

## The buzz about bear flies

### USD bearish butterflies have significant pickups to bear flatteners

*We highlight a few USD bearish conditional curve trades, in particular a 6m 3s10s30s and a 6m 3s7s30s bear tightener. These have considerable pickup to forwards, a decent pickup to other conditional flatteners (e.g., 2s10s or 3s10s conditional bear flatteners), and have a positive pickup to spot. Unlike butterflies with a 2y short leg, these trades benefit from both positive gamma (8x and 4x that of the underlying butterfly, respectively) and very positive vega, both desirable attributes when positioning for a sell-off. We strike the flies based on performance over the past five years, noting that using OTM payers significantly improves the trades' performance. The resulting 6m 3s10s30s and 6m 3s7s30s conditional bear tighteners have historical gains of 203cts and 111cts to term respectively, over the past five years for trades putting on \$10k/bp of spread risk.*

#### Trade recommendations: bear flies

**6m 3s10s30s Bear Tightener:** Buy \$16.8mn 6m3y 1.01%, sell \$11.1mn 6m10y 3.42% and buy \$2.6mn 6m30y 4.09% payers for \$10,000/bp of risk to the 3s10s30s butterfly spread at zero initial cost.

**6m 3s7s30s Bear Tightener:** Buy \$16.8mn 6m3y 1.15%, sell \$15.1mn 6m7y 3.04% and buy \$2.6mn 6m30y 4.23% payers for \$10,000/bp of risk to the 3s7s10s butterfly spread at zero initial cost.

### Bearish trades in USD

While many US-based investors are only now coming around to the notion that USD rates can still sell off even with Janet Yellen at the helm of the Fed, European-based investors have had this view for some time. The market gave a huge sigh of relief to President Obama's choice of Janet Yellen for Fed Chairman and to her more recent Senate confirmation, but the data continue to (albeit hesitantly) back up former Fed Chairman Ben Bernanke's initial plans to taper although with a delay. Meanwhile, the relative complacency of US investors and the crowded USD carry trade could give any bearish move real legs.

It is with this in mind that we present a few bear flies, particularly because of their pickups to other correspondingly bearish trades (bear flatteners) as well as their overall pickup to forwards.

For confirmation of our data, we refer to [Conditional curve trades: Eyeballing relative value](#), which gives a simple methodology for finding pickups of any given conditional curve trade. In particular, we note in Figure 1 that (although this may shift for changes in strikes), bearish tighteners (e.g., short payers on the belly 6m 2s10s30s, 6m 3s7s30s, 6m 2s7s30s, etc) have a significant gain to corresponding steepeners in terms of pickups to forwards and to spot. Meanwhile, the tighteners have all the benefits of a flattener and the butterfly spread is essentially the same thing as the corresponding slope which we can see from their high correlation.

November 29, 2013

#### Research analysts

##### Quantitative Strategies

**Nick Firoozye - Nipic**  
[nick.firoozye@nomura.com](mailto:nick.firoozye@nomura.com)  
+44 20 7102 1660

**Qilong Zhang - NIHK**  
[qilong.zhang@nomura.com](mailto:qilong.zhang@nomura.com)  
+852 2252 6191

See Appendix A-1 for analyst certification, important disclosures and the status of non-US analysts.

**Fig. 1: Pretty bearish – 6m expiry conditional bear trades**

All express the same view but some with larger pickups

	Bear Flattener			Bear Tightener			
	2s10s	3s10s	3s7s	2s7s10s	2s10s30s	3s10s30s	3s7s30s
Pickup to Forwards	23.6	18.9	17.8	21.4	29.3	24.6	22.4
Pickup to Spot	28.2	13.1	18.5	39.0	46.9	31.8	42.6
Correlations to 2s10s (1y)	100.0%	99.6%	93.6%	99.2%	99.3%	99.5%	97.0%

Source: Bloomberg, Nomura Research

In Figure 1 we see the pickup to forwards and to spot (i.e., strike spread – forward spread and strike spread – spot spread, respectively) for a number of competing trades. We note that the correlations to slope over the past year were sufficiently high that the trades all express the same view. The bear tighteners generally have a more sizeable pickup than the corresponding bear flatteners. Bearish flies have the greatest pickups when they involve selling the belly in the 7y and the 10y tails.

Our US economics team expects tapering to begin some time in Q1 2014, most likely in January. They also expect forward guidance to be strengthened during this time and to be in place for some time thereafter. We concentrate on 6m expiries as being of adequate length to buffer a delay in tapering.

We note that although butterfly and flattener trades with a 2y short leg may offer attractive pickups, they are mostly short vega. In Figure 2, we give the risk profile for each of the trades in a 6m horizon, normalised at \$10,000/bp of spread, where we have chosen to strike the belly ATMF+20bp. The short vega could prove painful in a sell-off given the strong directionality of volatility. Consequently, we would recommend avoiding trading the 2y as the short wing. Meanwhile, as we would expect, quite a lot of butterflies are long gamma, which could benefit them in a large move.

**Fig. 2: Risk profile for ATMF+20bp bearish flatteners and tighteners**

Generally short vega could hurt trades in a sell-off

	Delta	Gamma	Vega	Swap Spd Gamma
\$10k bp/spd	(\$/bp)	(\$/bp <sup>2</sup> )	(\$/bp)	(\$/bp <sup>2</sup> )
6m 2s10s	3908	178	-767	-8
6m 3s10s	1542	80	-11	-7
6m 2s7s	3933	180	-748	-5
6m 3s7s	1582	79	-15	-4
6m 2s10s30s	2355	95	-358	4
6m 3s10s30s	1172	46	20	5
6m 2s7s10s	1999	90	-385	-1
6m 3s7s30s	1225	45	8	8

Source: Nomura Research

To put the gamma in context, in Figure 2 we also show the gamma of the underlying unconditional flatteners or tighteners (where the unconditional flatteners and butterflies are scaled to have \$10,000/bp of risk to their underlying spreads). We note that the gamma for the conditional flies is typically 6x to 20x that of the underlying butterfly, while the flatteners do benefit from positive gamma (but very negative vega). The trades that do stand out are the 6m 3s10s30s and 6m 3s7s30s (highlighted and boxed in Figure 2) for their positive gamma and positive to flat vega.

We have chosen conditional flies so that the two wings have the same premium while they are dv01 weighted notionals and scaled to have exposure of \$10,000 per bp of spread. In Figure 2, we have chosen the strike of the belly to be ATMF+20bp for uniformity, although we vary this assumption later.

Based on Figure 2, we look at the 3s10s30s and 3s7s30s in more detail because they are both positive vega and positive gamma, desirable properties for a large move.

## 6m 3s10s30s bear tighteners

**Fig. 3: 6m 3s10s30s bear tighteners: optimising strike for past performance (five years)**

Belly ATMF+40bp gives attractive entry of 174bp and highest historical returns

6m 3s10s30s	
Spot	121.74
Forward	128.94
High (5 Jun 2009)	152.9

Belly Strike	Fraction P&L>0	Fraction P&L=0	Fraction P&L<0	Average P&L	Strike Spread
100	33.49%	66.51%	0.00%	115.11	209.9
80	37.73%	62.27%	0.00%	161.48	198.0
60	42.21%	57.79%	0.00%	191.35	186.1
40	45.88%	54.12%	0.00%	203.14	174.4
20	54.28%	45.72%	0.00%	201.34	163.4
ATMF	66.35%	33.17%	0.48%	196.72	153.3

Source: Add source here

We now concentrate on looking for appropriate strikes. Our plan is to ensure first that the butterfly spread is higher (wider) than the peaks over the past five years. In Figure 3 we look at spot spreads, forward spreads and the highs. We then choose the strikes to maximise performance over the past five years.

**Fig. 4: 6m 3s10s30s bear tightener<sup>1</sup>**

Strikes vs spot and forward, 30y and 10y most likely to be expire ITM

6m Expiry	3y	10y	30y	Bfly (bp)
Spot	0.65	2.80	3.74	121.10
Fwd	0.93	3.03	3.83	128.83
Strikes	1.02	3.43	4.09	174.48
Realized Vol (1m)	0.34	0.71	0.69	54.17
Realized Vol (3m)	0.46	0.75	0.70	52.30
Realized Vol (6m)	0.53	0.90	0.79	63.83
Realized Vol (1y)	0.41	0.76	0.71	52.93
Strike Z-score (1m)	1.07	0.88	0.51	0.99
Strike Z-score (3m)	0.79	0.83	0.50	1.02
Strike Z-score (6m)	0.69	0.69	0.45	0.84
Strike Z-Score (1y)	0.89	0.82	0.49	1.01

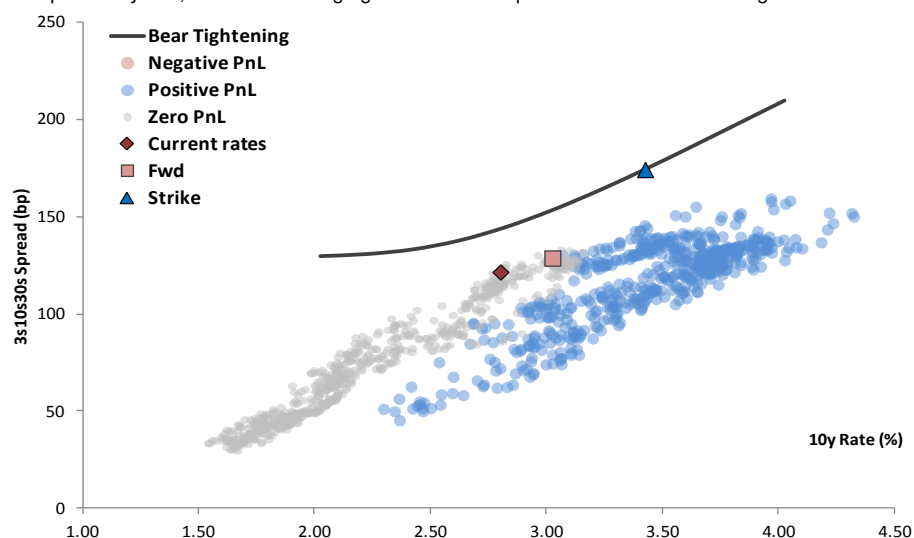
Source: Nomura Research

Based on this methodology, the belly strike of ATMF+40bp gives peak performance over the past year. In Figure 4, we show the strikes of this specific trade relative to spot and realised vols. It should be clear that there is far greater likelihood of making money on the 30y leg, although the 10y and 3y legs are not far behind in terms of the z-score of the strikes, this gives some sense of the likelihood of the moves over the next six months being severe enough for the bear butterfly to expire ITM.

<sup>1</sup> Strike Z-Score (1m) = (Strike – Spot)/Realised Vol(1m). The corresponding 3m, 6m, and 1y entries have similar definitions.

**Fig. 5: Five-year historical performance of 6m3y 1.02% / 6m10y 3.43% / 6m30y 4.09% bear tightener**

Over past five years, 203.14cts average gains and strike spreads close to historical highs



Source: Nomura Research

Finally, in Figure 5 we plot the past five years of data as a back-test together with all the zero-cost bear tightener strikes (typically struck far wider than the data), highlighting our chosen strike, spot and forward. The x-axis is the belly rates (i.e., 10y rate) and the y-axis is the 3s10s30s spread. We note that there have been many instances when the butterfly would have expired worthless (54% of the five years of data), while no data would have resulted in an actual loss over this period. We see that the strike spread is well above the historical spot spreads in Figure 5. Although it is not entirely clear how to depict regions where the P&L would be positive, negative and zero, given the three dimensions of the P&L it is clear that the 10y would have to expire ITM (so we would look only at rates to the left of the strike) and spreads would generally have to be above the strike spread, leaving little room for history to guide us on likely losses.

During this past five years, the gain was an average of 203.14cts. Conditional on the P&L being non-zero, the gain was in fact 440cts. We consequently believe that, in the event that it does not expire worthless, the trade could prove to be very profitable.

## 6m 3s7s30s bear tighteners

**Fig. 6: 6m 3s7s30s ATMF+60bp bear tighteners: optimised for past performance (five years)**

Belly ATMF+60bp gives entry of 77.8bp and average gains of 111.37cts

6m 3s7s30s	
Spot	-8.54
Forward	11.51
High (21 Nov 2008)	77.95

Belly Strike	Fraction P&L>0	Fraction P&L=0	Fraction P&L<0	Average P&L	Strike Spread
100	33.97%	66.03%	0.00%	83.05	103.9
80	38.05%	61.95%	0.00%	105.55	90.8
60	41.73%	57.79%	0.48%	111.37	77.8
40	44.36%	54.12%	1.52%	104.18	65.2
20	49.00%	45.16%	5.84%	85.16	53.4
ATMF	54.32%	34.21%	11.47%	66.32	42.7

Source: Nomura Research

The next alternative, favoured by some due to its not being short the 10y outright (although the behaviour of the 7y should not be significantly different from that of the 10y), is the 6m 3s7s30s bear tightener. As was true of the previous trade, we want to consider optimal strikes. Unlike the 3s10s30s trade, we have to consider strikes far closer to the highs, perhaps even slightly below them. In Figure 6, we look at the average P&L over the past five years as our guide. We see that the optimal belly strike is ATMF+60bp, with an average gain of 111.37cts. During that same period 41.73% of history resulted in positive P&L, while 57.19% in zero P&L and a mere 0.48% (6 days out of 1352) resulted in a loss.

We note that this optimal strike is actually slightly below the historical highs (i.e., the resulting strike spread of 77.8bp is near the 77.95bp high of 21 November 2008), making this appear more risky than the 3s10s30s tightener which had a large buffer.

In Figure 7, we inspect the strikes and the moves needed for them to expire ITM. We note that the 30y is more likely to expire ITM based on historical moves of the past one month to one year, while the 3y and 7y are approximately equally likely to expire ITM. Meanwhile, the butterfly spread itself is relatively far from the strike spread, making it far less likely that the trade will lose money even if all three swaptions expire ITM.

**Fig. 7: 6m 3s7s30s bear tightener<sup>2</sup>**

30y most likely to expire ITM while 3y just slightly more likely than 7y

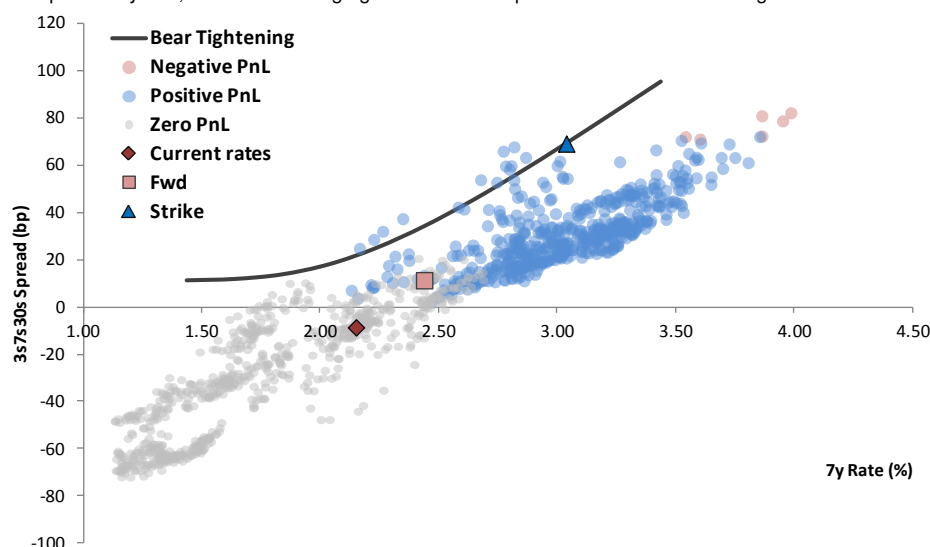
6m Expiry	3y	10y	30y	Bfly (bp)
Spot	0.65	2.80	3.74	121.10
Fwd	0.93	3.03	3.83	128.83
Strikes	1.02	3.43	4.09	174.48
Realized Vol (1m)	0.34	0.71	0.69	54.17
Realized Vol (3m)	0.46	0.75	0.70	52.30
Realized Vol (6m)	0.53	0.90	0.79	63.83
Realized Vol (1y)	0.41	0.76	0.71	52.93
Strike Z-score (1m)	1.07	0.88	0.51	0.99
Strike Z-score (3m)	0.79	0.83	0.50	1.02
Strike Z-score (6m)	0.69	0.69	0.45	0.84
Strike Z-Score (1y)	0.89	0.82	0.49	1.01

Source: Nomura Research

<sup>2</sup> Strike Z-Score (1m) = (Strike – Spot)/Realised Vol(1m). The corresponding 3m, 6m, and 1y entries have similar definitions.

**Fig. 8: Historical performance of 6m3y 1.15% / 6m7y 3.04% / 6m30y 4.23% bear tightener**

Over past five years, 111.37cts average gains and strike spreads close to historical highs



Source: Nomura Research

In Figure 8, we plot the historical performance together with the zero-cost bear tightener strikes, highlighting our chosen strike, forwards and spot. We note that while our chosen strikes are not above the historical highs, they are very close to them. As we should expect, the region where the trade loses money has butterfly spreads above the strike spread (i.e., above 78bp) and 7y rates above the 7y strike (i.e., 3.04%), although we caution that the trade cannot be adequately represented in two dimensions. Care should be taken if viewing this chart in black and white as some of the lighter blue dots (with positive P&L) may be mistaken for the (only six) pink dots which have negative P&L.

While the average P&L is 111.67cts, we note that, conditional on the trade expiring with positive P&L, the conditional average gain is 267cts. The gain conditional on there being a loss is -27cts (as we said, occurring on just 0.48% of history, i.e., 6 out of 1352 days). Given its historical performance and what we consider to be adequate buffers, we believe this trade is a particularly good means of taking a bearish view.

#### Are we being paid to take the risk and is now a good time?

One of the other reasons why these bearish trades are particularly attractive is the relative richness of the 7y to 10y sector of the vol surface. While popular belief is that this richness of vols is entirely justified because of the higher delivered vol in that sector, we think this is not quite true – implied/realised vol ratios are at their highs in the 1y and shorter tenors (e.g., through 1y swaps, 6m and 3m caps), but these ratios are higher in the 7y to 15y sectors than any other tenors longer than 2y (see Figure 9 for the past month). Some of this pattern repeats when we look over longer historical periods, with 7y to 10y implied/realised ratios generally above those of the 2y to 3y tails.

**Fig. 9: USD implied/realised normal vol ratio (1M history)**

Over the past month, 7y to 10y are among the richest implieds.

	1y	2y	3y	5y	7y	10y	15y	20y	30y
1m	1.99	1.25	1.01	1.03	1.03	1.02	1.00	0.99	0.98
3m	1.64	1.08	1.03	1.06	1.07	1.07	1.04	1.02	1.01
6m	1.72	1.05	1.02	1.08	1.11	1.13	1.10	1.08	1.06
1y	1.29	0.99	1.03	1.09	1.11	1.13	1.09	1.07	1.05

Source: Nomura Research

We find as well that, in terms of relative value, ATM vols in the 3y to 7y tails remain some of the richest compared with recent history, while 30y vols (and front-end vols) have some of the best entry levels. Relatively speaking, 7y to 10y tails are rich and 3y (and shorter) and 20y and longer are cheap.

**Fig. 10: 5y and 7y vols are among the highest historically, while front and long ends are relatively depressed**

Sell the belly and buy the wings

**ATM Vol Z-Score (1y history)**

Exp/Tenor	1y	2y	3y	5y	7y	10y	20Y	30Y
1m	-1.12	-0.58	0.06	0.12	0.00	-0.18	-0.44	-0.61
3m	-1.10	-0.55	0.00	0.21	0.14	-0.05	-0.34	-0.66
6m	-0.50	-0.21	0.17	0.38	0.35	0.19	-0.21	-0.61
9m	-0.42	-0.05	0.27	0.48	0.46	0.29	-0.25	-0.64
1y	-0.24	0.08	0.43	0.56	0.53	0.37	-0.34	-0.74
2y	0.45	0.67	0.73	0.75	0.55	0.42	-0.27	-0.77

Source: Nomura Research

To look at entry timing, we show the Z-scores of volatilities given one year of data in Figure 10. We note that the upper right corner and the upper left corner are among the cheapest on this metric, while 5y to 7y vols are generally much higher than their past history, making them a good sell. While 2y is obviously cheap and 3y far less so, we judge the negative vega of 2y flies to be reason enough to avoid them.

**The trades:**

In Figures 11 and 12 we reiterate the trade idea in more detail, noting that risk numbers in Figure 2 were for ATMF+20bp so there may be a slight difference given the differing strikes (and in fact our delta has decreased markedly while our vega has increased significantly):

**Fig. 11: The 6m 3s10s30s (10y ATMF+40bp) bear tightener**

Trade	Notional (MM)	Spot %	Forward %	Strike %	Delta	Gamma	Vega	Swap Gamma
6m3y Payer	16.8	0.65	0.92	1.01	1,510	51	1,408	2
6m10y Payer	-11.1	2.80	3.02	3.42	-2,089	-42	-2,425	-12
6m30y Payer	2.6	3.74	3.83	4.09	1,426	30	1,276	14
<b>6m 3s10s30s</b>					<b>847</b>	<b>40</b>	<b>259</b>	<b>5</b>

Source: Nomura Research

**Fig. 12: The 6m 3s7s10s (10y ATMF+60bp) conditional bear tightener**

Trade	Notional (MM)	Spot %	Forward %	Strike %	Delta	Gamma	Vega	Swap Gamma
6m3y Payer	16.8	0.65	0.93	1.16	970	35	1,313	2
6m7y Payer	-15.1	2.15	2.44	3.04	-1,352	-28	-2,107	-9
6m30y Payer	2.6	3.74	3.83	4.23	1,038	25	1,117	14
<b>6m 3s7s30s</b>					<b>656</b>	<b>32</b>	<b>323</b>	<b>8</b>

Source: Nomura Research

While our goal was not to increase vega, we have found trades that are very long vega in the process of optimising to historical performance.

**Trade recommendations: bear flies**

- **6m 3s10s30s Bear Tightener:** Buy \$16.8mn 6m3y 1.01%, sell \$11.1mn 6m10y 3.42% and buy \$2.6mn 6m30y 4.09% payers for \$10,000/bp of risk to the 3s10s30s butterfly spread at zero initial cost.
- **6m 3s7s30s Bear Tightener:** Buy \$16.8mn 6m3y 1.15%, sell \$15.1mn 6m7y 3.04% and buy \$2.6mn 6m30y 4.23% payers for \$10,000/bp of risk to the 3s7s10s butterfly spread at zero initial cost.



# Appendix A-1

## Analyst Certification

I, Nick Firoozye, hereby certify (1) that the views expressed in this Research report accurately reflect my personal views about any or all of the subject securities or issuers referred to in this Research report, (2) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this Research report and (3) no part of my compensation is tied to any specific investment banking transactions performed by Nomura Securities International, Inc., Nomura International plc or any other Nomura Group company.

## Important Disclosures

### Online availability of research and conflict-of-interest disclosures

Nomura research is available on [www.nomuranow.com/research](http://www.nomuranow.com/research), Bloomberg, Capital IQ, Factset, MarkitHub, Reuters and ThomsonOne. Important disclosures may be read at <http://go.nomuranow.com/research/globalresearchportal/pages/disclosures/disclosures.aspx> or requested from Nomura Securities International, Inc., on 1-877-865-5752. If you have any difficulties with the website, please email [grpsupport@nomura.com](mailto:grpsupport@nomura.com) for help.

The analysts responsible for preparing this report have received compensation based upon various factors including the firm's total revenues, a portion of which is generated by Investment Banking activities. Unless otherwise noted, the non-US analysts listed at the front of this report are not registered/qualified as research analysts under FINRA/NYSE rules, may not be associated persons of NSI, and may not be subject to FINRA Rule 2711 and NYSE Rule 472 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

Nomura Global Financial Products Inc. ("NGFP") Nomura Derivative Products Inc. ("NDPI") and Nomura International plc. ("Nlplc") are registered with the Commodities Futures Trading Commission and the National Futures Association (NFA) as swap dealers. NGFP, NDPI, and Nlplc are generally engaged in the trading of swaps and other derivative products, any of which may be the subject of this report.

### ADDITIONAL DISCLOSURES REQUIRED IN THE U.S.

Principal Trading: Nomura Securities International, Inc and its affiliates will usually trade as principal in the fixed income securities (or in related derivatives) that are the subject of this research report. Analyst Interactions with other Nomura Securities International, Inc. Personnel: The fixed income research analysts of Nomura Securities International, Inc and its affiliates regularly interact with sales and trading desk personnel in connection with obtaining liquidity and pricing information for their respective coverage universe.

### Valuation methodology - Fixed Income

Nomura's Fixed Income Strategists express views on the price of securities and financial markets by providing trade recommendations. These can be relative value recommendations, directional trade recommendations, asset allocation recommendations, or a mixture of all three. The analysis which is embedded in a trade recommendation would include, but not be limited to:

- Fundamental analysis regarding whether a security's price deviates from its underlying macro- or micro-economic fundamentals.
- Quantitative analysis of price variations.
- Technical factors such as regulatory changes, changes to risk appetite in the market, unexpected rating actions, primary market activity and supply/ demand considerations.

The timeframe for a trade recommendation is variable. Tactical ideas have a short timeframe, typically less than three months. Strategic trade ideas have a longer timeframe of typically more than three months.

## Disclaimers

This document contains material that has been prepared by the Nomura entity identified at the top or bottom of page 1 herein, if any, and/or, with the sole or joint contributions of one or more Nomura entities whose employees and their respective affiliations are specified on page 1 herein or identified elsewhere in the document. The term "Nomura Group" used herein refers to Nomura Holdings, Inc. or any of its affiliates or subsidiaries and may refer to one or more Nomura Group companies including: Nomura Securities Co., Ltd. ('NSC') Tokyo, Japan; Nomura International plc ('Nlplc'), UK; Nomura Securities International, Inc. ('NSI'), New York, US; Nomura International (Hong Kong) Ltd. ('NIHK'), Hong Kong; Nomura Financial Investment (Korea) Co., Ltd. ('NFIK'), Korea (Information on Nomura analysts registered with the Korea Financial Investment Association ('KOFIA') can be found on the KOFIA Intranet at <http://dis.kofia.or.kr>); Nomura Singapore Ltd. ('NSL'), Singapore (Registration number 197201440E, regulated by the Monetary Authority of Singapore); Nomura Australia Ltd. ('NAL'), Australia (ABN 48 003 032 513), regulated by the Australian Securities and Investment Commission ('ASIC') and holder of an Australian financial services licence number 246412; P.T. Nomura Indonesia ('PTNI'), Indonesia; Nomura Securities Malaysia Sdn. Bhd. ('NSM'), Malaysia; NIHK, Taipei Branch ('NITB'), Taiwan; Nomura Financial Advisory and Securities (India) Private Limited ('NFASL'), Mumbai, India (Registered Address: Ceejay House, Level 11, Plot F, Shivsagar Estate, Dr. Annie Besant Road, Worli, Mumbai- 400 018, India; Tel: +91 22 4037 4037, Fax: +91 22 4037 4111; SEBI Registration No: BSE INB011299030, NSE INB231299034, INF231299034, INE 231299034, MCX: INE261299034) and Nlplc, Madrid Branch ('Nlplc, Madrid'). 'CNS Thailand' next to an analyst's name on the front page of a research report indicates that the analyst is employed by Capital Nomura Securities Public Company Limited ('CNS') to provide research assistance services to NSL under a Research Assistance Agreement. CNS is not a Nomura entity.

THIS MATERIAL IS: (I) FOR YOUR PRIVATE INFORMATION, AND WE ARE NOT SOLICITING ANY ACTION BASED UPON IT; (II) NOT TO BE CONSTRUED AS AN OFFER TO SELL OR A SOLICITATION OF AN OFFER TO BUY ANY SECURITY IN ANY JURISDICTION WHERE SUCH OFFER OR SOLICITATION WOULD BE ILLEGAL; AND (III) BASED UPON INFORMATION FROM SOURCES THAT WE CONSIDER RELIABLE, BUT HAS NOT BEEN INDEPENDENTLY VERIFIED BY NOMURA GROUP.

Nomura Group does not warrant or represent that the document is accurate, complete, reliable, fit for any particular purpose or merchantable and does not accept liability for any act (or decision not to act) resulting from use of this document and related data. To the maximum extent permissible all warranties and other assurances by Nomura group are hereby excluded and Nomura Group shall have no liability for the use, misuse, or distribution of this information.



Opinions or estimates expressed are current opinions as of the original publication date appearing on this material and the information, including the opinions and estimates contained herein, are subject to change without notice. Nomura Group is under no duty to update this document. Any comments or statements made herein are those of the author(s) and may differ from views held by other parties within Nomura Group. Clients should consider whether any advice or recommendation in this report is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. Nomura Group does not provide tax advice. Nomura Group, and/or its officers, directors and employees, may, to the extent permitted by applicable law and/or regulation, deal as principal, agent, or otherwise, or have long or short positions in, or buy or sell, the securities, commodities or instruments, or options or other derivative instruments based thereon, of issuers or securities mentioned herein. Nomura Group companies may also act as market maker or liquidity provider (within the meaning of applicable regulations in the UK) in the financial instruments of the issuer. Where the activity of market maker is carried out in accordance with the definition given to it by specific laws and regulations of the US or other jurisdictions, this will be separately disclosed within the specific issuer disclosures.

This document may contain information obtained from third parties, including ratings from credit ratings agencies such as Standard & Poor's. Reproduction and distribution of third party content in any form is prohibited except with the prior written permission of the related third party. Third party content providers do not guarantee the accuracy, completeness, timeliness or availability of any information, including ratings, and are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such content. Third party content providers give no express or implied warranties, including, but not limited to, any warranties of merchantability or fitness for a particular purpose or use. Third party content providers shall not be liable for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including lost income or profits and opportunity costs) in connection with any use of their content, including ratings. Credit ratings are statements of opinions and are not statements of fact or recommendations to purchase hold or sell securities. They do not address the suitability of securities or the suitability of securities for investment purposes, and should not be relied on as investment advice.

Any MSCI sourced information in this document is the exclusive property of MSCI Inc. ('MSCI'). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, re-disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI and the MSCI indexes are services marks of MSCI and its affiliates.

Investors should consider this document as only a single factor in making their investment decision and, as such, the report should not be viewed as identifying or suggesting all risks, direct or indirect, that may be associated with any investment decision. Nomura Group produces a number of different types of research product including, among others, fundamental analysis, quantitative analysis and short term trading ideas; recommendations contained in one type of research product may differ from recommendations contained in other types of research product, whether as a result of differing time horizons, methodologies or otherwise. Nomura Group publishes research product in a number of different ways including the posting of product on Nomura Group portals and/or distribution directly to clients. Different groups of clients may receive different products and services from the research department depending on their individual requirements. Clients outside of the US may access the Nomura Research Trading Ideas platform (Retina) at <http://go.nomuranow.com/equities/tradingideas/retina/>. Figures presented herein may refer to past performance or simulations based on past performance which are not reliable indicators of future performance. Where the information contains an indication of future performance, such forecasts may not be a reliable indicator of future performance. Moreover, simulations are based on models and simplifying assumptions which may oversimplify and not reflect the future distribution of returns.

Certain securities are subject to fluctuations in exchange rates that could have an adverse effect on the value or price of, or income derived from, the investment.

The securities described herein may not have been registered under the US Securities Act of 1933 (the '1933 Act'), and, in such case, may not be offered or sold in the US or to US persons unless they have been registered under the 1933 Act, or except in compliance with an exemption from the registration requirements of the 1933 Act. Unless governing law permits otherwise, any transaction should be executed via a Nomura entity in your home jurisdiction.

This document has been approved for distribution in the UK and European Economic Area as investment research by Nplc. Nplc is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. Nplc is a member of the London Stock Exchange. This document does not constitute a personal recommendation within the meaning of applicable regulations in the UK, or take into account the particular investment objectives, financial situations, or needs of individual investors. This document is intended only for investors who are 'eligible counterparties' or 'professional clients' for the purposes of applicable regulations in the UK, and may not, therefore, be redistributed to persons who are 'retail clients' for such purposes. This document has been approved by NIHK, which is regulated by the Hong Kong Securities and Futures Commission, for distribution in Hong Kong by NIHK. This document has been approved for distribution in Australia by NAL, which is authorized and regulated in Australia by the ASIC. This document has also been approved for distribution in Malaysia by NSM. In Singapore, this document has been distributed by NSL. NSL accepts legal responsibility for the content of this document, where it concerns securities, futures and foreign exchange, issued by their foreign affiliates in respect of recipients who are not accredited, expert or institutional investors as defined by the Securities and Futures Act (Chapter 289). Recipients of this document in Singapore should contact NSL in respect of matters arising from, or in connection with, this document. Unless prohibited by the provisions of Regulation S of the 1933 Act, this material is distributed in the US, by NSI, a US-registered broker-dealer, which accepts responsibility for its contents in accordance with the provisions of Rule 15a-6, under the US Securities Exchange Act of 1934.

This document has not been approved for distribution to persons other than 'Authorised Persons', 'Exempt Persons' or 'Institutions' (as defined by the Capital Markets Authority) in the Kingdom of Saudi Arabia ('Saudi Arabia') or 'professional clients' (as defined by the Dubai Financial Services Authority) in the United Arab Emirates ('UAE') or a 'Market Counterparty' or 'Business Customers' (as defined by the Qatar Financial Centre Regulatory Authority) in the State of Qatar ('Qatar') by Nomura Saudi Arabia, Nplc or any other member of Nomura Group, as the case may be. Neither this document nor any copy thereof may be taken or transmitted or distributed, directly or indirectly, by any person other than those authorised to do so into Saudi Arabia or in the UAE or in Qatar or to any person other than 'Authorised Persons', 'Exempt Persons' or 'Institutions' located in Saudi Arabia or 'professional clients' in the UAE or a 'Market Counterparty' or 'Business Customers' in Qatar. By accepting to receive this document, you represent that you are not located in Saudi Arabia or that you are an 'Authorised Person', an 'Exempt Person' or an 'Institution' in Saudi Arabia or that you are a 'professional client' in the UAE or a 'Market Counterparty' or 'Business Customers' in Qatar and agree to comply with these restrictions. Any failure to comply with these restrictions may constitute a violation of the laws of the UAE or Saudi Arabia or Qatar.

NO PART OF THIS MATERIAL MAY BE (I) COPIED, PHOTOCOPIED, OR DUPLICATED IN ANY FORM, BY ANY MEANS; OR (II) REDISTRIBUTED WITHOUT THE PRIOR WRITTEN CONSENT OF A MEMBER OF NOMURA GROUP. If this document has been distributed by electronic transmission, such as e-mail, then such transmission cannot be guaranteed to be secure or error-free as information could be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. The sender therefore does not accept liability for any errors or omissions in the contents of this document, which may arise as a result of electronic transmission. If verification is required, please request a hard-copy version.

Nomura Group manages conflicts with respect to the production of research through its compliance policies and procedures (including, but not limited to, Conflicts of Interest, Chinese Wall and Confidentiality policies) as well as through the maintenance of Chinese walls and employee training.

**Additional information is available upon request and disclosure information is available at the Nomura Disclosure web page:**

<http://go.nomuranow.com/research/globalresearchportal/pages/disclosures/disclosures.aspx>

Copyright © 2013 Nomura International plc. All rights reserved.