30 April 2012

Macro
Currency Strategy

HSBC Global Research

Currency Weekly

Sterling's M&A hallmark

Market focus pg 2

Sterling has been appreciating for several months, and this has accelerated somewhat in recent weeks. As we discussed last week (*'Escaping from Death Valley'*, 23 April 2012), with the US and Eurozone monetary policy at a standstill, actions by other central banks may be being given more significance by the market. The Bank of England has become more hawkish, and this may well have been important in giving GBP a recent boost.

However, it is not just the change in MPC tone that has been behind sterling strength. Here we discuss the other factors that may be important and try to determine whether or not recent GBP strength is sustainable. The factors we discuss are:

1. **Fiscal discipline:** Despite growing political unpopularity, the coalition government has stuck to its fiscal targets, and met its borrowing target for the fiscal year just ended. This fiscal credibility may be encouraging a more favourable attitude from global investors.

2. **Reserve flows**: International FX reserves held in sterling are rising again, and the Q1 jump in reserves in Asia may have been more allocated to sterling.

3. **RORO**: As we discussed in our recent RORO report (*'Risk On – Risk Off: Fixing a broken investment process'*, 19 April 2012) one way for investors to cope with a world of highly correlated asset returns is to focus on those assets that are relatively unaffected by RORO. Sterling is one such asset.

4. **M&A flows:** There is evidence to suggest the return of possibly significant net M&A inflows into the UK.

While all the factors described above have probably had some influence on sterling over the past few months, our conclusion is that it may be the M&A inflow which is the most significant and offers the prospect of a firmer tone to sterling for some time to come.

Will RBNZ words ground the NZD? pg 9

The RBNZ's discomfort with NZD is unlikely to extend beyond rhetoric. However, the FX market is increasingly sensitive to shifts in central bank mood, with downside risks for the NZD as a result.

Recommended trades pg 11

Quant indicators pg 12

Regular updates of our quantitative indicators. This includes an overview of the correlations between all G10 exchange rates; a series of indicators that measure the dominance of the 'risk on – risk off' phenomenon, including new emerging markets RORO analysis; and indices that quantify the market's appetite for risk.

David Bloom
Strategist
HSBC Bank plc
+44 20 7991 5969
david.bloom@hsbcib.com

Paul Mackel
Strategist
The Hongkong and Shanghai Banking Corporation Limited
+852 2996 6565
paulmackel@hsbc.com.hk

Daragh Maher
Strategist
HSBC Bank plc
+44 20 7991 5968
daragh.maher@hsbcib.com

Stacy Williams
Strategist
HSBC Bank plc
+44 20 7991 5967
stacy.williams@hsbcgroup.com

Mark McDonald
Strategist
HSBC Bank plc
+44 20 7991 5966
mark.mcdonald@hsbcib.com

Robert Lynch
Strategist
HSBC Securities (USA) Inc
+1 212 525 3159
robert.lynch@us.hsbc.com

Mark Austin
Consultant

View HSBC Global Research at:
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Market focus

Sterling's M&A hallmark

GBP has been slowly and quietly appreciating for several months, rising about 7% on a trade-weighted basis since last July (chart 1).

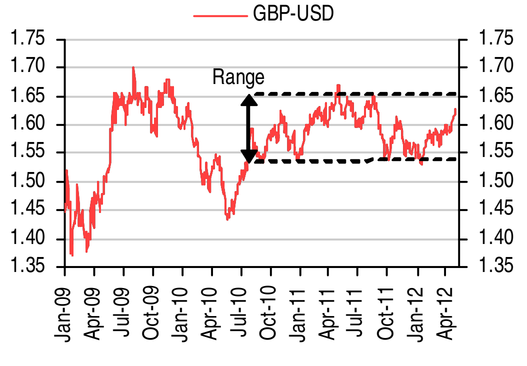
1. Sterling has been quietly appreciating since last July

Source: Bloomberg, HSBC

These gains have accelerated in recent weeks with a 3.5% rise since early March, and the currency has shown resilience in the face of some disappointing economic data (including the Q1 GDP data published on 25 April). While sterling still trades within its recent ranges against the dollar, it is heading towards a two-year high against the euro (chart 2 and 3).

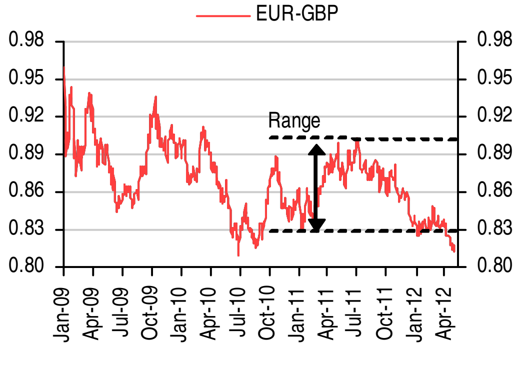
What lies behind this performance, and is it sustainable?

2. Sterling still in its range against the dollar...



Source: Bloomberg, HSBC

3. ...but EUR-GBP is making new lows



Source: Bloomberg, HSBC

As we discussed last week (*'Escaping from Death Valley'*, 23 April 2012), with Fed and ECB policy at a standstill, changes in other central bank policies may have more significance for the market. It is clear that the Bank of England has become more hawkish. The MPC is now more concerned with inflation than with growth, and seems willing to look through weak activity data, which they expect to be driven by one-off or erratic factors. According to the minutes released on 18 April, the vote was 8-1 with Adam Posen changing his vote away from a call for more QE. This is significant because Posen has consistently been the most dovish member of the committee, and called for a second round of QE in October 2010, a year before the rest of the committee joined him.

The weak Q1 GDP data prompted Martin Weale, another MPC member, to argue that the case for further QE had been strengthened, so it may be that some members are not very happy about discounting weak activity data. The support for sterling from a more hawkish MPC may, therefore, prove only temporary. In any case, while the change in tone from the MPC has undoubtedly been significant for sterling recently, the currency has been rising for some time, suggesting other factors have been at play. Here we analyse several other possible forces behind sterling's strength, to see which may be the most important and long lasting. The areas we address are:

1. **Fiscal discipline**: Despite growing political unpopularity, the coalition government has stuck with its austerity programme, and has achieved its borrowing target for the fiscal year that recently ended. This may have been supportive for sterling. The upcoming local elections could, however, see the coalition under renewed pressure to change direction.

2. **Reserve flows**: Global FX reserves held in sterling have started to grow again, and the acceleration in reserve accumulation in Asia seen in Q1 may have helped boost GBP.

3. **RORO**: As we discussed in our recent report on RORO (*'Risk On – Risk Off: Fixing a broken investment process'*, 19 April 2012), one way of coping with a world of highly correlated asset returns is for investors to focus on assets which are relatively unaffected by the RORO phenomenon. GBP is one such asset, and this may have been a positive influence for the currency.

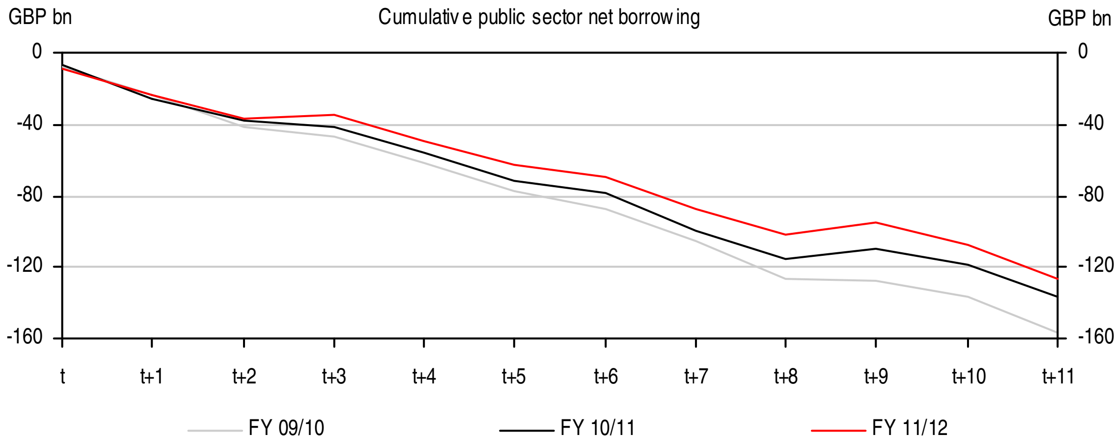
4. **M&A flows**: The volume of cross-border M&A flows has remained at a relatively low level following the collapse in the immediate aftermath of the financial crisis. However, there is evidence that the net inflow into the UK has picked up significantly, and this could be an important factor in keeping Sterling relatively strong.

While all the factors described above have probably had some influence on sterling over the past few months, our conclusion is that it may be the M&A inflow which is the most significant and offers the prospect of a firmer tone to sterling for some time to come.

Fiscal Discipline – to come under more pressure?

Despite a weak economy and growing political unpopularity, the coalition government has stuck to its fiscal austerity measures. As can be seen in chart 4, this has meant that total government borrowing has gradually been reduced over the past three years.

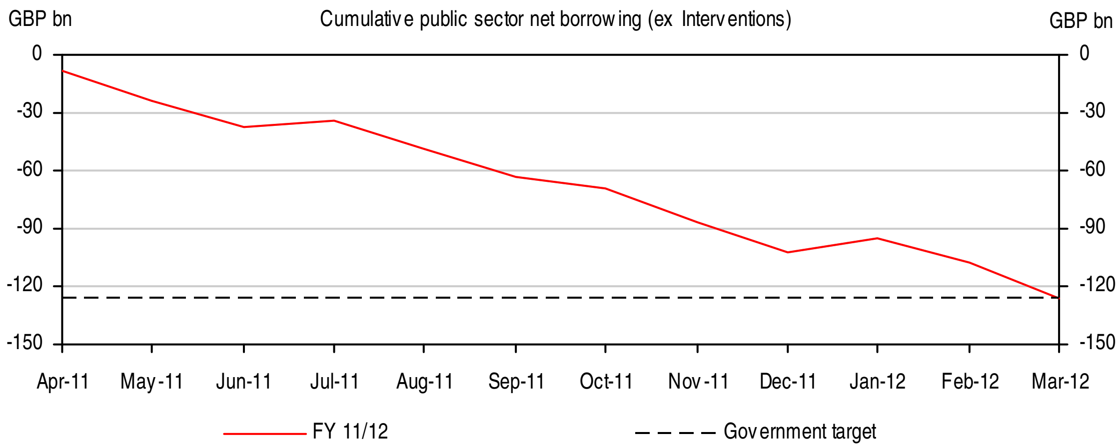
4. Borrowing has been reduced in the last three years



Source: Thomson Reuters Datastream, ONS, HSBC

In addition, while many governments in Europe have missed their own borrowing targets recently, the UK government did reach its target for 2011/12 (chart 5).

5. UK government borrowing hit its target for 2001/12



Source: Thomson Reuters Datastream, ONS, HSBC

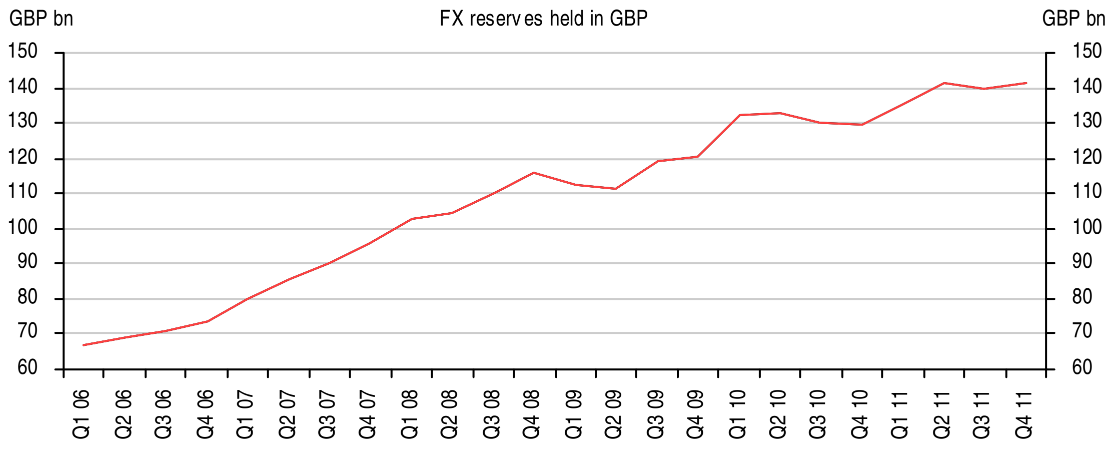
So far, this has meant that the UK has retained its strong credit rating, and this may have encouraged more in the way of reserve inflows (see below). While this may have helped sterling over the past few months, the local election on 3 May might see significant losses for the coalition which will put their fiscal policies under more pressure. In the 2011 local election, the Conservative party actually gained ground (though the Liberal Democrats lost heavily), but this year could be much worse for the Conservatives after a poorly received budget and weakening opinion poll ratings, so the results may be of

more significance, at least in the short term. Nevertheless, fiscal policy is unlikely to be changed radically, and with crucial elections due in France, Greece and the US, relative political stability in the UK should remain a positive for sterling.

Reserve Inflows

Between 2006 and 2008, world identified FX reserves held in sterling rose, according to the IMF, by nearly GBP50bn. However, in 2010 reserves in sterling actually declined a little before starting to rise again in 2011. By the end of 2011 they stood at GBP142bn having risen by GBP12bn during the year (chart 6).

6. International reserves held in GBP are growing again



Source: IMF, HSBC

No data on the currency composition of FX reserves are yet available for 2012, but overall world reserves rose about USD200bn in Q1 according to Bloomberg data, with strong rises in Asia. Given the problems in the US and the Eurozone, it seems likely that there were additional flows into GBP. Assuming the proportion held in sterling was unchanged, this implies an additional GBP3bn of sterling reserve accumulation during the quarter. However, it is quite possible that the proportion allocated to sterling rose during the quarter, which would mean a stronger inflow. This inflow may be tempered in the future, however, if the local election results put fiscal discipline more at question.

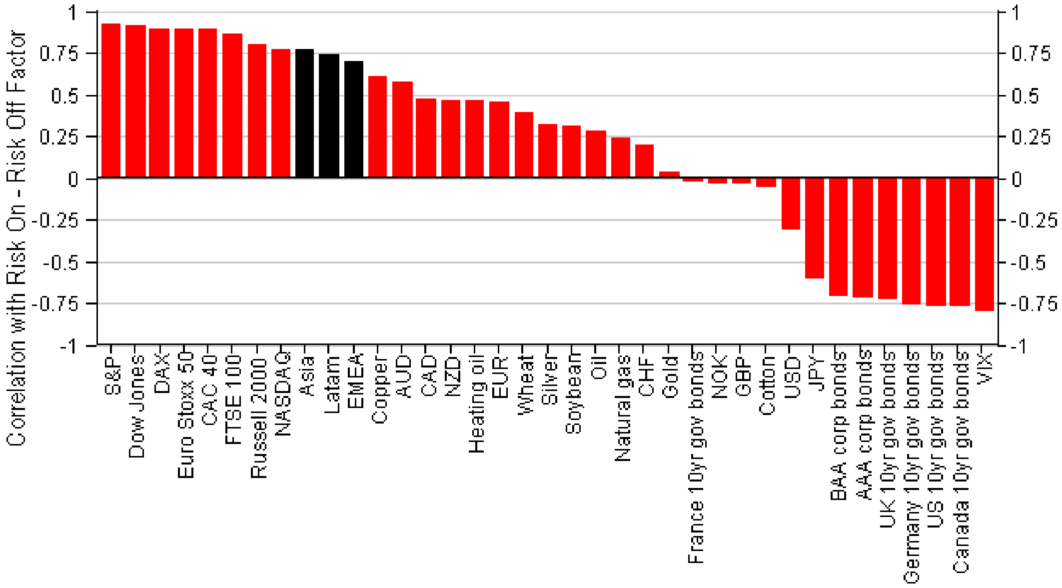
RORO

One of the consequences of the dominance of the risk on – risk off phenomenon is that it has made international investors' portfolio management decisions much more difficult as the benefits of diversification are drastically reduced by the high correlation between returns on different assets. In a recent report (*'Risk On – Risk Off: Fixing a broken investment process'*, 19 April 2012) we suggested a variety of ways in which investment managers could respond to RORO. One such response is to focus more on those assets which are less affected by the phenomenon.

Chart 7 shows the correlation between a range of assets and the RORO factor. As can be seen from the chart, sterling is one of the assets that is least affected, and it may be that investors are beginning to show more interest in sterling precisely because its returns are largely unaffected by RORO. While some have argued that sterling's better performance reflects some form of 'safe haven' flows, it may be more accurate to describe this as RORO flows.

Obviously correlations with the RORO factor are not constant over time, but sterling has shown some independence from RORO ever since the factor became dominant, so it is likely that this will offer the currency some support for as long as RORO continues to be a major influence in the markets.

7. Sterling is one of the assets least affected by RORO



Source: Bloomberg, HSBC

M&A Flows

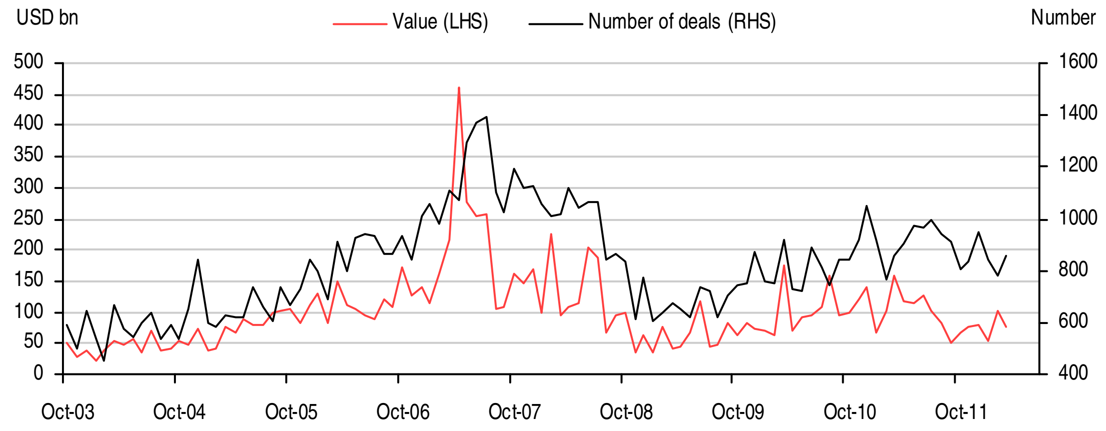
Although all of the factors described above have probably had some impact on sterling's behaviour in recent months, the one that is perhaps the most significant is the return of significant M&A inflows into the UK.

In 2006, there were significant net M&A inflows into the UK as a number of large utilities and other corporates were bought by overseas investors. This flow was important in sustaining a high level for the currency at the time. This inflow went into sharp reversal in 2007 with the ill-fated purchase of ABN by RBS. In the aftermath of the financial crisis both gross flows and net flows declined sharply.

Data on M&A flows from official sources are only available with long lags, but more timely data are available from Bloomberg which can aggregate announced and completed deal on M&A both domestic and cross border. Chart 8 shows global cross border announced M&A deals by month since October 2003 in terms both of the number of deals, and the total USD value. Both peaked in 2006, but fell away very sharply during the financial crisis. Since mid 2009, there has been a recovery in the number of cross border M&A deals, but the overall value has remained relatively low.

The data need to be treated with caution because announced deals may fail, and it is not clear that deals will always involve large FX flows as they may, for example, be financed by local borrowing or share exchanges. However, they do give some indication of potentially important FX flows.

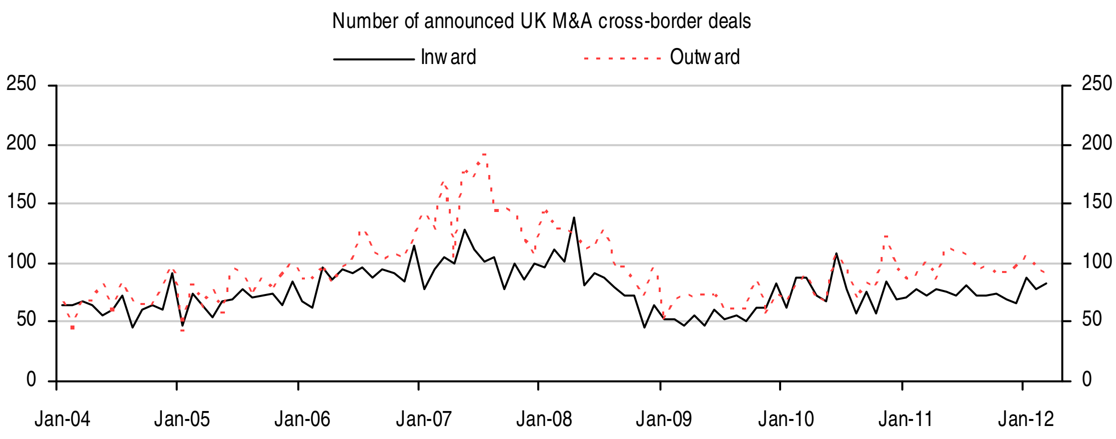
8. Total cross border M&A



Source: Bloomberg, HSBC

Chart 9 shows the same data, but only for deals involving the UK as a buyer or as a target. These show a peak in 2007 and a low in 2009. Since then, there have been some signs of recovery, both in terms of deals and value, though both remain well below their peaks. Although there tends to be a number of UK purchases abroad and overseas purchases in the UK, the average size of inward deals tends to be larger, and it is this that generates the net inflow in certain periods.

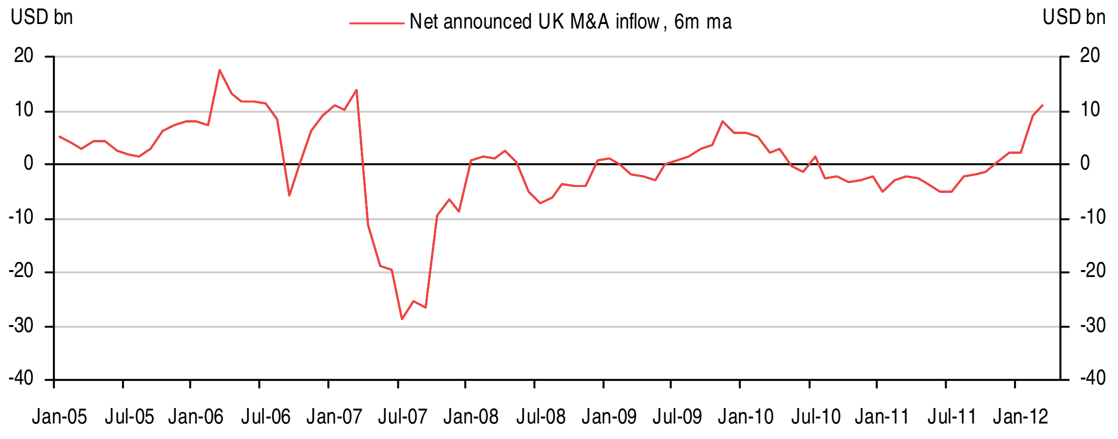
9. UK cross border M&A deals have picked up somewhat



Source: Bloomberg, HSBC

The net flow has shown a significant return to inflows in recent months. Chart 10 shows the 6-month moving average of net announced M&A inflows into the UK since 2005. In 2006 these peaked at about USD15bn per month before turning very strongly negative in 2007. Since the beginning of this year, the inflow has become strongly positive again and is currently running at about USD10bn per month, a level which is likely to have a positive impact on the currency.

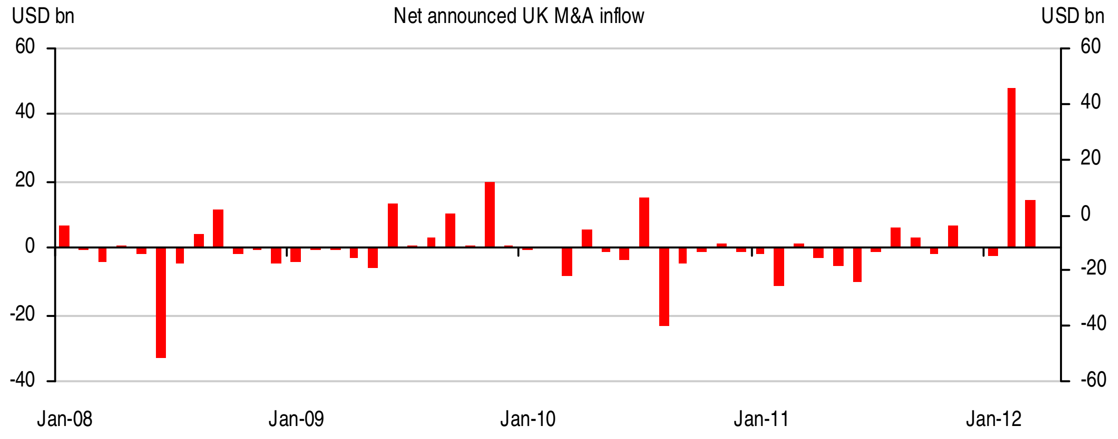
10. Net M&A inflow has turned strongly positive again...



Source: Bloomberg, HSBC

Of course, M&A flows are erratic, and tend to be dominated by a relatively small number of large deals, so there is no guarantee that this inflow will continue. Chart 11 shows the net inflow by month since 2008 and the increase in inflows in early 2012 is clear. Data for early April suggest that a net inflow has continued.

11. ...but flows are erratic



Source: Bloomberg, HSBC

Conclusion

Sterling has been gaining ground gradually over the past few months, and has been making fresh gains recently. While some of this has been due to the change in monetary policy tone from the Bank of England, other forces have also been at play. The UK's relative political stability and fiscal discipline may be attracting reserve flows, and its independence from RORO may also be a factor. Perhaps most significantly, there is evidence of a return to net M&A inflows. While these flows are erratic, they have the potential to keep GBP firm for a while longer.

Will RBNZ words ground the kiwi?

NZD's surprising resilience

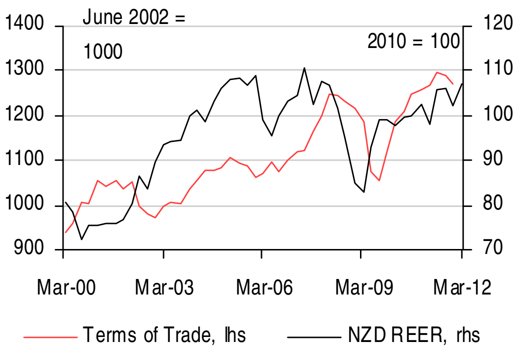
We have been surprised by the resilience of the NZD. In February, we outlined our expectations for weakness in both the AUD and NZD and they have indeed weakened against the USD. However, we expected the NZD to underperform the AUD. It has not. Also in February, we highlighted why Scandinavian currencies should outperform antipodean currencies. This call has proven correct, and our short NZD-NOK trade remains in the money, but we expected to see rather more drama to the downside than has been evident. NZD-USD has become trapped in a 0.8050-0.8300 range.

Others share our surprise at the NZD's resilience. Governor Alan Bollard recently noted that the NZD had "stayed elevated despite recent falls in commodity prices" and that the NZD's high level could cause the policy board to "reassess the outlook for monetary settings". This is not the first time the currency has been cited as a concern. The most recent Monetary Policy Statement said the "high value of the NZD is detrimental to the tradable sector (and) undermines growth", and that its present value is "difficult to reconcile" with fundamentals.

Those fundamentals are looking more testing for the NZD. With commodity prices starting to turn and the terms of trade peaking, the NZD should start coming under more pressure from a fundamental flow perspective. This story has been evident in the latest trade data, with the 12m trade balance for March disappointing expectations for the third month in a row, and printing the smallest surplus since May 2010. We also think it will be difficult for financial flows to fully offset the likely decline in the capital account this year, (see *'Antipodean Tipping Point'*, 7 February 2012).

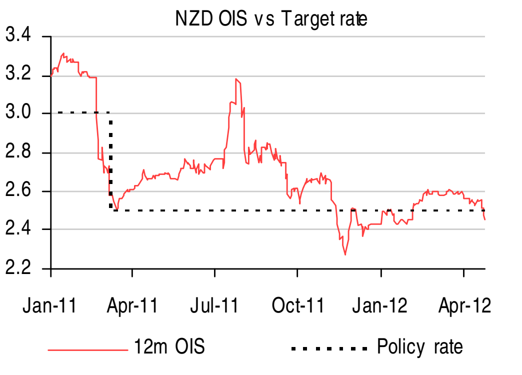
However, while the RBNZ may be concerned with the Kiwi Dollar's strength, we think they are unlikely to take any direct action in the FX market to weaken it, for example by repeating the intervention of June

1. Terms of trade appear to have peaked



Source: Bloomberg, BIS, HSBC

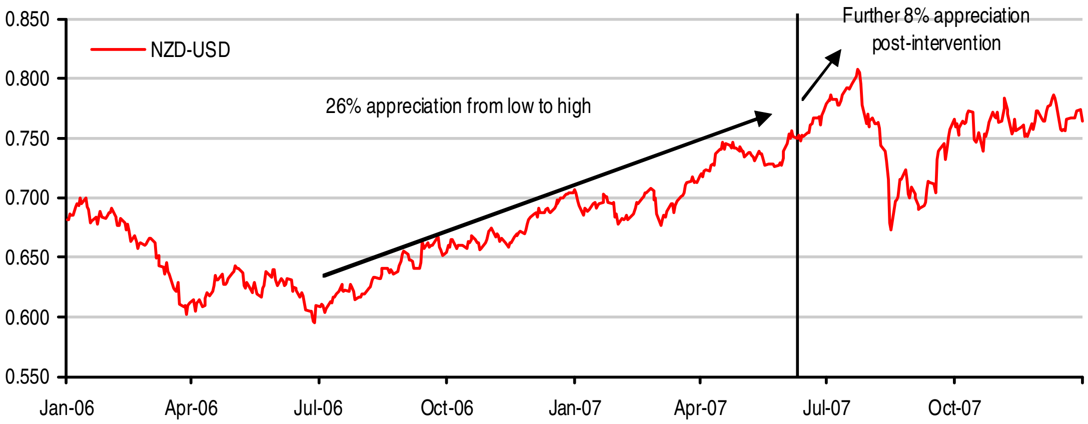
2. Market no longer pricing in rate hikes



Source: Bloomberg, HSBC

2007. At that time, USD-NZD was trading around the 0.75 handle, having appreciated over 26% versus the USD from the low in June 2006, on the back of carry trade demand. After the intervention though, the market brushed off the RBNZ's selling and the currency made it to new highs above 0.82 by late July (chart 3). It was only on the back of a much wider sell-off in carry currencies, and some other "risk" assets, that NZD fell. We think the RBNZ will still be aware of that perceived "failure" and is unlikely to test the market again. It is also worth highlighting that any moves could be politically difficult with Prime Minister John Key stating recently that he doesn't "believe in currency intervention".

3. Intervention in NZD-USD by the RBNZ in June failed to halt the rise of the currency



Source: Bloomberg, HSBC

The alternative strategy might be to adjust monetary policy to weaken the NZD, as the Norges Bank has tried with the NOK. But adjusting monetary policy to account for a strong currency need not mean actually cutting rates. Instead, our economists think that in the case of the RBNZ, this would most likely simply mean holding rates low for longer (see RBNZ Observer Update, *'High NZD still key concern'*, 26 April 2012). The market is currently of the same view, pricing in little chance of an interest rate cut, with the 12m OIS yield only just below that of the current target rate, but having already fallen significantly since mid-2011 (chart 2).

So far in 2012, NZD-USD has had an extremely low correlation with changes in the interest rate spreads. The question is whether this might change? We noted in last week's Currency Weekly (*'Escaping from Death Valley'*, 23 April 2012) that US and European monetary policy is in limbo, and this may be lend greater market potency to any signs of shift in the attitude of other central banks. GBP, CAD and SEK have rallied on a less dovish stance, while AUD has lost its allure alongside RBA dovishness. Even if the RBNZ reaction to the NZD's resilience does not extend beyond rhetoric, it could still have a meaningful impact on the currency.

We continue to believe the best way to express this caution on NZD is through the crosses. With an overly aggressive 100bp of easing already priced into the AUD over the next year, AUD-NZD could rally if RBNZ rhetoric continues to focus on unwarranted NZD strength. We also retain our short NZD-NOK recommendation, given the NOK retains strong underlying flows and "safe haven" attributes (see Currency Weekly, *'Sick of fickle risk? Time to get cross with NZD-NOK'*, 13 February 2012).

Recommended trades

Recommended trades

Position/entry	Take profit	Stop loss	Rationale
Short NZD-NOK Entry: 4.7680 13 February 2012	4.4840	4.9010	See `*Sick of fickle risk? Time to get cross with NZD-NOK*`, Currency Weekly, 13 February 2012
Short AUD-CAD Entry: 1.0288 03 April 2012	1.0050	1.0410	See '*Trade Recommendation: Sell AUD-CAD*', 03 April 2012

Source: HSBC

Quant Indicators

In this section, we publish a series of quantitative indicators that summarise current market conditions. Below, we provide an overview of these indices and explain what they are currently telling us about the state of the market.

1. RORO: Risk on – risk off indices (pg 13)

(a) RORO Index

The HSBC RORO index measures the extent to which the risk on – risk off paradigm is driving markets. A high level of the index indicates that risk on – risk off is dominant and correlations are high across many different assets. In addition to the RORO index, we also measure the extent to which different assets and regions are driven by the risk on – risk off phenomenon rather than asset or region-specific factors.

At present, **the RORO Index has fallen but is still high** by historical levels**.** This indicates that the risk on – risk off phenomenon continues to dominate markets. **The JPY is the most risk-off currency.**

(b) Emerging Market RORO Indices

The EM RORO indices measure the strength of regional correlations in Asia, Latin America and EMEA. Strong correlation in a particular region could be the result of RORO driving synchronized moves in that region, or the result of local phenomena. To separate the two effects, we measure the extent to which correlations in the different regions are driven by risk on – risk off rather than local factors.

Regional correlations within EM have fallen recently.

(c) Equity RORO Index

The Equity RORO index measures the strength of correlations within the main "risky" asset class of equities. **The Equity RORO Index has fallen sharply but is still high by historical levels**.

2. OPRA: Position-based risk appetite index (pg 19)

The OPRA index measures risk appetite based on the positions held in contracts with varying degrees of risk by speculative traders on US futures exchanges. The OPRA index is **in neutral territory**, which means that speculative traders have shifted their positions in a way unrelated to the risk of holding them.

3. MRAI: Price-based risk appetite index (pg 20)

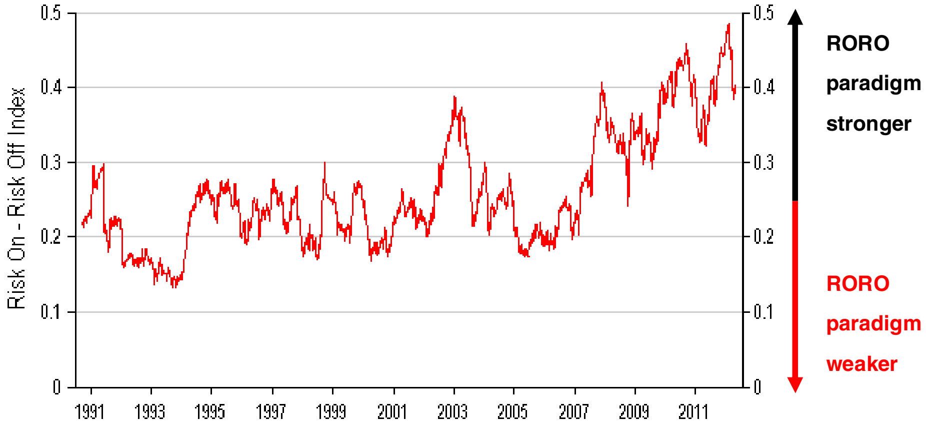
The MRAI measures risk appetite based on changes in the price and volatility of several assets that are known to be strongly affected by the market's appetite for risk. The index **has moved sideways with high volatility since May 2010**. This is indicative of **neutral risk appetite** and consistent with the RORO phenomenon.

4. Correlation: G10 exchange rates (pg 21)

We show the strength of the correlations between all G10 exchange rates. This highlights currency pairs that move independently or in the same (or opposite) direction.

HSBC Risk On – risk Off Index

Risk On – risk Off Index



Source: HSBC, Bloomberg

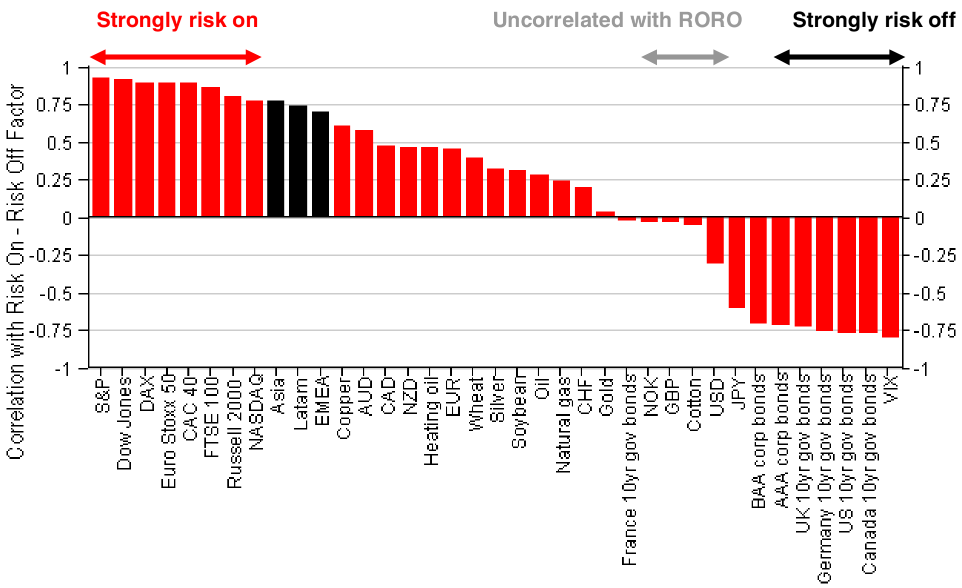
RORO Index

The RORO index has fallen but is still high by historical levels.

This indicates that the risk on – risk off phenomenon continues to dominate markets.

See Appendix A1 for more details of the methodology.

Asset correlations with the risk on – risk off factor



Source: HSBC, Bloomberg

RORO Correlations

The assets that were most highly correlated with the risk on – risk off factor during the previous 80 days were:

Risk-on assets
- S&P
- Dow Jones

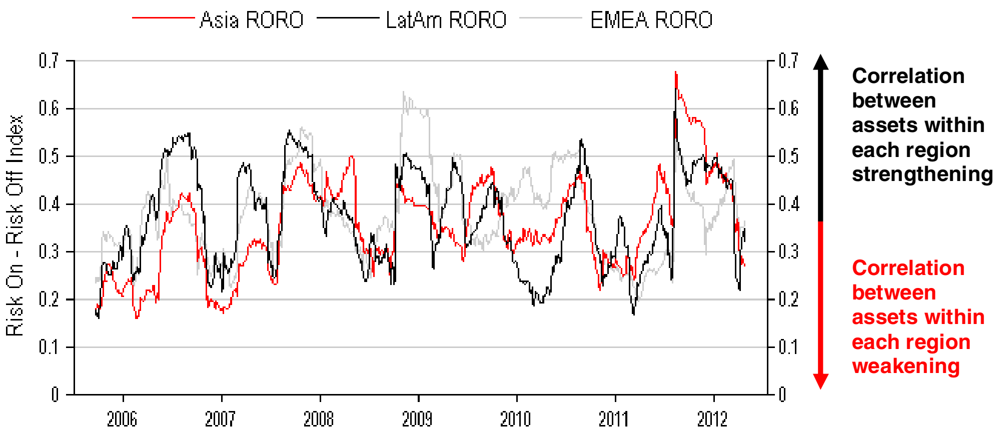
Risk-off assets
- VIX
- US, Canada, Germany and UK government bonds

Uncorrelated with RORO
- Gold
- France government bonds

In the emerging world, Asia, Latam and EMEA are all similarly strongly correlated with RORO.

HSBC Emerging Market RORO Indices

Emerging market risk on – risk off indices



Source: HSBC, Bloomberg

EM RORO Indices

The regional indices have fallen sharply and are now at relatively moderate levels.

This indicates that regional correlations within EM regions have weakened.

Countries included:

Asia: *Hong Kong, South Korea, Singapore, India, Taiwan, Malaysia, Thailand*

Latam: *Brazil, Mexico, Chile*

EMEA: *Czech Republic, Hungary, Poland, South Africa, Turkey*

Interpretation

Risk on – risk off is a truly global phenomenon that drives returns and causes high correlations across many different markets and geographic regions. However, there can still be variations in the strength of correlations between assets from different markets, as well as differences in the extent to which these correlations are driven by risk on – risk off rather than region-specific factors.

To quantify the strength of correlations in different emerging markets, we construct three EM RORO indices (shown in the chart above). A high index level indicates strong correlations between assets in that region. For example, when the Asia RORO index is high this implies that a single factor is driving returns across Asia, which leads to strong correlations between Asian assets. Similarly, high levels of the Latam and EMEA RORO indices imply that correlations are high in Latin America and EMEA, respectively.

Strong correlations between assets in different regions can be caused by local phenomena as well as global RORO dynamics. To illustrate the importance of risk on – risk off rather than local factors in driving correlations, in the bar chart on the previous page we show the extent to which the different regions are driven by the RORO factor. When a region is strongly driven by risk on – risk off, it will have a high correlation with the RORO factor and will appear to the left of the bar chart. On the other hand, if regional correlations are not primarily driven by risk on – risk off, but instead by other local factors, a region will be only weakly correlated with the RORO factor.

The picture today

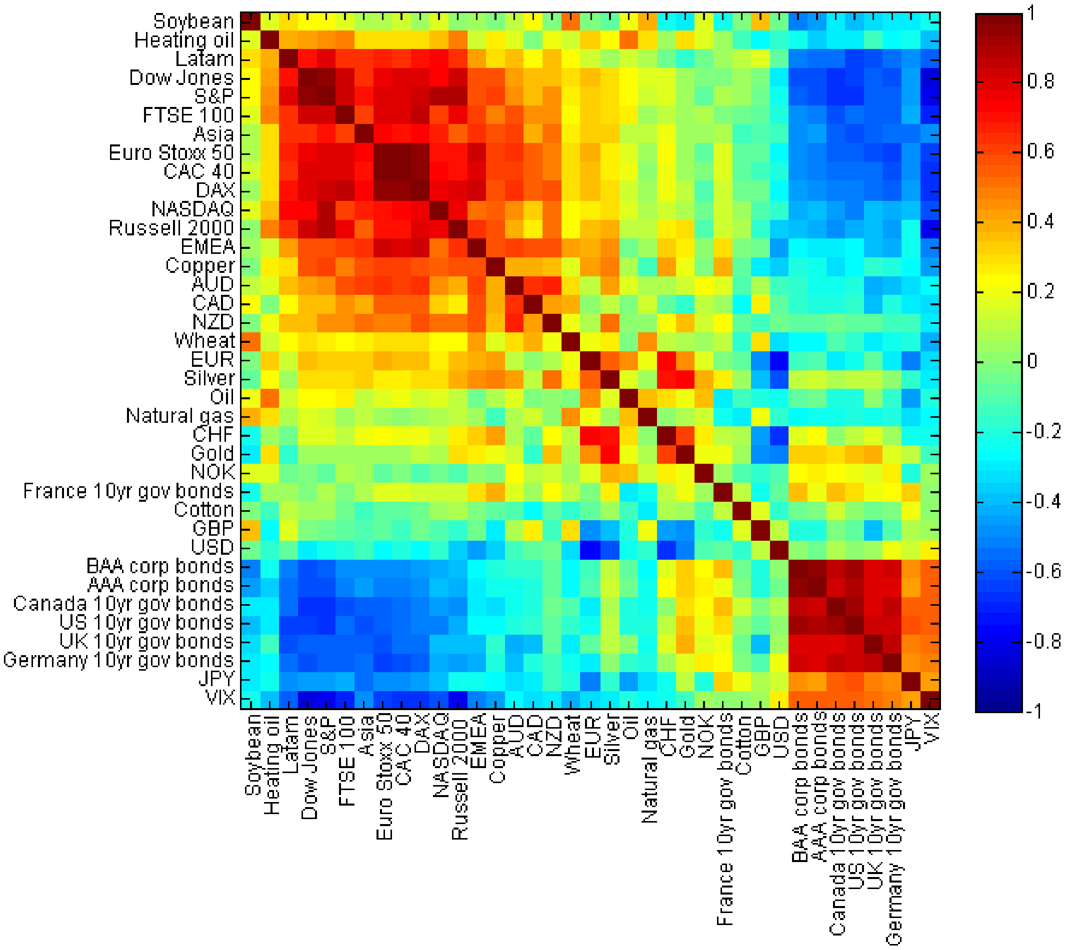
Correlations within the EM regions have weakened recently. This is indicative of greater dispersion in EM returns.

Methodology

See Appendix A2 for more details of the construction methodology.

Correlation heat map

Heat map showing correlations over the last 80 days



Source: HSBC, Bloomberg

Reading the heat maps

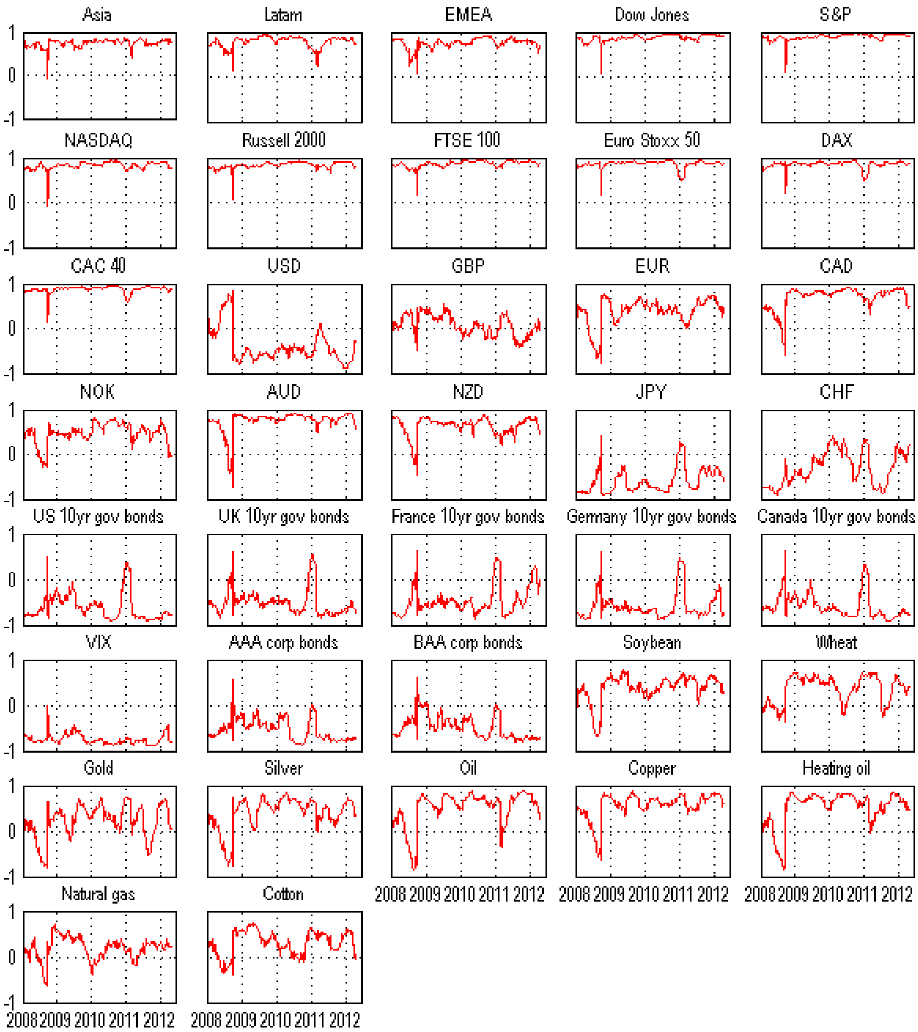
The heat map shows the correlations between different assets during the last 80 days. **Dark red** regions indicate **strong positive** correlations. **Dark blue** regions indicate **strong negative** correlations. **Yellow** and **green** regions indicate **weak correlations/uncorrelated** assets.

The picture today

The heat map illustrates that **the risk on – risk off phenomenon remains strong, but has weakened**. There are two large red blocks corresponding to a group of highly correlated risk-on assets and another group of highly correlated risk-off assets. The blue regions show the negative correlations between strongly risk-on and strongly risk-off assets, eg the S&P and the JPY. There are more noticeable green areas (weak correlations), which indicate that a few assets have recently moved independently of the risk on – risk off phenomenon.

Correlations with the risk on – risk off factor through time

Rolling correlations of individual assets with the risk on – risk off factor

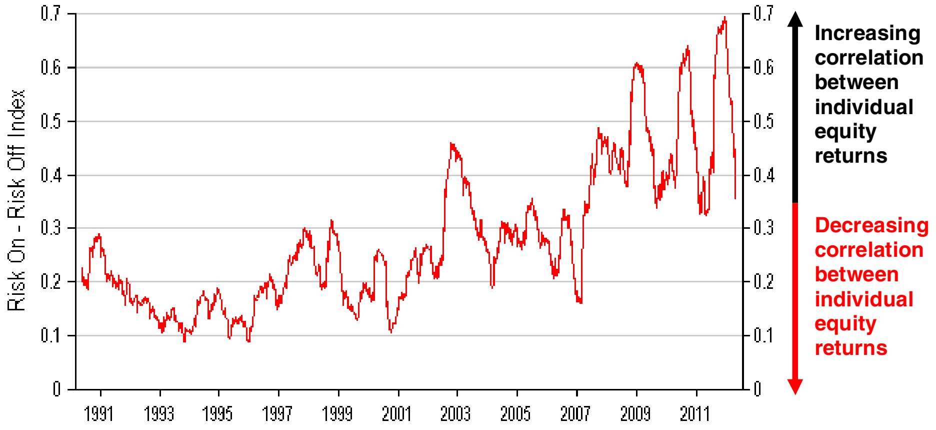


Source: HSBC, Bloomberg

The charts show the strength of the correlations between individual assets and the risk on – risk off factor through time. **These correlations quantify the extent to which the different assets are driven by risk on – risk off.** A correlation close to 1 implies that the asset is strongly risk on; a correlation close to -1 implies that the asset is strongly risk off; and a correlation near zero suggests that the asset is not primarily driven by the risk on – risk off phenomenon.

HSBC Equity RORO Index

Equity RORO Index



Source: HSBC, Bloomberg

EM RORO Indices

The Equity RORO index has fallen sharply but is still high by historical levels.

This indicates that whilst equity moves remain highly correlated, there is significantly more dispersion than in late 2011.

See Appendix A3 for more details of the methodology.

Interpretation

Whilst risk on – risk off is inherently a cross-asset phenomenon, equities are the quintessential risk-on asset. When there is a perception in the market that correlations are high, it is important to determine whether it is simply a within-asset-class phenomenon or part of the wider global macro theme.

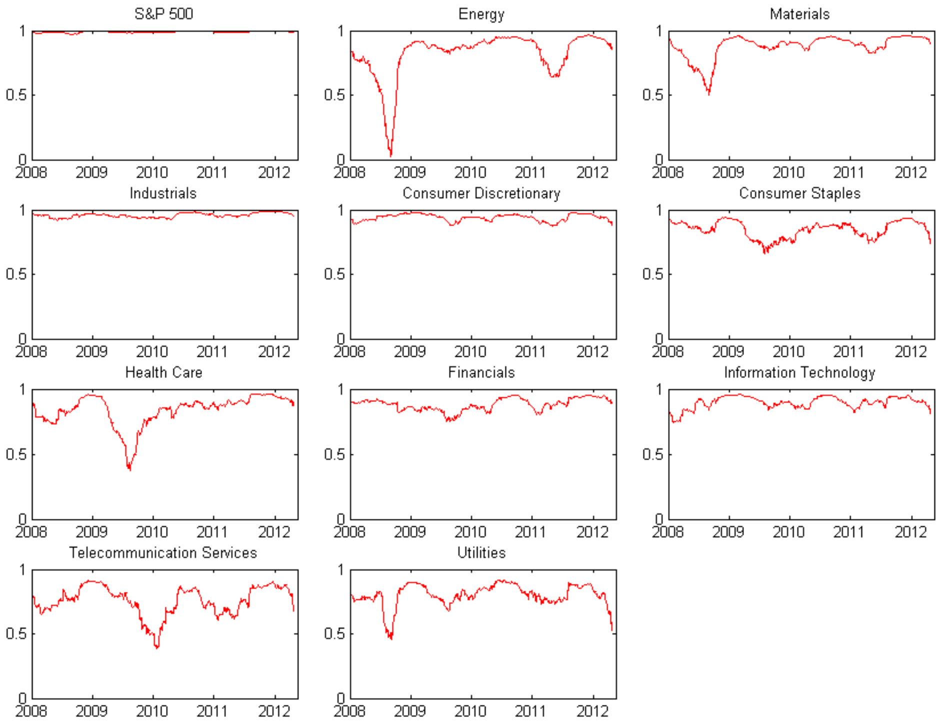
The HSBC Equity RORO Index allows us to distinguish between high correlations which are specific to this main "risky" asset class and high cross-asset correlations, as measured in the original RORO Index, which indicate broader macro stress.

The picture today

At the moment the **Equity RORO Index has fallen sharply but is still high by historical levels**. This indicates that movements in individual equities remain very similar but that signs of more dispersion have come through.

Correlation of sectors with Equity RORO factor

Rolling correlations of individual sectors with Equity RORO factor



Source: HSBC, Bloomberg

These charts show the rolling correlations between the returns of individual equity sectors and the Equity RORO factor. Values close to +1 indicate that the sector is simply moving in response to changes in the Equity RORO factor. The closer the value is to 0, the more that sector is displaying sector-specific character.

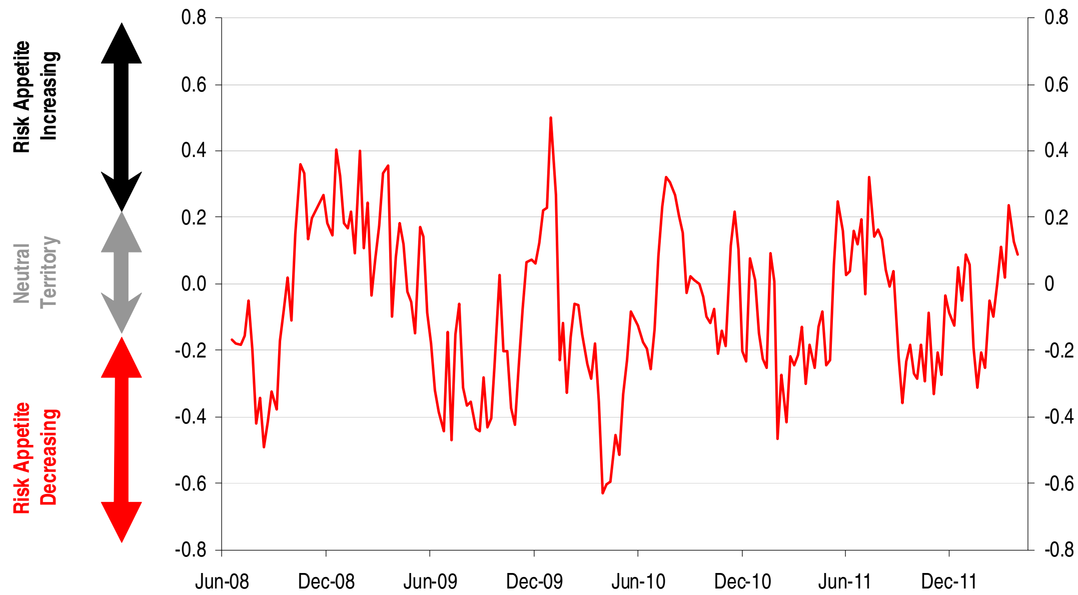
Interpretation

Some sectors are now showing lower correlations to the Equity RORO factor. This indicates that these sectors are responding more to their own sector-specific factors and are less dominated by the overall Equity RORO factor. This is consistent with the fall in the Equity RORO index seen since late 2011.

However, **most sectors remain strongly correlated to the Equity RORO factor** by historical standards.

OPRA

OPRA Index



Source: HSBC, Bloomberg

Interpretation

When the OPRA index is close to 1 it indicates that speculators have increased their exposure to risky assets, whereas a value close to -1 indicates that speculators have shifted their exposure to less risky assets.

The picture today

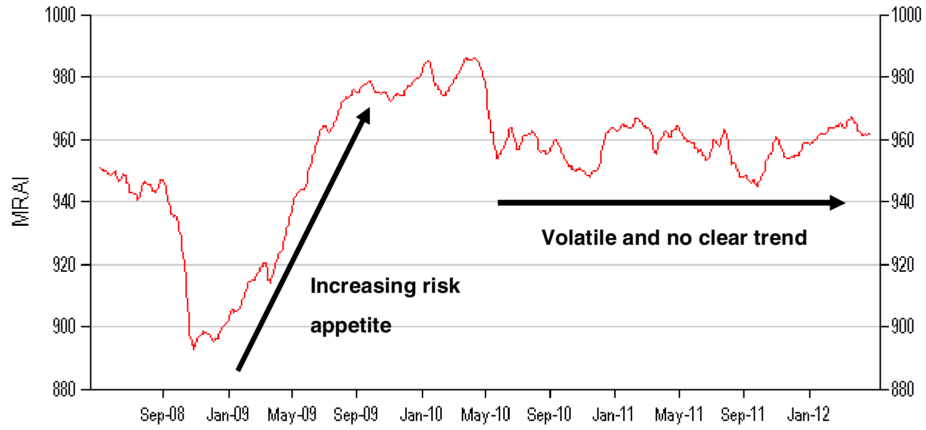
The position-based risk appetite index is **in neutral territory**. This means that speculative traders on the US futures exchanges have shifted their positions in a way unrelated to the risk of holding them. This is indicative of **neutral risk appetite**.

Methodology

The OPRA index is based on the relationship between changes in the futures positions held by speculative traders in various contracts and the risk associated with holding the contracts. See Appendix B for more details of the methodology.

MRAI

MRAI: Short-term picture



Source: HSBC, Bloomberg

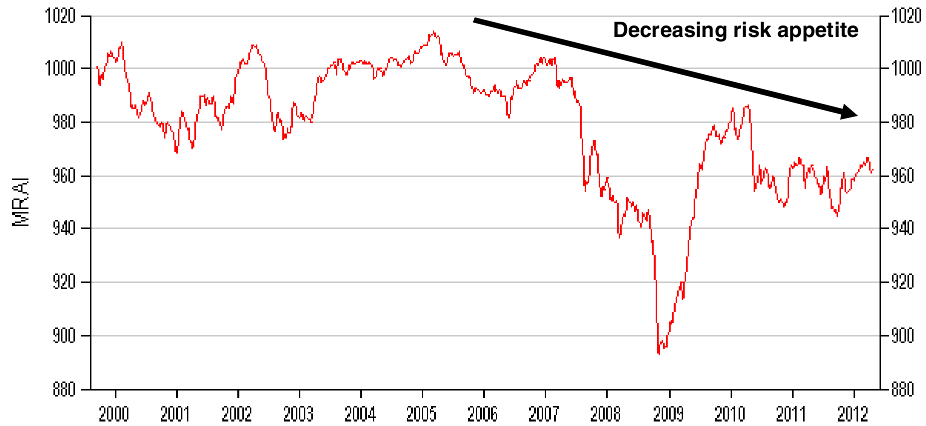
Short-term picture

The price-based risk appetite index has moved sideways with high volatility since May 2010.

This index is based on changes in prices and volatilities of assets that are known to be affected by risk appetite.

See Appendix C for more details of the methodology.

MRAI: Long-term picture



Source: HSBC, Bloomberg

Long-term picture

The MRAI is in a long-term downward trend.

Interpretation

A positive trend in the MRAI implies increasing risk appetite whereas a negative trend implies decreasing risk appetite.

The picture today

The MRAI has been volatile and has shown no clear trend since May 2010. This indicates that **there is constantly changing appetite for risk**, which is consistent with the risk on – risk off phenomenon.

G10 Exchange Rate Correlations

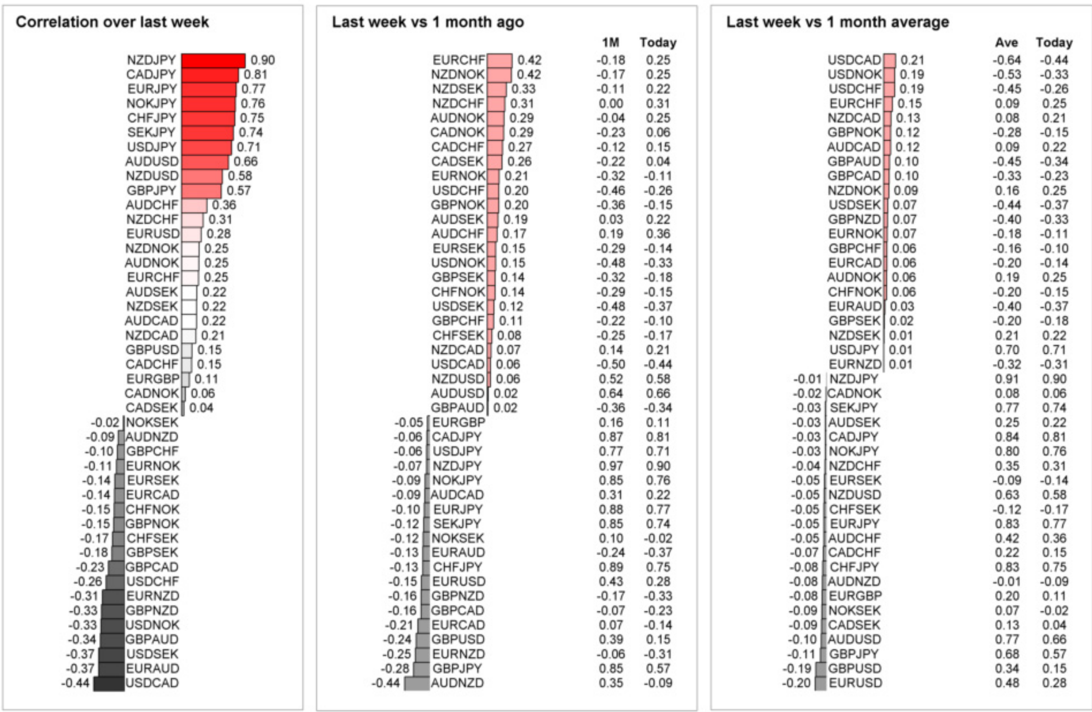
In the linked document at the following url (https://www.research.hsbc.com/midas/Res/RDV?p=pdf&key=1xnuZB0lkt&n=328790.PDF), we show the strength of the correlations between all G10 exchange rates. If one has a view on how an exchange rate is going to move, this can be used to identify other trading opportunities by highlighting other currency pairs that move independently or in the same (or opposite) direction.

The chart below is an example page from this document for AUD-JPY. The three bar charts show:

- The correlation of AUD-JPY with all other G10 crosses during the previous week;
- A comparison of AUD-JPY correlations during the previous week with a 1-week period 1-month ago; and
- A comparison of last week's AUD-JPY correlations with the average correlation during the previous month.

To enable us to calculate correlations over periods as short as a week, we have used hourly price data. In the linked document, we provide similar charts for all other G10 crosses and more details of the methodology that we use to construct the charts.

Example page from the linked correlation document: AUD-JPY correlations over the last week and versus the previous month



Source: HSBC

HSBC

Appendix A1: RORO Methodology

Market-wide correlation index

HSBC Risk On – Risk Off (RORO) Index

The Risk On – Risk Off (RORO) index takes the rolling correlations between the daily returns of the 34 assets listed in the table below and combines them into a single index. We construct the index by using principal component analysis (PCA) to decompose the 34 asset return time series into 34 principal components (PCs), which are mutually uncorrelated variables that explain the observed asset returns.

The first PC represents the most important factor driving financial markets during a particular time period. In current market conditions, this factor can be considered to represent "risk on – risk off". That is, the paradigm in which the market either believes the future is bright – "risk on" – or that it is bad – "risk off". The proportion of the variance explained by the first PC then provides an indication of the strength with which this paradigm dominates markets. If the first PC dominates markets and explains a large proportion of the variance, this implies that market-wide correlations are strong, which is a key feature of the risk on – risk off paradigm. In this scenario, this single factor is driving synchronized changes amongst many different markets; hence correlations are high.

We define the RORO index as the variance in market returns explained by the first PC. An increase in the RORO index implies an increase in market correlations, whereas a decrease implies that market correlations have decreased. In constructing the index we focus on markets that have a large overlap in trading hours (Europe and North America and Asian currency markets). This enables us to track correlations on a daily basis without having to worry about the non-synchronicity of return time series.

We also consider correlations between the different assets and the risk on – risk off "factor". These are the correlations between the different return time series and the first PC, and can also be considered to provide an indication of the extent to which risk on – risk off is driving different assets.

Assets included in the RORO Index

Equities	Government bonds (10 year yields)	Corporate bonds (yields)	Currencies (trade weights indices)	Metals	Other
S&P	US	AAA	USD	Gold	VIX
Dow Jones	Canada	BAA	EUR	Silver	Oil
NASDAQ	UK		CHF	Copper	Natural Gas
Russell 2000	Germany		GBP		Heating Oil
FTSE 100	France		JPY		Wheat
Euro Stoxx 50			AUD		Soybean
DAX			CAD		Cotton
CAC 40			NZD		

Source: HSBC

Appendix A2: EM RORO

Regional emerging market correlations

HSBC Emerging Market RORO Indices

We produce Emerging Market RORO Indices for Asia, Latin America, and EMEA. We construct the indices using a similar methodology to that described in Appendix A1 for the cross-asset RORO index. For each region, we perform a principal component analysis (PCA) on the returns of a range of assets from that region. We then define each regional index as the proportion of the variance in the returns of assets in that region explained by the first principal component (PC).

For the original multi-asset RORO Index the first PC represents the most important global macro factor driving returns across a wide range of different assets. When the RORO index is high, this factor is strong. The regional EM indices have an analogous interpretation. For example, when the Asia RORO index is high this implies that a single factor is driving returns across Asia, which leads to strong correlations between Asian assets. Similarly, high levels of the Latam and EMEA RORO indices imply that correlations are high in Latin America and EMEA, respectively.

For each of the regions, we use both bond and equity data for the countries listed in the table below. To enable us to compare the regional indices, we use weekly price data to eliminate any effects due to the different time zones. This also allows us to compare these indices to the cross-asset RORO. We consider the correlation between the dominant market factor in the different regions and the main risk on – risk off factor that we identify in our cross-asset analysis. This is the correlations between the first PC for each region and the first PC for the cross-asset returns. The strength of these correlations can be considered to provide an indication of the extent to which risk on – risk off is driving returns in the different regions.

Assets included in the EM RORO Indices

Asia	Latin America	EMEA
Hong Kong	Brazil	Czech Republic
South Korea	Mexico	Hungary
Singapore	Chile	Poland
India		South Africa
Taiwan		Turkey
Malaysia		
Thailand		

Source: HSBC

Appendix A3: Equity RORO

Equity market correlations

HSBC Equity RORO Index

The HSBC Equity RORO Index looks at all current members of the S&P 500 Index that have an appropriate data history back to 1 January 1990. We use a similar construction methodology for this index to the one described in Appendix A1 for the RORO Index.

To construct the Equity RORO Index we perform a principal component analysis (PCA) on the returns of all of the equities that we consider. We define the index as the proportion of the variance in the returns of these equities that can be explained by the first principal component (PC).

This first PC is the most important factor driving the returns at any time. For the original multi-asset RORO Index the first PC represents the most important global macro factor driving returns across a wide range of different assets. When the RORO index is high, this factor is strong.

For the Equity RORO, there is an analogous interpretation; however, in this case we are only looking at the risky asset class of equities. When the Equity RORO index is high it indicates there is a "supercharged" market beta dominating stocks – correlations are high and individual identity is reduced.

We use the two indices together to characterise the stress in the global macro environment. High correlations are generally an indication of market strain and have consequences for most asset classes. The two indices help understand the extent to which stress is confined to risky assets or is more comprehensive.

Appendix B: OPRA Methodology

Position-based risk appetite index

Open Positions Risk Appetite (OPRA) Index

We use speculative positions from the CFTC Commitments of Traders report to measure risk appetite. We track changes in exposure of the speculative community to the various contracts listed in the table below and relate these changes to the risk associated with the contracts.

We view it as a sign of high risk appetite when the speculative community has increased its exposure to the more risky assets more than for less risky assets. To measure this we calculate the rank correlation between changes in the speculative open interest and volatility. A rank correlation is used since this is less susceptible to outliers than a standard correlation.

Since this is a correlation, the index will lie between -1 and +1. A value close to +1 indicates that speculators have been increasing their positions in risky assets across the board, with the largest percentage increase in exposure being in the riskiest assets. A value close to the minimum value of -1 indicates the opposite. If speculative positions have been changing in a way unrelated to risk, then the value of this index will be close to zero.

Contracts included in OPRA Index

Agricultural	Drinks	Metals	Currencies	Oil	Other
Corn	Cocoa	Platinum	AUD	LSCrude	Lumber
Oats	Coffee	Silver	CAD	Unleaded	
Rough Rice	OJ	Copper	CHF	Heating Oil	
Soybeans			EUR	Natural Gas	
Soybean Oil			GBP		
Soybean Meal			JPY		
Wheat					
Cotton					
Lean Hogs					
Live Cattle					

Source: HSBC

Appendix C: MRAI Methodology

Price-based risk appetite index

Market Risk Appetite Index (MRAI)

The MRAI measures the aggregate level of risk appetite in the financial system using risk premia from various markets. The index is based on changes in price and volatility of several assets that are known to be strongly affected by risk appetite. A positive trend in the MRAI implies an increasing appetite for risk whereas a negative trend in the MRAI implies a decreasing appetite for risk.

We construct the index using equally weighted z-scores of changes in the level of six inputs: the VIX and VDAX volatility indices; the Global Hazard Index, which aggregates the 3-month implied volatilities for EURUSD, USDJPY, and EURJPY; BAA and AAA corporate bonds spreads; and interest rate swap spreads.

Disclosure appendix

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Issuer of report
HSBC Bank plc
8 Canada Square, London
E14 5HQ, United Kingdom
Telephone: +44 20 7991 8888
Telex: 888866
Fax: +44 20 7992 4880
Website: www.research.hsbc.com

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Global Currency Strategy Research Team

Global

David Bloom
Global Head of FX Research
+44 20 7991 5969 david.bloom@hsbcib.com

Asia

Paul Mackel
Head of FX Research, Asia-Pacific
+852 2996 6565 paulmackel@hsbc.com.hk

Perry Kojodjojo
+852 2996 6568 perrykojodjojo@hsbc.com.hk

Dominic Bunning
+852 2822 1672 dominic.bunning@hsbc.com

United Kingdom

Daragh Maher
+44 20 7991 5968 daragh.maher@hsbcib.com

Stacy Williams
+44 20 7991 5967 stacy.williams@hsbcgroup.com

Mark McDonald
+44 20 7991 5966 mark.mcdonald@hsbcib.com

Daniel Fenn
+44 20 7991 5003 dan.fenn@hsbcib.com

Murat Toprak
+44 20 7991 5415 murat.toprak@hsbcib.com

Mark Austin
Consultant

United States

Robert Lynch
+1 212 525 3159 robert.lynch@us.hsbc.com

Clyde Wardle
+1 212 525 3345 clyde.wardle@us.hsbc.com

Marjorie Hernandez
+1 212 525 4109 marjorie.hernandez@us.hsbc.com

Technical Analysis

Murray Gunn
+44 20 7991 6797 murray,gunn@hsbcib.com

Precious Metals

James Steel
+1 212 525 3117 james.steel@us.hsbc.com

Howard Wen
+1 212 525 3726 howard.x.wen@us.hsbc.com