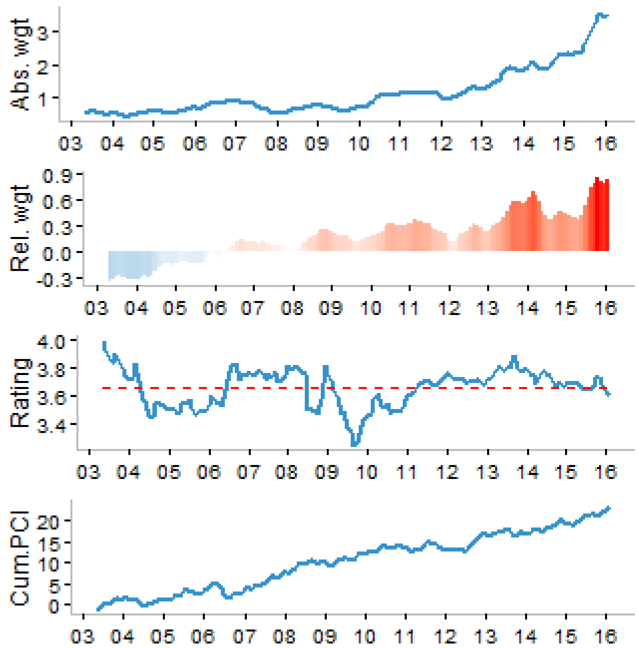

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 80: Consumer staples**



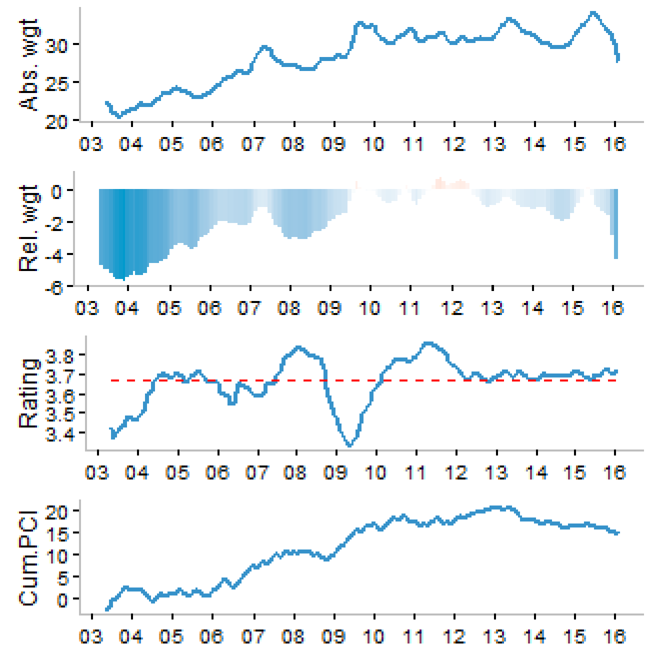

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 81: Healthcare**



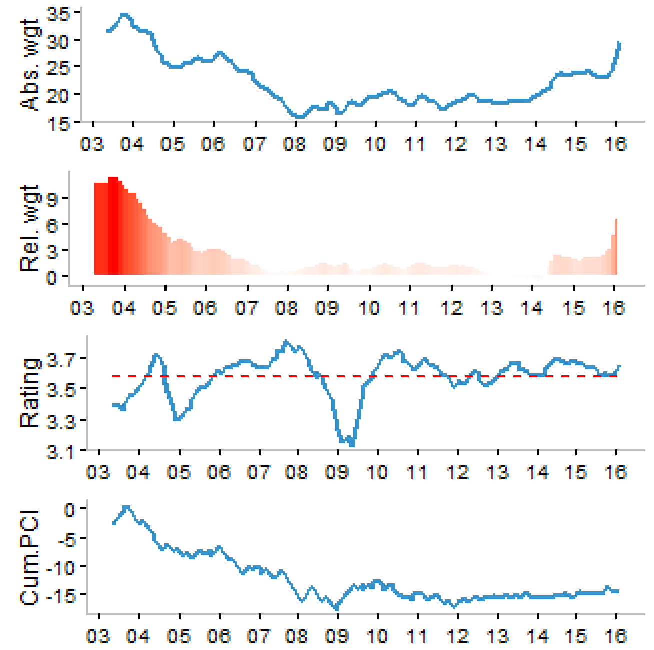

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 82: Financials**



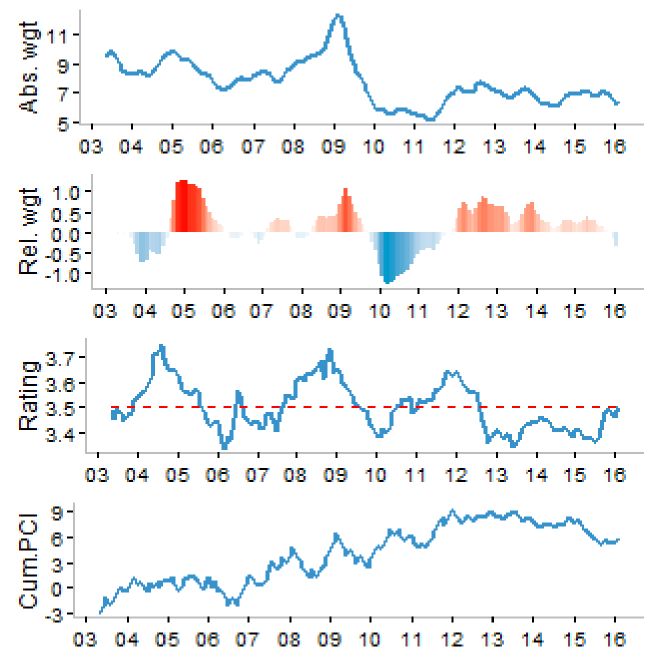

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 83: IT**



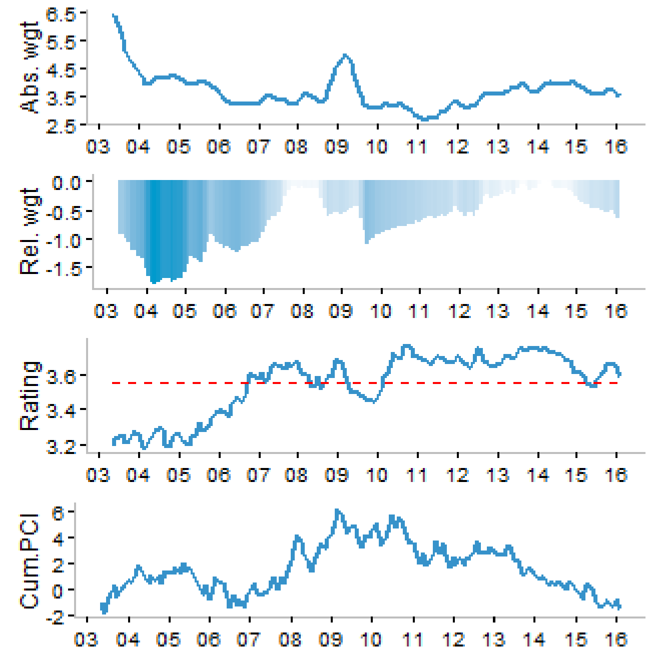

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 84: Telecom services**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

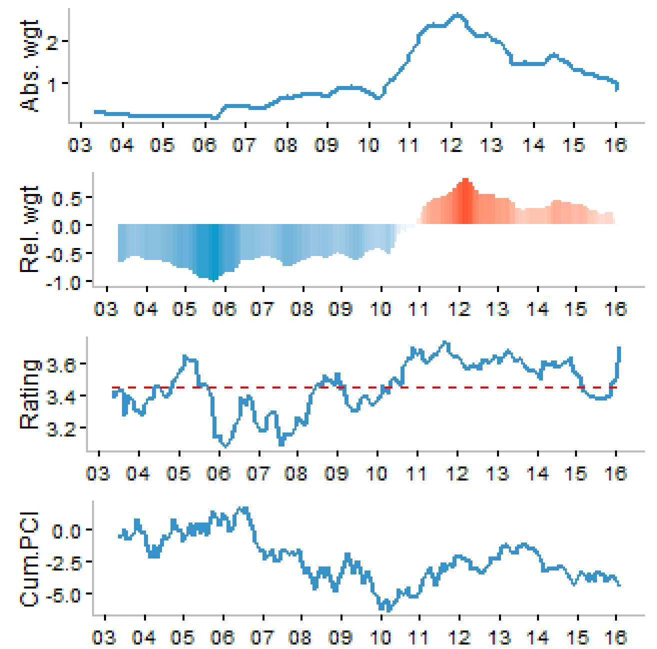
**Figure 85: Utilities**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

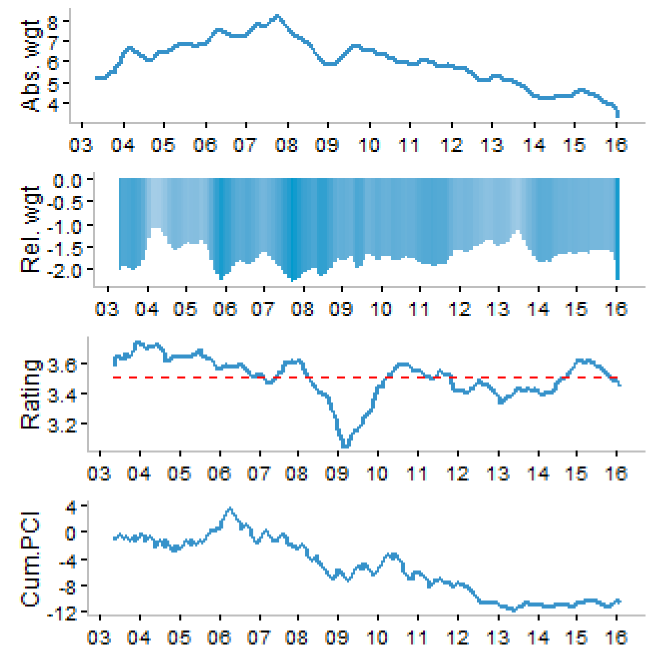
## Japan

**Figure 86: Energy**



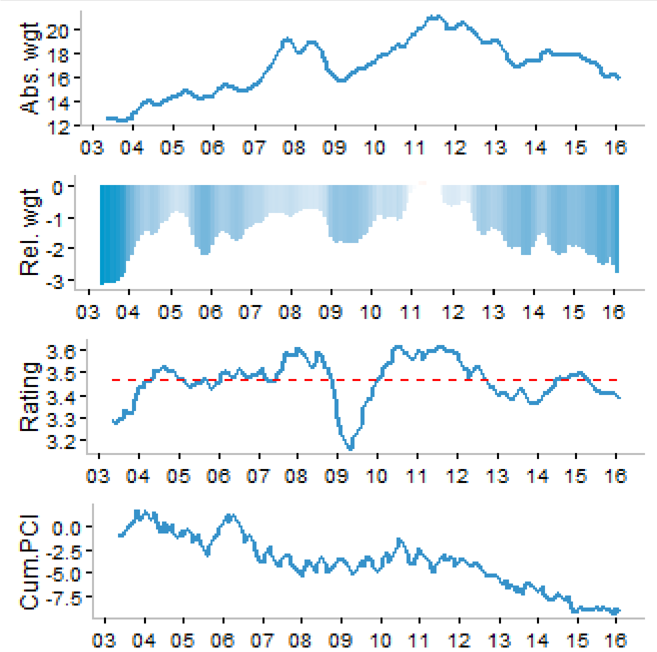

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 87: Materials**



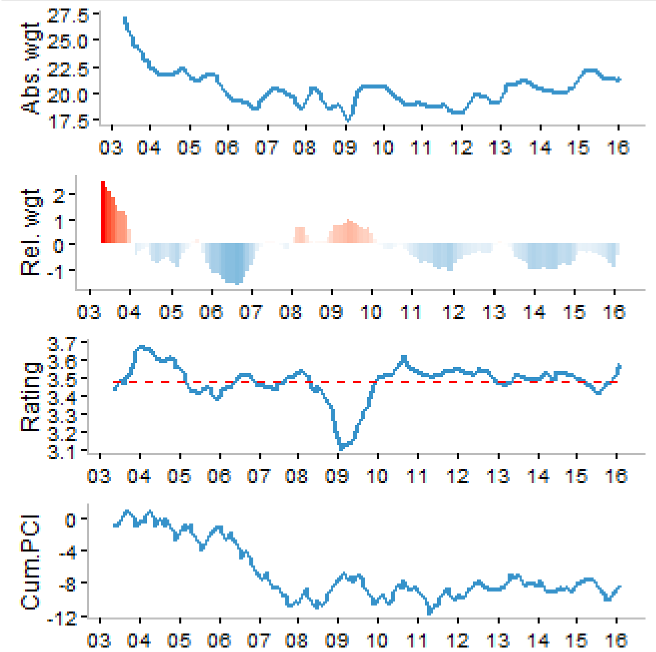

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 88: Industrials**



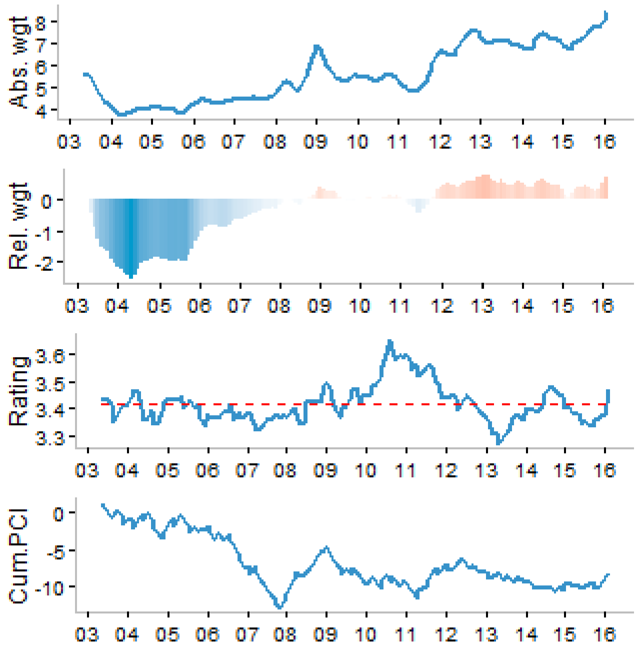

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 89: Consumer discretionary**



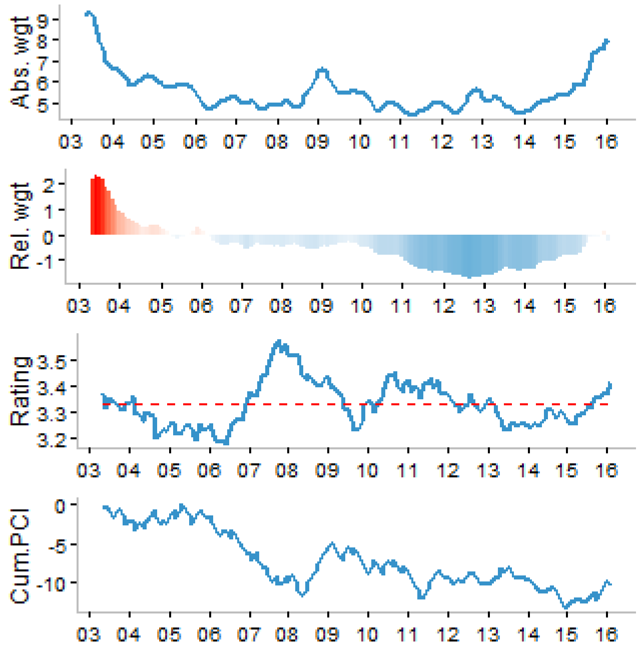

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 90: Consumer staples**



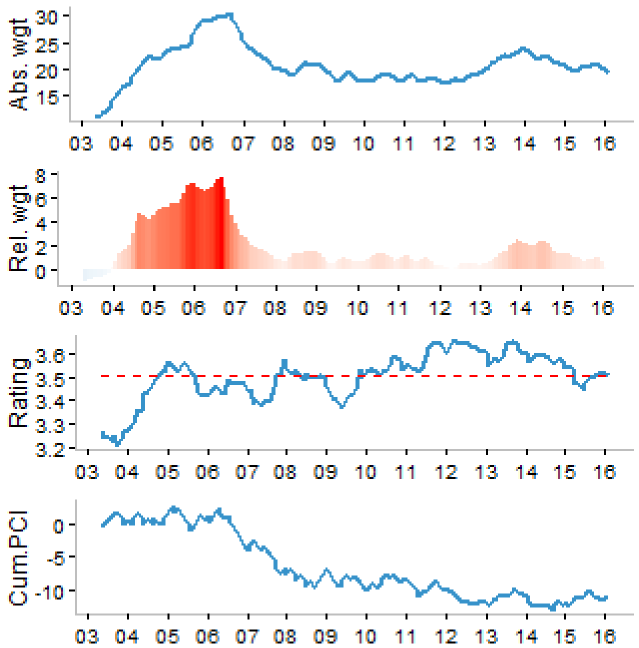

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 91: Healthcare**



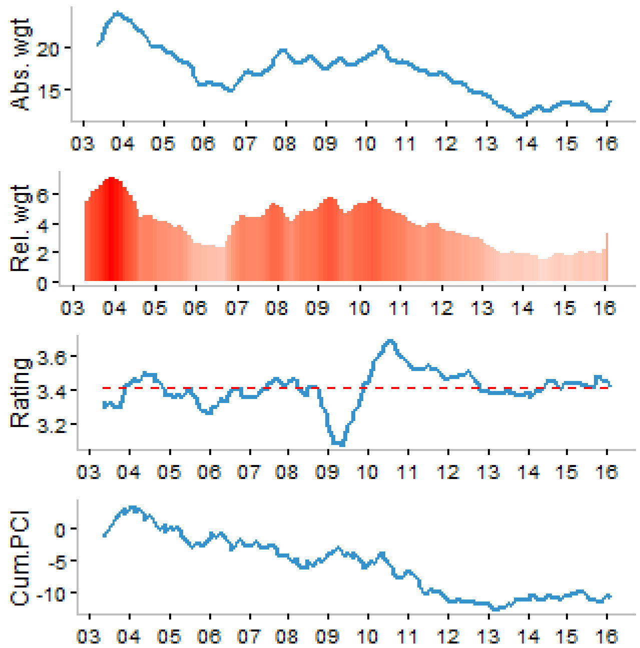

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 92: Financials**



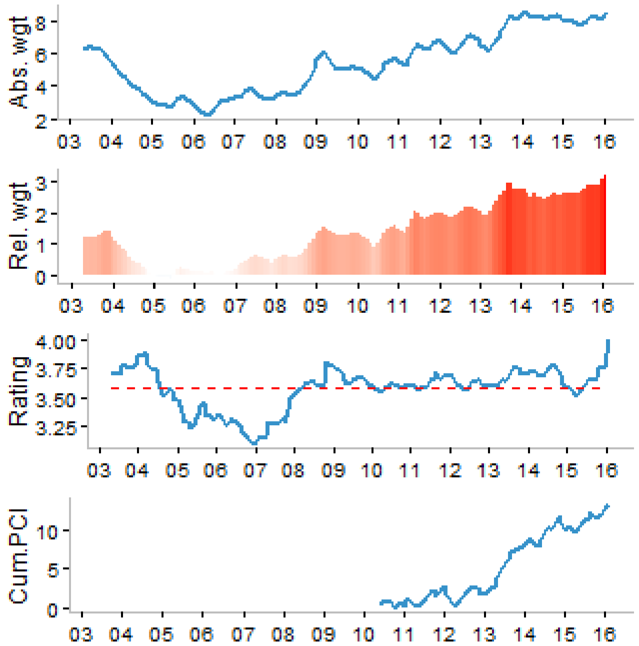

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 93: IT**



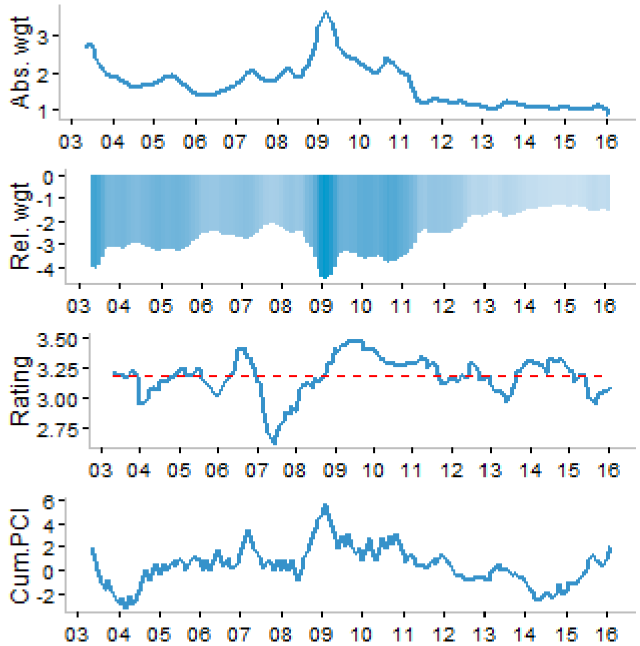

Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 94: Telecom services**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Figure 95: Utilities**




Source: MSCI, IBES, FactSet, UBS Quantitative Research

**Valuation Method and Risk Statement**

Our quantitative models rely on reported financial statement information, consensus earnings forecasts and stock prices. Errors in these numbers are sometimes impossible to prevent (as when an item is misstated by a company). Also, the models employ historical data to estimate the efficacy of stock selection strategies and the relationships among strategies, which may change in the future. Additionally, unusual company-specific events could overwhelm the systematic influence of the strategies used to rank and score stocks.

## Required Disclosures

This report has been prepared by UBS Securities Asia Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

For information on the ways in which UBS manages conflicts and maintains independence of its research product; historical performance information; and certain additional disclosures concerning UBS research recommendations, please visit www.ubs.com/disclosures. The figures contained in performance charts refer to the past; past performance is not a reliable indicator of future results. Additional information will be made available upon request. UBS Securities Co. Limited is licensed to conduct securities investment consultancy businesses by the China Securities Regulatory Commission. UBS acts or may act as principal in the debt securities (or in related derivatives) that may be the subject of this report.

**Analyst Certification:** Each research analyst primarily responsible for the content of this research report, in whole or in part, certifies that with respect to each security or issuer that the analyst covered in this report: (1) all of the views expressed accurately reflect his or her personal views about those securities or issuers and were prepared in an independent manner, including with respect to UBS, and (2) no part of his or her compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in the research report.

**UBS Investment Research: Global Equity Rating Definitions**

| 12-Month Rating | Definition | Coverage[1] | IB Services[2] |
|---|---|---|---|
| **Buy** | FSR is > 6% above the MRA. | 48% | 36% |
| **Neutral** | FSR is between -6% and 6% of the MRA. | 39% | 28% |
| **Sell** | FSR is > 6% below the MRA. | 12% | 22% |
| **Short-Term Rating** | **Definition** | **Coverage[3]** | **IB Services[4]** |
| **Buy** | Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event. | <1% | <1% |
| **Sell** | Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event. | <1% | <1% |

Source: UBS. Rating allocations are as of 31 December 2015.
1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
3:Percentage of companies under coverage globally within the Short-Term rating category.
4:Percentage of companies within the Short-Term rating category for which investment banking (IB) services were provided within the past 12 months.

**KEY DEFINITIONS: Forecast Stock Return (FSR)** is defined as expected percentage price appreciation plus gross dividend yield over the next 12 months. **Market Return Assumption (MRA)** is defined as the one-year local market interest rate plus 5% (a proxy for, and not a forecast of, the equity risk premium). **Under Review (UR)** Stocks may be flagged as UR by the analyst, indicating that the stock's price target and/or rating are subject to possible change in the near term, usually in response to an event that may affect the investment case or valuation. **Short-Term Ratings** reflect the expected near-term (up to three months) performance of the stock and do not reflect any change in the fundamental view or investment case. **Equity Price Targets** have an investment horizon of 12 months.

**EXCEPTIONS AND SPECIAL CASES: UK and European Investment Fund ratings and definitions are: Buy:** Positive on factors such as structure, management, performance record, discount; **Neutral:** Neutral on factors such as structure, management, performance record, discount; **Sell:** Negative on factors such as structure, management, performance record, discount. **Core Banding Exceptions (CBE):** Exceptions to the standard +/-6% bands may be granted by the Investment Review Committee (IRC). Factors considered by the IRC include the stock's volatility and the credit spread of the respective company's debt. As a result, stocks deemed to be very high or low risk may be subject to higher or lower bands as they relate to the rating. When such exceptions apply, they will be identified in the Company Disclosures table in the relevant research piece.

Research analysts contributing to this report who are employed by any non-US affiliate of UBS Securities LLC are not registered/qualified as research analysts with FINRA. Such analysts may not be associated persons of UBS Securities LLC and therefore are not subject to the FINRA restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. The name of each affiliate and analyst employed by that affiliate contributing to this report, if any, follows.

**UBS AG Hong Kong Branch:** Shanle Wu, PhD; Josh Holcroft; Matthew Gilman. **UBS Securities Australia Ltd:** Paul Winter; David Cassidy; Oliver Antrobus, CFA; Pieter Stoltz. **UBS Limited:** Nick Nelson; David Jessop; Nick Baltas, PhD. **UBS Securities LLC:** Julian Emanuel. **UBS Securities Japan Co., Ltd.:** Tomohiro Okawa.

Unless otherwise indicated, please refer to the Valuation and Risk sections within the body of this report. For a complete set of disclosure statements associated with the companies discussed in this report, including information on valuation and risk, please contact UBS Securities LLC, 1285 Avenue of Americas, New York, NY 10019, USA, Attention: Investment Research.

# Global Disclaimer

This document has been prepared by UBS Securities Asia Limited, an affiliate of UBS AG. UBS AG, its subsidiaries, branches and affiliates are referred to herein as UBS.

Global Research is provided to our clients through UBS Neo, the UBS Client Portal and UBS.com (each a "System"). It may also be made available through third party vendors and distributed by UBS and/or third parties via e-mail or alternative electronic means. The level and types of services provided by Global Research to a client may vary depending upon various factors such as a client's individual preferences as to the frequency and manner of receiving communications, a client's risk profile and investment focus and perspective (e.g. market wide, sector specific, long-term, short-term, etc.), the size and scope of the overall client relationship with UBS and legal and regulatory constraints.

When you receive Global Research through a System, your access and/or use of such Global Research is subject to this Global Research Disclaimer and to the terms of use governing the applicable System.

When you receive Global Research via a third party vendor, e-mail or other electronic means, your use shall be subject to this Global Research Disclaimer and to UBS's Terms of Use/Disclaimer (http://www.ubs.com/global/en/legalinfo2/disclaimer.html). By accessing and/or using Global Research in this manner, you are indicating that you have read and agree to be bound by our Terms of Use/Disclaimer. In addition, you consent to UBS processing your personal data and using cookies in accordance with our Privacy Statement (http://www.ubs.com/global/en/legalinfo2/privacy.html) and cookie notice (http://www.ubs.com/global/en/homepage/cookies/cookie-management.html).

**If you receive Global Research, whether through a System or by any other means, you agree that you shall not copy, revise, amend, create a derivative work, transfer to any third party, or in any way commercially exploit any UBS research provided via Global Research or otherwise, and that you shall not extract data from any research or estimates provided to you via Global Research or otherwise, without the prior written consent of UBS.**

For access to all available Global Research on UBS Neo and the Client Portal, please contact your UBS sales representative.

This document is for distribution only as may be permitted by law. It is not directed to, or intended for distribution to or use by, any person or entity who is a citizen or resident of or located in any locality, state, country or other jurisdiction where such distribution, publication, availability or use would be contrary to law or regulation or would subject UBS to any registration or licensing requirement within such jurisdiction. It is published solely for information purposes; it is not an advertisement nor is it a solicitation or an offer to buy or sell any financial instruments or to participate in any particular trading strategy. No representation or warranty, either expressed or implied, is provided in relation to the accuracy, completeness or reliability of the information contained in this document ('the Information'), except with respect to Information concerning UBS. The Information is not intended to be a complete statement or summary of the securities, markets or developments referred to in the document. UBS does not undertake to update or keep current the Information. Any opinions expressed in this document may change without notice and may differ or be contrary to opinions expressed by other business areas or groups of UBS. Any statements contained in this report attributed to a third party represent UBS's interpretation of the data, information and/or opinions provided by that third party either publicly or through a subscription service, and such use and interpretation have not been reviewed by the third party.

Nothing in this document constitutes a representation that any investment strategy or recommendation is suitable or appropriate to an investor's individual circumstances or otherwise constitutes a personal recommendation. Investments involve risks, and investors should exercise prudence and their own judgement in making their investment decisions. The financial instruments described in the document may not be eligible for sale in all jurisdictions or to certain categories of investors. Options, derivative products and futures are not suitable for all investors, and trading in these instruments is considered risky. Mortgage and asset-backed securities may involve a high degree of risk and may be highly volatile in response to fluctuations in interest rates or other market conditions. Foreign currency rates of exchange may adversely affect the value, price or income of any security or related instrument referred to in the document. For investment advice, trade execution or other enquiries, clients should contact their local sales representative.

The value of any investment or income may go down as well as up, and investors may not get back the full (or any) amount invested. Past performance is not necessarily a guide to future performance. Neither UBS nor any of its directors, employees or agents accepts any liability for any loss (including investment loss) or damage arising out of the use of all or any of the Information.

Any prices stated in this document are for information purposes only and do not represent valuations for individual securities or other financial instruments. There is no representation that any transaction can or could have been effected at those prices, and any prices do not necessarily reflect UBS's internal books and records or theoretical model-based valuations and may be based on certain assumptions. Different assumptions by UBS or any other source may yield substantially different results.

This document and the Information are produced by UBS as part of its research function and are provided to you solely for general background information. UBS has no regard to the specific investment objectives, financial situation or particular needs of any specific recipient. In no circumstances may this document or any of the Information be used for any of the following purposes:

(i) valuation or accounting purposes;

(ii) to determine the amounts due or payable, the price or the value of any financial instrument or financial contract; or

(iii) to measure the performance of any financial instrument.

By receiving this document and the Information you will be deemed to represent and warrant to UBS that you will not use this document or any of the Information for any of the above purposes or otherwise rely upon this document or any of the Information.

Research will initiate, update and cease coverage solely at the discretion of UBS Investment Bank Research Management. The analysis contained in this document is based on numerous assumptions. Different assumptions could result in materially different results. The analyst(s) responsible for the preparation of this document may interact with trading desk personnel, sales personnel and other parties for the purpose of gathering, applying and interpreting market information. UBS relies on information barriers to control the flow of information contained in one or more areas within UBS into other areas, units, groups or affiliates of UBS. The compensation of the analyst who prepared this document is determined exclusively by research management and senior management (not including investment banking). Analyst compensation is not based on investment banking revenues; however, compensation may relate to the revenues of UBS Investment Bank as a whole, of which investment banking, sales and trading are a part.

For financial instruments admitted to trading on an EU regulated market: UBS AG, its affiliates or subsidiaries (excluding UBS Securities LLC) acts as a market maker or liquidity provider (in accordance with the interpretation of these terms in the UK) in the financial instruments of the issuer save that where the activity of liquidity provider is carried out in accordance with the definition given to it by the laws and regulations of any other EU jurisdictions, such information is separately disclosed in this document. For financial instruments admitted to trading on a non-EU regulated market: UBS may act as a market maker save that where this activity is carried out in the US in accordance with the definition given to it by the relevant laws and regulations, such activity will be specifically disclosed in this document. UBS may have issued a warrant the value of which is based on one or more of the financial instruments referred to in the document. UBS and its affiliates and employees may have long or short positions, trade as principal and buy and sell in instruments or derivatives identified herein; such transactions or positions may be inconsistent with the opinions expressed in this document.

**United Kingdom and the rest of Europe:** Except as otherwise specified herein, this material is distributed by UBS Limited to persons who are eligible counterparties or professional clients. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. **France:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities France S.A. UBS Securities France S.A. is regulated by the ACPR (Autorité de Contrôle Prudentiel et de Résolution) and the Autorité des Marchés Financiers (AMF). Where an analyst of UBS Securities France S.A. has contributed to this document, the document is also deemed to have been prepared by UBS Securities France S.A. **Germany:** Prepared by UBS Limited and distributed by UBS Limited and UBS Deutschland AG. UBS Deutschland AG is regulated by the Bundesanstalt fur Finanzdienstleistungsaufsicht (BaFin). **Spain:** Prepared by UBS Limited and distributed by UBS Limited and UBS Securities España SV, SA. UBS Securities España SV, SA is regulated by the Comisión Nacional del Mercado de Valores (CNMV). **Turkey:** Distributed by UBS Limited. No information in this document is provided for the purpose of offering, marketing and sale by any means of any capital market instruments and services in the Republic of Turkey. Therefore, this document may not be considered as an offer made or to be made to residents of the Republic of Turkey. UBS AG is not licensed by the Turkish Capital Market Board under the provisions of the Capital Market Law (Law No. 6362). Accordingly, neither this document nor any other offering material related to the instruments/services may be utilized in connection with providing any capital market services to persons within the Republic of Turkey without the prior approval of the Capital Market Board. However, according to article 15 (d) (ii) of the Decree No. 32, there is no restriction on the purchase or sale of the securities abroad by residents of the Republic of Turkey. **Poland:** Distributed by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce regulated by the Polish Financial Supervision Authority. Where an analyst of UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce has contributed to this document, the document is also deemed to have been prepared by UBS Limited (spolka z ograniczona odpowiedzialnoscia) Oddzial w Polsce. **Russia:** Prepared and distributed by UBS Bank (OOO). **Switzerland:** Distributed by UBS AG to persons who are institutional investors only. UBS AG is regulated by the Swiss Financial Market Supervisory Authority (FINMA). **Italy:** Prepared by UBS Limited and distributed by UBS Limited and UBS Italia Sim S.p.A. UBS Italia Sim S.p.A. is regulated by the Bank of Italy and by the Commissione Nazionale per le Società e la Borsa (CONSOB). Where an analyst of UBS Italia Sim S.p.A. has contributed to this document, the document is also deemed to have been prepared by UBS Italia Sim S.p.A. **South Africa:** Distributed by UBS South Africa (Pty) Limited (Registration No. 1995/011140/07), an authorised user of the JSE and an authorised Financial Services Provider (FSP 7328). **Israel:** This material is distributed by UBS Limited. UBS Limited is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. UBS Securities Israel Ltd is a licensed Investment Marketer that is supervised by the Israel Securities Authority (ISA). UBS Limited and its affiliates incorporated outside Israel are not licensed under the Israeli Advisory Law. UBS Limited is not covered by insurance as required from a licensee under the Israeli Advisory Law. UBS may engage among others in issuance of Financial Assets or in distribution of Financial Assets of other issuers for fees or other benefits. UBS Limited and its affiliates may prefer various Financial Assets to which they have or may have Affiliation (as such term is defined under the Israeli Advisory Law). Nothing in this Material should be considered as investment advice under the Israeli Advisory Law. This Material is being issued only to and/or is directed only at persons who are Eligible Clients within the meaning of the Israeli Advisory Law, and this material must not be relied on or acted upon by any other persons. **Saudi Arabia:** This document has been issued by UBS AG (and/or any of its subsidiaries, branches or affiliates), a public company limited by shares, incorporated in Switzerland with its registered offices at Aeschenvorstadt 1, CH-4051 Basel and Bahnhofstrasse 45, CH-8001 Zurich. This publication has been approved by UBS Saudi Arabia (a subsidiary of UBS AG), a Saudi closed joint stock company incorporated in the Kingdom of Saudi Arabia under commercial register number 1010257812 having its registered office at Tatweer Towers, P.O. Box 75724, Riyadh 11588, Kingdom of Saudi Arabia. UBS Saudi Arabia is authorized and regulated by the Capital Market Authority to conduct securities business under license number 08113-37. **Dubai:** The information distributed by UBS AG Dubai Branch is intended for Professional Clients only and is not for further distribution within the United Arab Emirates. **United States:** Distributed to US persons by either UBS Securities LLC or by UBS Financial Services Inc., subsidiaries of UBS AG; or by a group, subsidiary or affiliate of UBS AG that is not registered as a US broker-dealer (a **'non-US affiliate'** ) to major US institutional investors only. UBS Securities LLC or UBS Financial Services Inc. accepts responsibility for the content of a document prepared by another non-US affiliate when distributed to US persons by UBS Securities LLC or UBS Financial Services Inc. All transactions by a US person in the securities mentioned in this document must be effected through UBS Securities LLC or UBS Financial Services Inc., and not through a non-US affiliate. UBS Securities LLC is not acting as a municipal advisor to any municipal entity or obligated person within the meaning of Section 15B of the Securities Exchange Act (the "Municipal Advisor Rule"), and the opinions or views contained herein are not intended to be, and do not constitute, advice within the meaning of the Municipal Advisor Rule. **Canada:** Distributed by UBS Securities Canada Inc., a registered investment dealer in Canada and a Member-Canadian Investor Protection Fund, or by another affiliate of UBS AG that is registered to conduct business in Canada or is otherwise exempt from registration. **Brazil:** Except as otherwise specified herein, this material is prepared by UBS Brasil CCTVM S.A. to persons who are eligible investors residing in Brazil, which are considered to be: (i) financial institutions, (ii) insurance firms and investment capital companies, (iii) supplementary pension entities, (iv) entities that hold financial investments higher than R$300,000.00 and that confirm the status of qualified investors in written, (v) investment funds, (vi) securities portfolio managers and securities consultants duly authorized by Comissão de Valores Mobiliários (CVM), regarding their own investments, and (vii) social security systems created by the Federal Government, States, and Municipalities. **Hong Kong:** Distributed by UBS Securities Asia Limited and/or UBS AG, Hong Kong Branch. **Singapore:** Distributed by UBS Securities Pte. Ltd. [MCI (P) 018/09/2015 and Co. Reg. No.: 198500648C] or UBS AG, Singapore Branch. Please contact UBS Securities Pte. Ltd., an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110); or UBS AG, Singapore Branch, an exempt financial adviser under the Singapore Financial Advisers Act (Cap. 110) and a wholesale bank licensed under the Singapore Banking Act (Cap. 19) regulated by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with, the analysis or document. The recipients of this document represent and warrant that they are accredited and institutional investors as defined in the Securities and Futures Act (Cap. 289). **Japan:** Distributed by UBS Securities Japan Co., Ltd. to professional investors (except as otherwise permitted). Where this document has been prepared by UBS Securities Japan Co., Ltd., UBS Securities Japan Co., Ltd. is the author, publisher and distributor of the document. Distributed by UBS AG, Tokyo Branch to Professional Investors (except as otherwise permitted) in relation to foreign exchange and other banking businesses when relevant. **Australia:** Clients of UBS AG: Distributed by UBS AG (Holder of Australian Financial Services License No. 231087). Clients of UBS Securities Australia Ltd: Distributed by UBS Securities Australia Ltd (Holder of Australian Financial Services License No. 231098). Clients of UBS Wealth Management Australia Ltd: Distributed by UBS Wealth Management Australia Ltd (Holder of Australian Financial Services Licence No. 231127). This Document contains general information and/or general advice only and does not constitute personal financial product advice. As such, the Information in this document has been prepared without taking into account any investor's objectives, financial situation or needs, and investors should, before acting on the Information, consider the appropriateness of the Information, having regard to their objectives, financial situation and needs. If the Information contained in this document relates to the acquisition, or potential acquisition of a particular financial product by a 'Retail' client as defined by section 761G of the Corporations Act 2001 where a Product Disclosure Statement would be required, the retail client should obtain and consider the Product Disclosure Statement relating to the product before making any decision about whether to acquire the product. The UBS Securities Australia Limited Financial Services Guide is available at: www.ubs.com/ecs-research-fsg. **New Zealand:** Distributed by UBS New Zealand Ltd. The information and recommendations in this publication are provided for general information purposes only. To the extent that any such information or recommendations constitute financial advice, they do not take into account any person's particular financial situation or goals. We recommend that recipients seek advice specific to their circumstances from their financial advisor. **Korea:** Distributed in Korea by UBS Securities Pte. Ltd., Seoul Branch. This document may have been edited or contributed to from time to time by affiliates of UBS Securities Pte. Ltd., Seoul Branch. **Malaysia:** This material is authorized to be distributed in Malaysia by UBS Securities Malaysia Sdn. Bhd (Capital Markets Services License No.: CMSL/A0063/2007). This material is intended for professional/institutional clients only and not for distribution to any retail clients. **India:** Prepared by UBS Securities India Private Ltd. (Corporate Identity Number U67120MH1996PTC097299) 2/F, 2 North Avenue, Maker Maxity, Bandra Kurla Complex, Bandra (East), Mumbai (India) 400051. Phone: +912261556000. It provides brokerage services bearing SEBI Registration Numbers: NSE (Capital Market Segment): INB230951431, NSE (F&O Segment) INF230951431, NSE (Currency Derivatives Segment) INE230951431, BSE (Capital Market Segment) INB010951437; merchant banking services bearing SEBI Registration Number: INM000010809 and Research Analyst services bearing SEBI Registration Number: INH000001204. UBS AG, its affiliates or subsidiaries may have debt holdings or positions in the subject Indian company/companies. Within the past 12 months, UBS AG, its affiliates or subsidiaries may have received compensation for non-investment banking securities-related services and/or non-securities services from the subject Indian company/companies. The subject company/companies may have been a client/clients of UBS AG, its affiliates or subsidiaries during the 12 months preceding the date of distribution of the research report with respect to investment banking and/or non-investment banking securities-related services and/or non-securities services. With regard to information on associates, please refer to the Annual Report at: http://www.ubs.com/global/en/about_ubs/investor_relations/annualreporting.html

The disclosures contained in research documents produced by UBS Limited shall be governed by and construed in accordance with English law.



UBS