5 April 2013 │ 26 pages

Australia/NZ

APAC Developed Markets Rates Strategy

Trading the AUD yield curve

- We look at key drivers of the Aussie curve and conclude that the recent flattening could run aground if global yields march higher again. This is unusual behaviour as the curve is more typically driven from the front-end. However, we see reasons for the recent bull flattening/bear steepening dynamic of the curve to persist a while longer. The aggressive monetary expansion announced by the BoJ yesterday accentuates the risk of a further period of bull flattening in global yield curves including AUD.

- Global business conditions surveys also point to more downside risks for growth which supports proxy long trades like AUD-USD 5y5y spread compression, AUD OIS flatteners out to 1y and bullish option structures such as AUD 1x1x1 receiver ladders. We also recommend scaling into NZD forward 1s2s steepeners on dips based on the latest business confidence data.

- We also identify some seasonal factors that should ensure an underlying bid tone for semi spreads and keep them range bound in the absence of offshore risks. Notwithstanding the uncertainty around APRA's revised liquidity standards and credit rating risks, we think there are tactical trading opportunities to be had in 3y-10y semi-ACGB boxes which are at historically wide levels.

- In the very first meeting by Kuroda and other new leadership, the BoJ decided on the introduction of the "quantitative and qualitative monetary easing." With the new operation scheme of large-scale JGB purchases by the BoJ in play, the net JGB issuance to the market will be a large negative. Although external factors for the JGB market are different from the time of previous QE, the market demand for maturity extension will likely heighten and a lower-band of the JGB yield is set to be tested, in our view.

Steven Mansell
+61-2-8225-4351
steven.mansell@citi.com

Carl Ang
+61-2-8225-4832
carl.ang@citi.com

Maki Shimizu
+81-3-6270-7246
maki.shimizu@citi.com

Figure 1. Strategy Summary Table

APAC Developed Markets	View	Strategies
Direction	Outright duration looks unattractive reflecting improved prospects for global growth. Markets are range bound still	Trade the ranges and look to sell rallies in ACGBs.
Yield Curve	AUD curve still looks directional, with high beta point at the long-end. Ample scope for NZD rate hike expectations to increase following a lift in NZ business conditions and outlook. Front-end AUD rates sensitive to risk of a growth slowdown in China due to policy reforms.	NZD 9m 1y-2y swap steepeners. AUD May-Oct OIS flatteners.
Cross-market	Long AUD vs USD. Cross-market trades should also benefit from falling AUD vs USD yield betas.	Receive AUD 5y5y vs USD. Sell 6m10yr AUD payers into USD payers.
Spreads	Tightness of European SSA spreads vulnerable to downgrades risks for the UK and Netherlands. Hold QTC vs NSWTC and TCV vs WATC based on ratings outlook.	Bias is to hold Renten over EIB. Buy TCV 22s vs WATC 21s.
Inflation	AUD BEIs expected to remain rangebound in line with the RBA outlook.	Prefer receiving fixed in 10y ZCS closer to 3.00%.
Volatility	Gamma now looks better medium-term value than vega on selected tenors. Add low-cost medium-term bearish positions in the gamma sector given the cheapness in volatility.	Sell AUD vega to buy gamma on 10yr tails. Scale into 1x1 +25bps wide ATM+75bps payer spreads in AUD 1y1y.
Risk Allocation	Spread and curve trades are likely to fare better than outright duration exposure in 2013.	

Source: Citi Research

APAC Developed Markets

Australia and New Zealand Rates Strategy

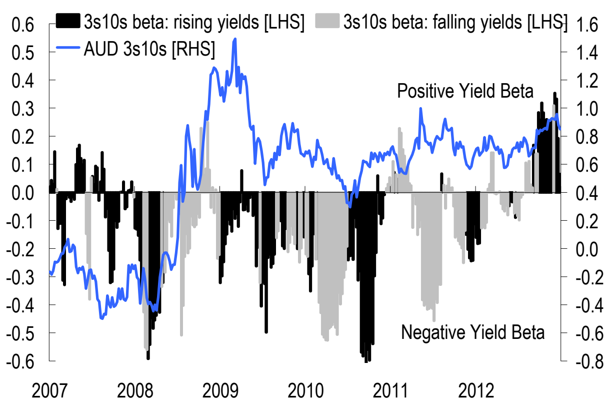
Trading the AUD yield curve

Steven Mansell
+61 2 8225 4351
steven.mansell@citi.com

Analysing the Australian yield curve has proven to be a taxing occupation over recent months. In this article we attempt to identify the key factors at work and to gauge their relative significance. We believe that this provides a useful analytical framework for assessing curve risk.

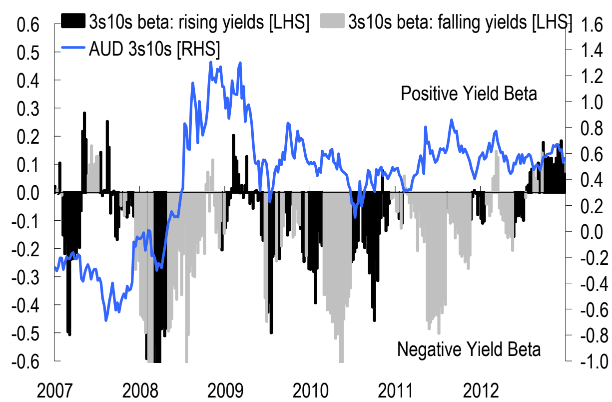
A starting point is to examine directional influences on the curve. We do this by regressing changes in curve slope on changes in average market yields. This produces some very interesting observations, as highlighted below. To interpret the charts, we show curve slope (solid line) and the associated beta of the curve slope (bars) when regressed against yields (regressions based on weekly changes for each variable). Dark areas highlight yield betas for periods when yields have been rising, light areas when yields have been declining. Areas above zero on the y-axis indicate periods of positive yield beta: i.e. the slope of the curve shifts in the same direction as average yield changes (so either bull flattening or bear-steepening), while, as seen for the majority of the sample period, areas below zero indicate negative yield beta periods: so periods of either bear flattening or bull steepening.

Figure 2. Yield Beta history for 3s10s AUD swap curve



Source: Citi Research

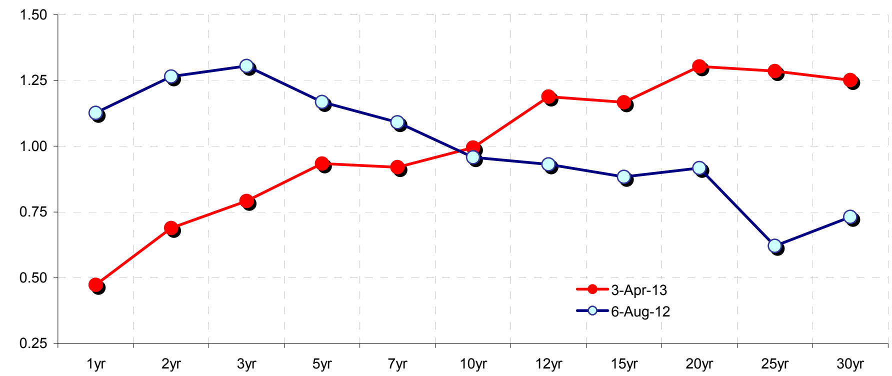
Figure 3. Yield Beta history for 3s10s ACGB curve



Source: Citi Research

The first conclusion we draw is that both the AUD 3s-10s swap and bond curves (shown in Figure 2 and Figure 3 respectively) are mostly disposed to either bear-flattening or bull steepening. More simply put, the short-end of the curve is usually in the driving seat in terms of determining curve slope. A further observation is that the recent phase of bear steepening and bull flattening is somewhat anomalous (positive yield betas have rarely been seen - as shown by the relatively few data points above zero) and the curve has typically reverted to type quite quickly. These exceptional events arise when offshore factors intervene to shift the high beta point of the curve out to the 10yr sector; this was clearly seen at the height of the euro debt crisis in late 2011 and, more recently, with the break out of 10yr US Treasury yields above 2%, which has since receded.

Figure 4. Yield beta plot of AUD swap curve: high beta point has shifted from 3s to the long-end

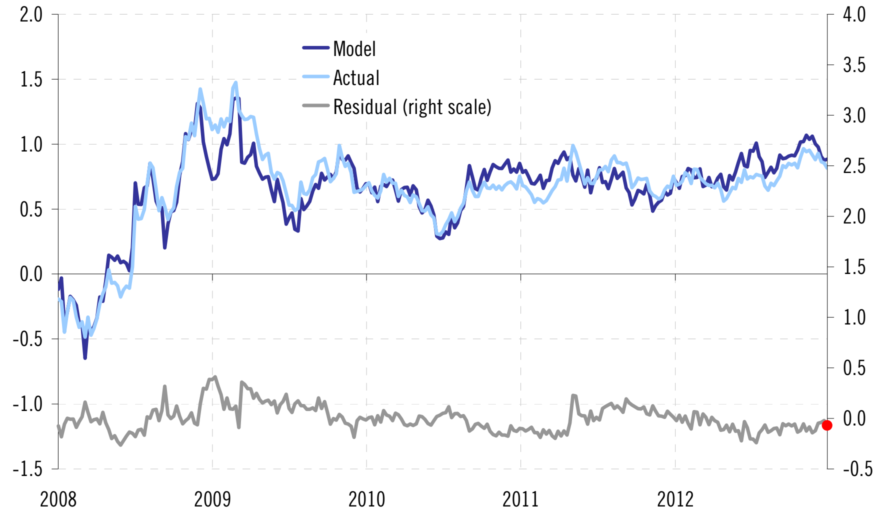


Source: Citi Research

To highlight the current situation, we also show a yield beta plot for the AUD swap curve compared to mid 2012, when RBA rate expectations were in a greater state of flux and the high beta point of the curve was then in the short-end. If history is our guide the current upward sloping yield beta curve is likely to prove a fairly transient phenomenon. However, for the time being offshore events still seem capable of producing a greater impact on the long-end of the yield curve, which may continue to bull-flatten or bear-steepen, as has been the case over the past month (this has been the general pattern across developed markets recently so the AUD curve has merely fallen into line with global trends). We think the BoJ's announcement of more aggressive monetary expansion makes bull flattening the most likely scenario over the short-term.

To put this into a more systematic framework we have estimated a simple linear regression model of the 3s10s swap curve, using both offshore and domestic variables. The results of this exercise are shown in Figure 5. We find the AUD swap curve to be quite closely correlated with offshore curves, notably the US yield curve, global yield levels and, most significantly, domestic policy rate expectations. Over the latest 6m period, the impact of shifting RBA rate expectations (to a more bearish setting) has exerted roughly twice the impact in our AUD curve model as the move in global rates has and around three times the impact of shifts in US curve slope. Over the latest 1m window the relative impact of changing RBA policy expectations has become even more accentuated as the failure of global yields or the US curve to break into higher trading ranges has lessened their impacts on the AUD curve.

Figure 5. AUD 3s10s swap curve: regression model versus actual (%)



Source: Citi Research

A key question going forward is whether RBA rate expectations are likely to shift even further, perhaps to the point of removing residual rate cut expectations entirely, in which case the curve is likely to continue to flatten (with the high beta point shifting back to the front-end of the curve), or whether the policy outlook will remain balanced with the high beta point remaining at the long-end for a while longer. We favour the latter scenario being dominant in the near-term such that the curve will likely remain disposed towards further flattening with lower yields and re-steepening once global yield levels turn higher. But as highlighted above, this configuration has typically proved to be short lived, with the curve likely to be driven more by RBA policy expectations rather than offshore events over the medium-term.

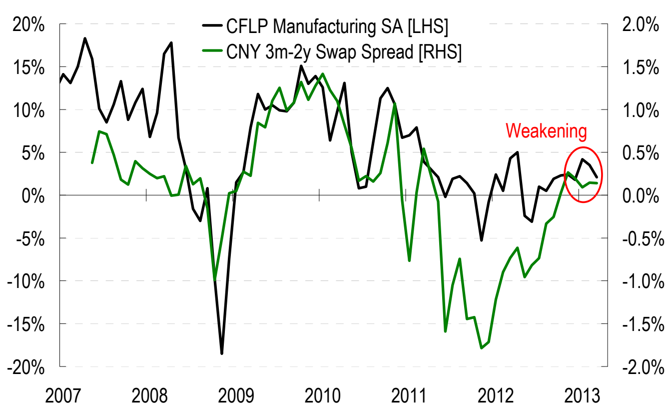
We do expect the market to gradually shift focus away from European sovereign risk and back towards the improving US business cycle. When this occurs (with attendant concerns of a winding down of QE by the Fed) we expect to witness higher global yields and a re-steepening of global curves. If the RBA continues to signal a balanced outlook (as we expect it will for some time) we think there is a good chance that the AUD curve will also witness some re-steepening pressure in line with other curves. In our view this suggests that investors should be looking to book profits on curve flattening trades probably when 10yr US Treasuries look like testing the 2% level again. We think that a better way of positioning for an eventual break-higher in global yields (likely driven by evidence of stronger US recovery) is via cross-market strategies rather than outright curve risk. Our current recommendations are long AUD 5y5y versus USD and we also still see merit in selling AUD payers on 10yr tails versus USD to capture a higher rate environment (please see our *Tradesheet* for existing cross market trade details).

Is the 'Magic Dragon' of the East running out of 'Puff'?

Carl Ang
+61 2 8225 4832
carl.ang@citi.com

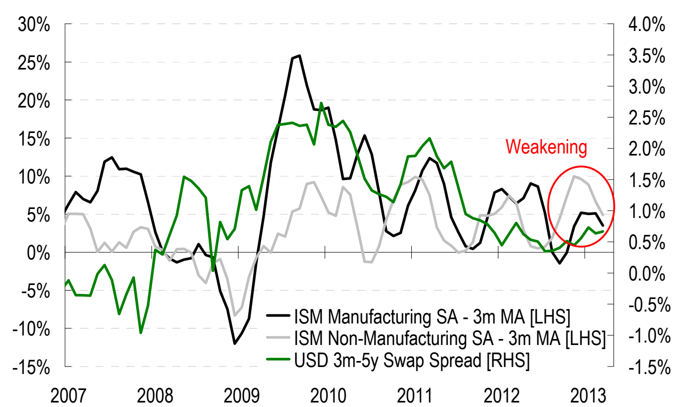
We continue to have a high conviction in proxy long trades in AUD such as AUD-USD 5y5y compression and AUD OIS flatteners as global business conditions surveys point to a consolidation in activity. We developed our own activity indicators based on difference between the 'new orders' and 'inventories' sub-indices in the global PMI surveys. Our activity indicator has historically tracked the slope of front-end yield curves like the CNY 3m-2y swap spread. As shown in Figure 6 our China activity indicator fell again in March with the CNY 3m-2y spread still quite sticky. Half of the twenty sectors surveyed experienced declines in activity, many of which are commodity-intensive such as ferrous metal mining, smelting & pressing and petroleum processing & coking. Our China economists expect this softer PMI result will quell expectations of immediate policy tightening as inflationary pressures subside (see China Macro Flash - March PMI: A Weak Economic Recovery with Uncertainty Ahead). More importantly for Australia, our China equity strategists argue that fiscal reforms in China could place a ceiling on investment-related growth which could also jeopardise Australian exports of coal and iron ore. Indeed, in China Equity Strategy - Constrained Economic Growth to Set Pace for Market they recommend being underweight coal and metal stocks. We think the downside risks to Chinese growth and inflation have become more material and could pose a serious threat to bulk commodity exporters like Australia.

Figure 6. CNY 3m-2y Swap Spread vs Activity Indicators



Source: Citi Research, Bloomberg

Figure 7. USD 3m-5y Swap Spread vs Activity Indicators



Source: Citi Research, Bloomberg

In the US we also saw further consolidation in our non-manufacturing and manufacturing activity indicators for March which are signaling for lower yields and flatter curves in USD (see Figure 7). Our activity indicator based on the US ISM non-manufacturing survey fell for the fourth time with commodity-related mining and agriculture, forestry, fishing & hunting industries (as well as health care & social assistance) facing rising inventories and falling new orders. Our manufacturing activity indicator also dipped for the first time since September 2012 with inventories outpacing new orders in the petroleum and coal products sector which is also commodity-related. Indeed, one petroleum and coal products respondent remarked that *'post-election in the U.S. — companies within the oil and gas sector are still waiting for signs of some regulatory certainty or stability'.* This has interesting parallels to China as it suggests fiscal policies in the US are still having a material dampening effect on global growth. We also looked at cross-correlations between our manufacturing activity indicator against the USD 3m-5y swap spread based on monthly changes over the last 20 years. We found a statistically significant lead in our manufacturing activity indicator against the yield curve slope of between 1 to 3

months. This confirms our activity index as a genuine leading indicator for markets. This month's fall in the manufacturing indicator hints at more bearish price action in global rates markets going forward which should facilitate AUD-USD yield spread narrowing in tenors like 5y5y (see *Tradesheet*).

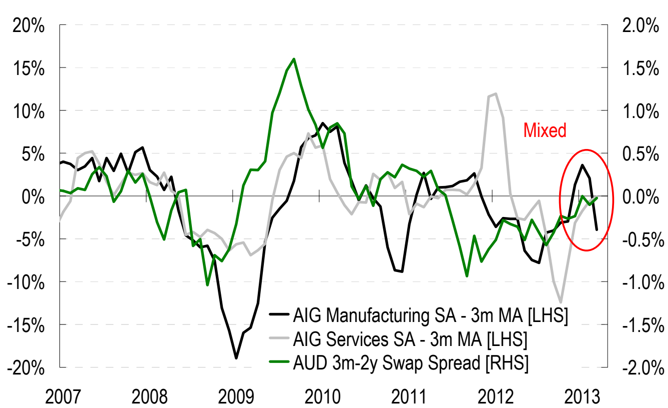
Figure 8. Payout ratios on 6m expiry AUD 1x1x1 receiver ladders across tenors

	6m Expiry									
1x1x1 Receiver Ladder	Net Premium (bps)					Maximum net payout to premium ratio				
Strike spread (bps)	1y	2y	3y	5y	10y	1y	2y	3y	5y	10y
25	5.2	4.1	3.3	3.4	3.5	3.8	**5.1**	**6.6**	**6.4**	**6.1**
50	14.0	14.7	14.8	14.9	14.8	2.6	2.4	2.4	2.4	2.4
75	17.2	18.8	19.5	19.5	19.3	3.4	3.0	2.8	2.8	2.9
100	18.3	20.4	21.6	21.5	21.2	4.5	3.9	3.6	3.7	3.7
125	18.8	21.1	22.4	22.3	22.0	5.7	4.9	4.6	4.6	4.7
150	19.0	21.4	22.8	22.6	22.3	6.9	6.0	5.6	5.6	5.7

Source: Citi Research

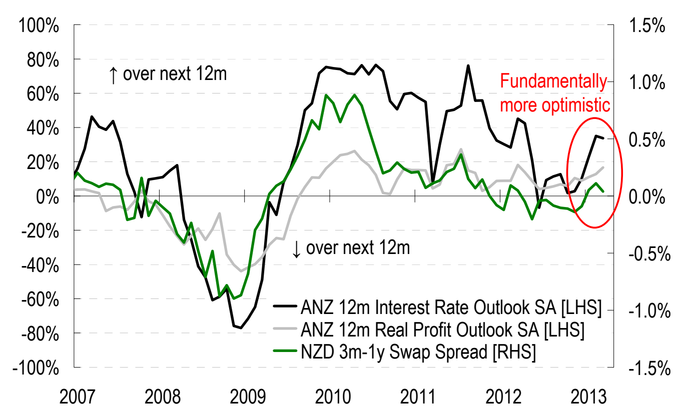
In Antipodean markets the Australian business survey data was relatively neutral with the sharp fall in the AIG manufacturing activity indicator offset by the continued rise in the services indicator (see Figure 9). Like the US, petroleum, coal, chemical & rubber products manufacturing was a major source of weakness for manufacturing activity in Australia. The mixed signals from these sector surveys suggest the RBA is unlikely to retreat from its easing bias in the near-term and as such we would also look to scale into AUD OIS flatteners out to 1y on any dips (see *Tradesheet*). Bullish option structures like AUD 1x1x1 receiver ladders also look attractive from a risk-reward perspective with +25bps wide strikes offering payout ratios in excess of 4 (see Figure 8). In New Zealand the ANZ Business Outlook survey for March also recorded a slight moderation in the interest rate outlook although businesses expressed more optimism with regards to the real profit outlook (see Figure 10). On net balance survey respondents expected interest rates to rise over the next 12 months although this was marginally lower than last month due to falls in the construction, services and agricultural indices (which outweighed rises in retail and manufacturing). Note this latest dip in the interest rate outlook index was very much in sympathy with the flattening of the NZD 3m-1y swap spread over the month. More encouragingly firms across all sectors (except for agriculture) lifted their expectations for real profits over the next 12 months.

Figure 9. AUD 3m-2y Swap Spread vs Activity Indicators



Source: Citi Research, Bloomberg

Figure 10. NZD 3m-1y Swap Spread vs Financial Outlook Indices



Source: Citi Research, Bloomberg, Haver

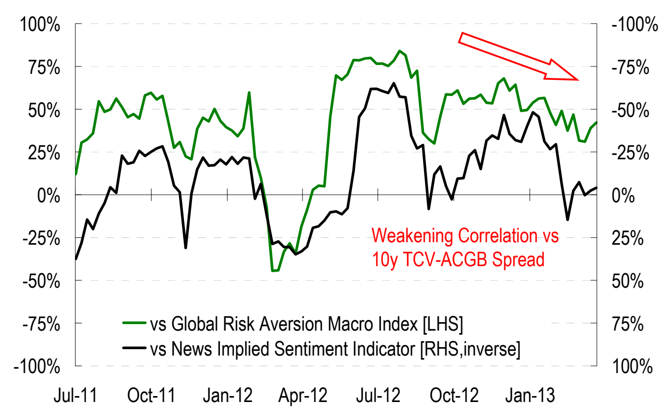
This also echoes some of the anecdotes in the Kiwi version of the Beige Book, the BNZ Business Confidence survey, with the overall confidence index easing in March. This fall was mainly due to drought concerns in the farming community with agricultural retailers noting poor sales of winter stock and farmers and farm servicing companies also observing reduced expenditure. Not all parts of the economy were so downbeat with sectors such as grain & seed farming and transport showing firmness. Construction was also more upbeat due to the Christchurch rebuild and catch-up in Auckland housing construction supporting subsidiary industries like land development. The wine sector also produced only positive responses in this month's survey with enhanced production assisted by the drought helping overcome the challenges of the high NZD. With animal spirits starting to diffuse throughout a large part of the NZ economy there is a risk that the RBNZ could bring forward their first projected rate hike in the next MPS. As such we still favour a short bias in NZD rates with the 6m and 9m forward 1s2s steepeners still offering positive rolldown (see *Tradesheet*).

Bond Appétit – Wide Spreads in Long-End Semis vs ACGBs

As we enter Q2 we expect semi spreads to maintain a range trading environment in the absence of international risks with semi-ACGB spreads looking wide in the long-end compared to the short-end. Developed market central banks like the BoJ have now committed themselves to significantly more expansionary policy as exemplified by yesterday's BoJ policy meeting, and as we enter the beginning of the new Japanese fiscal year we think the balance of offshore risks for semis has become more neutral. Indeed, Citi's global growth forecasts have remained largely steady since the beginning of 2013 which has contributed to the more benign environment for global spread products (see Global Economic Outlook and Strategy - March 2013).

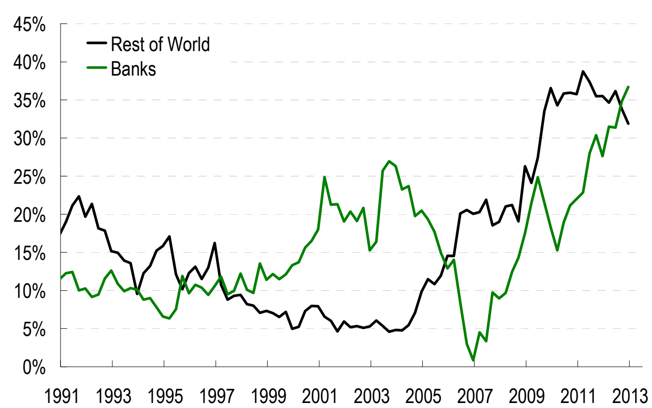
This has also been reflected in the diminishing sensitivity of semi spreads to risk indicators. Figure 11 displays the 3-month rolling correlation of 10y TCV-ACGB yield spread (our proxy for semi-ACGB spreads) against Citi's Global Risk Aversion Macro Index and News Implied Sentiment Indicator based on weekly changes. The strength of these correlations has waned from the extremes of the last year with the correlation against Citi's News Implied Sentiment Indicator (a proxy for investor sentiment) now close to zero. The correlation versus the multi-asset Global Risk Aversion Macro Index has also returned back to historically normal ranges.

Figure 11. 3m Rolling Correlations of 10y TCV-ACGB Spread vs Risk



Source: Citi Research, Bloomberg

Figure 12. Holdings of Domestically Issued Semi-Government Bonds

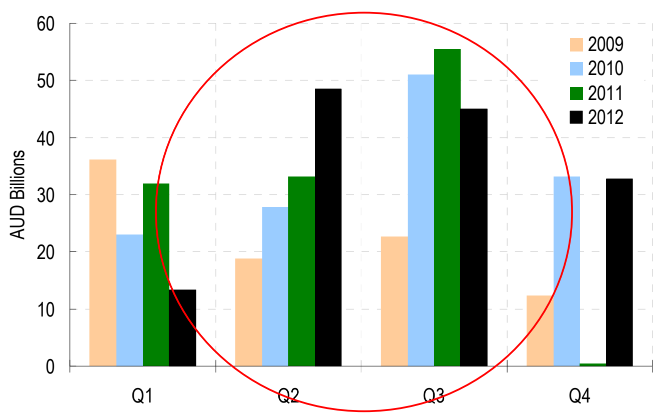


Source: Citi Research, Haver

We expect domestic bank flows to be the driving force for semi spread movements going forward as the banks remain the dominant buyer of semis. This was confirmed in the Financial Accounts data for Q4 12 which showed banks increasing their market share to 36.7% with the percentage held by foreigners falling to 31.9% (see Figure 12). As detailed in previous publications, to comply with Basel 3 Liquidity Coverage Ratio (LCR) targets the Australian banks have needed to increase their liquidity portfolio to match increases in deposits, with semis still the highest yielding class of eligible high-quality liquid assets (HQLA).

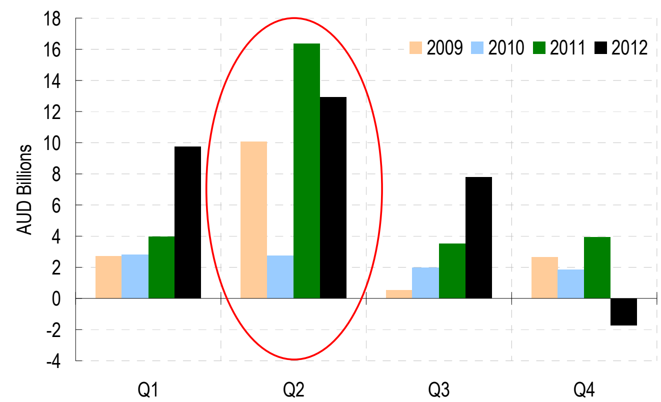
Domestically the next major hurdle for semis will be APRA's revised liquidity standards which will be made available for consultation in April (as per last week's Q1 13 Financial Stability Review from the RBA). We think APRA's policy around the eligible pool of HQLA and implementation schedule for the LCR requirement will remain unchanged based on recent commentary by senior APRA officials (see Semis Update – APRA's recipe calls for a pinch of Basel and Time). However, these new standards imply there could be some relaxation of the deposit run-off rates which is a scenario we canvassed in Basel III Liquidity Standard Update – Avoiding a Fawlty Basel. Under this scenario current bank LCRs would improve leading to softer demand for liquid assets like semis. We expect this policy uncertainty to temper bank flows in very near-term.

Figure 13. Net Transactions into Bank Deposits



Source: Citi Research, Haver

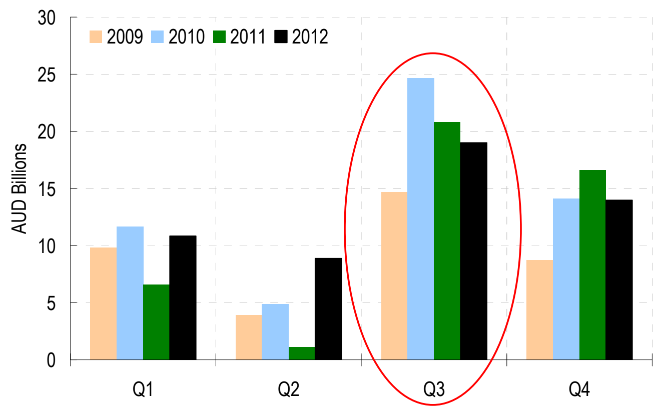
Figure 14. Net Transactions into Bank Deposits by Pension Funds



Source: Citi Research, Haver

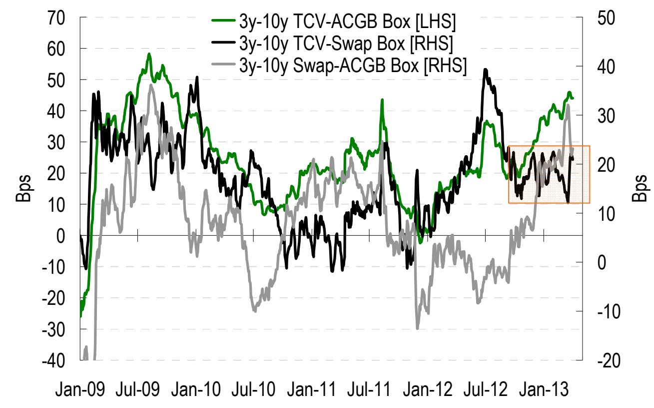
That being said, given that HQLA are still in short supply we are of the view medium-term that there will be a core bid tone for semis based on seasonal analysis of deposit inflows. This is illustrated in Figure 13 which shows net transactions into bank deposits. Deposit inflows have typically been robust in Q2 and strongest in Q3 due to pension fund and household activity. Pension fund deposits have been historically high in Q2 which we surmise is due to end-of-year effects related to reporting and tax (see Figure 14). Likewise, banks tend to draw in the bulk of household deposits mostly over Q3 which also coincides with the last quarter of the banks' reporting year (see Figure 15). As noted previously deposit funding receives more favourable treatment by prudential regulators as well as credit rating agencies.

Figure 15. Net Transactions into Bank Deposits by Households



Source: Citi Research, Haver

Figure 16. 3y-10y TCV-ACGB, TCV-Swap & Swap-ACGB Boxes



Source: Citi Research, Bloomberg

We note long-tenor semi-ACGB spreads offer the best value with the 3y-10y TCV-ACGB box approaching 4-year highs (see Figure 16). This chart shows our constant maturity series for the 3y-10y semi box trades against ACGB and swaps with semis being proxied by TCV. The graph shows that semi-swap and swap-ACGB boxes have both acted in tandem as drivers of the semi-ACGB box with the pair wise sensitivities changing over time. As highlighted in the orange box the 3y-10y semi-swap box has started to flatten after having been near the top of its 6-month trading range. On a short-term tactical basis we see scope for semi-ACGB boxes to play some catch up with the recent compression in the swap-ACGB box given the relative cheapness of semis in the long-end versus the short-end for asset swappers like the banks.

Apart from a shift in APRA's policy stance, risks around credit ratings could also throw semi spreads slightly off course with QTC and TCV preferred relative to NSW and WA. In a recent ratings report entitled '*Australian States' Credit Quality Hinges on Cost-Cutting Measures Amid Revenue Pressures*', a leading credit rating agency re-iterated some of the conditions that would lead to a loss of triple-A rating for NSW and WA which are currently on negative outlook. According to the analysts a strong rebound in state revenues is unlikely given the volatility in property-related income and forecast mining royalties. Moreover, they remark that cost-saving and efficiency programs have delivered mixed results so far. This has been the case in WA which has experienced significant expenditure pressures due to a growing population and increased business activity.

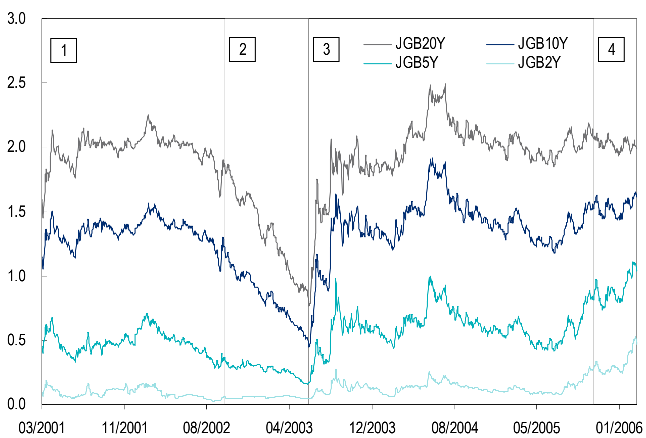
Amongst the states the ratings agencies deem that NSW possesses the greatest downside risks as capital expenditure needs may pressure debt levels and could result in NSW's debt burden rising beyond a level consistent with a 'AAA' rating. For WA they also consider the possibility that a sharp and sustained decline in iron ore price could stress their rating as debt-funded capital expenditure would sharply increase WA's debt metrics. Moreover they note that in the recent WA elections further large capital items were promised but details on when and how these would be funded were not available. The costing and funding of election expenditure commitments is an area of concern that we highlighted in Semi Trade Idea – Best Not Necessarily in the West. Government reforms in China are likely to exacerbate uncertainty over the demand outlook for WA iron ore and as such we are still a buyer of TCV 22s versus WATC 21s given the elevated risk of a negative ratings move for WA (see *Tradesheet*).

Japan Rates Strategy

Maki Shimizu
+81-3-6270-7246
maki.shimizu@citi.com

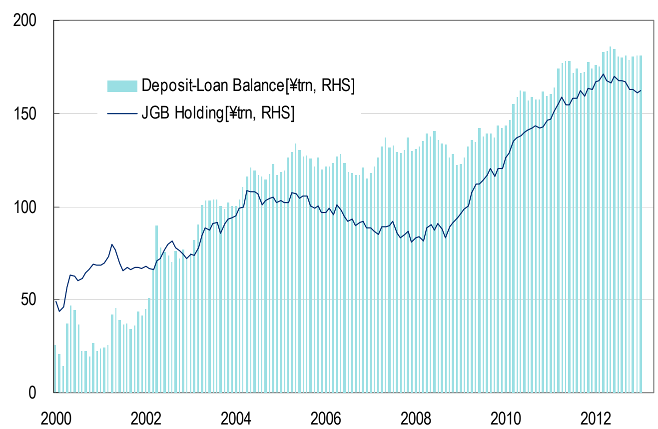
With global market sentiment tilting towards more risk-off on balance, domestic market participants are now focused on just how far JGB yields will decline. 10yr yield renewed the historical low of 0.43% set in June 2003 in response to the BoJ's "a big bazooka" on April 4. If we look back on the beginning of "quantitative easing era" started in March 2001, the BoJ switched from the unsecured overnight call rate to BoJ current account balances as its main target for monetary policy, at the same time stating that it would maintain its policy until YoY change in the core CPI was stably at zero or higher. During this period between 2001-2006, average yields on JGBs were 0.11% with a core range of 0.05%–0.2% for 2yr; 0.53% and 0.4%–0.7% for 5yr; 1.30% and 1.2%–1.6% for 10yr; and 1.88% and 1.8%–2.2% for 20yr (Figure 17). JGB yields reached all-time lows in 2003, Japanese banks increased purchases of JGBs to fund write-offs of nonperforming loans (NPLs). Pressure especially mounted on major banks under the Koizumi cabinet as they were required to halve their NPLs from September 2002 to 2004. Due to contraction in loan assets, the bank deposit-loan gap widened by almost ¥30trn, from around ¥76trn in September 2002 to some ¥104trn in June 2003 (Figure 18). Banks therefore bought JGBs as a way to invest excess funds. Given their zero risk weighting, JGBs were also an effective investment for improving capital adequacy. Also, by turning over positions, banks were able to build capital gains.

Figure 17. JGB Yields During QE [%]



Source: Bloomberg, Citi Research

Figure 18. Net Deposit and JGB Held by Japanese Banks

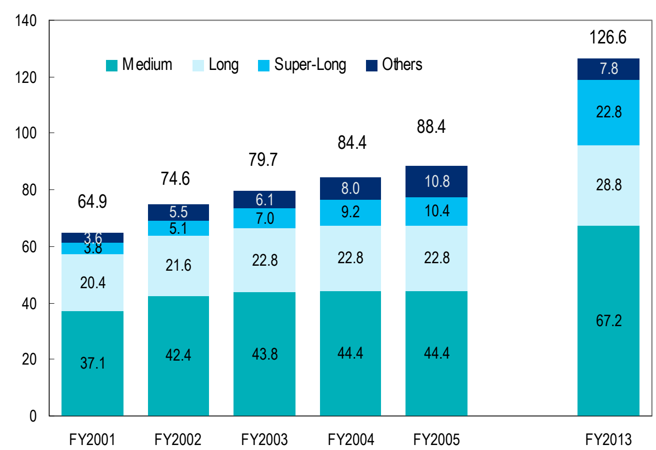


Source: BoJ, Citi Research

Next we look at the shape of the yield curve. Around June 9, 2003, the yield on on-the-run 10yr JGBs fell below 0.5% for the first time. At this time yields were 0.04%–0.045% for 2yr JGBs, 0.15%–0.16% for 5yr, around 0.85% for 20yr, and about 1.07% for 30yr. Two days later, yields on new issue JGBs reached all-time lows of 0.430% for 10yr, 0.745% for 20yr and 0.960% for 30yr. This yield curve is currently steeper from 10yr out than it was at that time. We believe one reason is caution regarding the risk of an increase in medium- to long-term rates due to concern regarding deterioration in government finances around the world. JGB issuance is now much larger than at that time. During the first half of his time in office then-PM Koizumi pledged to keep JGB issuance to ¥30trn. Open-market JGB issuance on a calendar basis (excluding short-term notes) averaged around ¥77trn in FY2002-FY2003, compared with the ¥126.6trn issuance plan for FY2013 (Figure 19). Issuance of 20yr and longer JGBs (excluding liquidity supply auctions) was ¥5trn–¥7trn in FY2002-FY2003, or around 8% of all maturities. This is expected to grow to

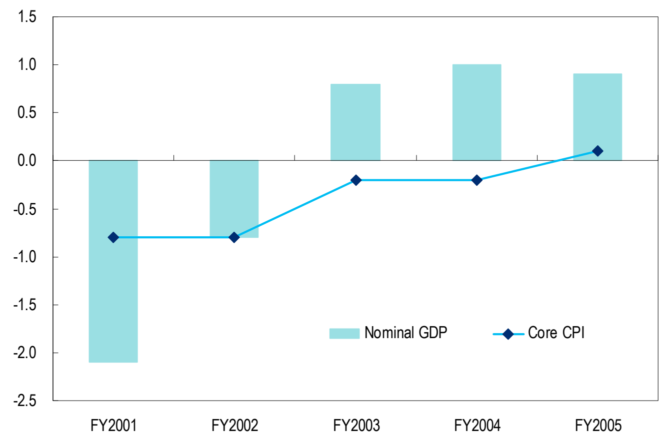
¥22.8trn, or 18%, according to the FY2013 JGB issuance plan, including a ¥1.2trn increase in issuance of 30yr JGBs.

Figure 19. JGB Issuance During QE and FY2013 [¥trn]



Source: MoF, Citi Research

Figure 20. GDP and CPI During QE [YoY, %]



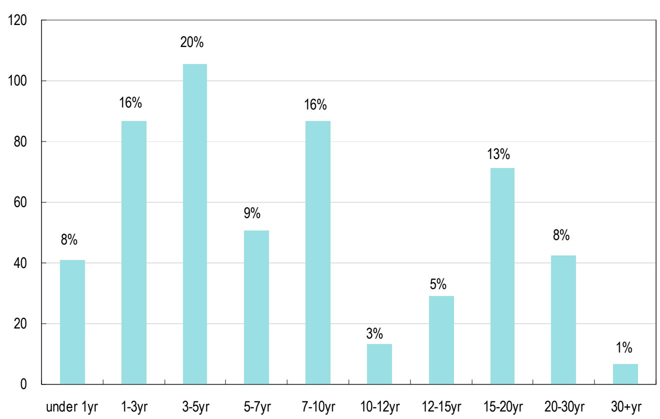
Source: Cabinet Office, BoJ, Citi Research

Inflationary expectations are also different now. Conceptually, the level of long rates can be expressed as nominal long rates = expected inflation rate + latent growth rate + risk premium. Deflation dominated when quantitative easing was first implemented, with the core CPI falling 0.8% YoY in FY2002 and 0.2% in FY2003 (Figure 20). While the CPI is declining now also, the BoJ under new Governor Kuroda has an inflation target of 2% that it aims to achieve in two years. In 2001–2006, the BoJ effectively had a zero inflation target, saying that it would continue quantitative easing until the increase in the core CPI was stably above zero. The Nikkei 225 was at 8,800 when the yield on new issue 10yr JGBs dropped below 0.5% in early June 2003. It had rebounded only some 1,200 since bottoming around one month prior. In addition the yen was much weaker than now, at around ¥118/$. Now, however, the dollar has recovered by around just ¥3 since the yen peaked around three weeks ago. Recently, the "Abe trade" has remained an underlying trend, so the yen is significantly weaker and equities markedly higher than they were four months ago. The stance of PM Abe and BoJ Governor Kuroda is very different from their predecessors Mr. Noda and Mr. Shirakawa. Sentiment may change if yen weakness and equity-market strength continue in the new fiscal year. Many in the JGB market appear skeptical regarding "Abenomics," and we recommend that investors remain cautious without overcommitting.

In the very first meeting by Kuroda and other new leadership, the BoJ decided on the introduction of the "quantitative and qualitative monetary easing." The Bank aims to "achieve its 2% inflation target at the earliest possible time, with a time horizon of about two years." The target of monetary policy was also changed from the uncollateralized overnight call rate to the monetary base to be increased "at an annual pace of ¥60-70trn." The BoJ's holding of JGBs will likely increase by ¥50trn per year in its effort to push down yields across the curve. The BoJ will therefore increase the monthly purchase of JGBs from current ¥4trn to around ¥7trn going forward. All maturity sectors will be available for the bond purchase operations including 40yr tenor. The average remaining maturity of JGB purchases will be extended to over 7years from just under 3years. In this regard, the average maturity of bonds to be additionally purchased in the future is estimated to be 12-13 years. Given that two thirds of market outstanding of JGBs remain under 10yr tenor

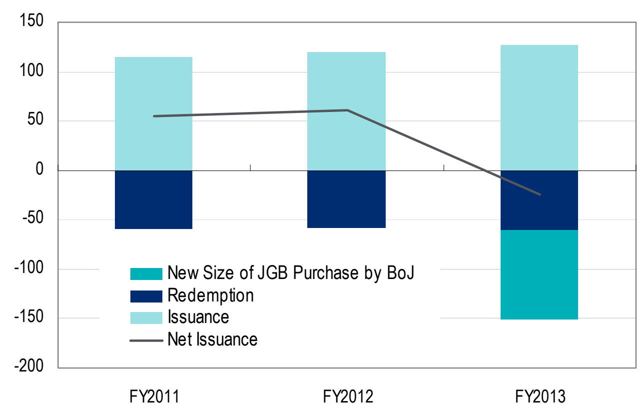
(Figure 21), maturity extension of the bond purchases will likely include decent amount of super-long JGBs. With 10yr yields being at a very low level, the driver of yield curve shifts will likely be driven by super-long sector going forward. In addition, the BoJ is set to also purchase ETFs and REIT worth of ¥1trn and ¥30bln, respectively. The BoJ will continue the quantitative and qualitative easing "as long as it is necessary for maintaining a 2% target in a stable manner." Alongside a significant increase of JGB purchases, the BoJ will temporary lift the banknote rule and terminate the asset purchase program. The purchase size as well as its average maturity of JGBs far exceeded the initial market expectation, which led the yield curve to bull flatten significantly. The question remains how the BoJ will lay out the exit strategy when the time comes because such large-scale bond purchases can be interpreted as fiscal financing. An abrupt rise in yields would deteriorate the BoJ's capital, making the Bank the last buyer of JGBs.

Figure 21. JGB (excl TB) Market Outstanding By Maturity [end-Mar, ¥trn]



Source: BoJ, MoF, Citi Research

Figure 22. Net JGB Issuance [¥trn]

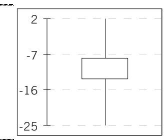
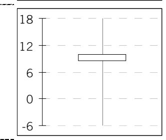
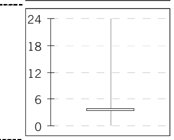
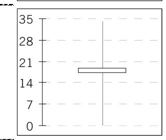
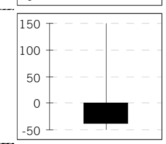
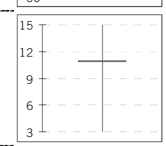
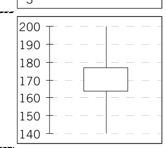
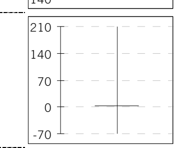
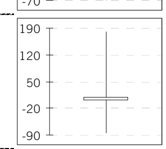


Source: BoJ, MoF, Citi Research

In the FY2013 issuance plan, the new supply of conventional JGBs will total ¥126.6trn excluding T-Bills. Expected redemptions, on the other hand, after subtracting buy-back operations by BoJ and MoF will likely total ¥60.9trn. So the net JGB issuance to the market was expected to be ¥65.7trn. Under the new operation scheme, the BoJ will buy around ¥90trn worth of JGBs, so the above calculation of the net JGB issuance to the market will be a large negative [Issuance 126.6trn – Redemption 60.9trn –BoJ's operation 90trn = -24.3trn, Figure 22]. The JGB holdings by domestic private financial institutions are likely to decrease based on the above. Although external factors for the JGB market are different from the spring of 2003, the market demand for maturity extension will likely heighten and a lower-band of the JGB yield is set to be tested, in our view.

Tradesheet

Figure 23. Record of Open Trades

Country	Trade	Levels		Publication Date	
AUD	**Pay AUD May2013 OIS. Receive AUD Oct2013 OIS.**	Open	-8bp		
		Current	-13.4bp		
Swap Curve	Pay AUD May2013 OIS	**P&L**	**5.4bp**		
	Receive AUD Oct2013 OIS	Target	-25bp		
		Stop	2bp	*APAC DMRS 15 March 2013*	
AUD	**Buy TCV 6% Oct 2022. Sell WATC 7% Jul 2021.**	Open	10bp		
		Current	8.2bp		
Cash Curve	Buy TCV 6% Oct 2022 at 4.22%	**P&L**	**1.8bp**		
	Sell WATC 7% Jul 2021 at 4.13%	Target	-6bp		
		Stop	18bp	*APAC DMRS 11 March 2013*	
AUD	**Buy AUD 1y1y payer spread**	Open	3.2c		
		Current	3.8c		
Volatility	Buy 1 x AUD 1y1y 3.79% strike payer	**P&L**	**0.6c**		
	Sell 1 x AUD 1y1y 4.04% strike payer	Target	24c		
		Stop	0c	*APAC DMRS 22 Febuary 2013*	
NZD	**NZD 9m fwd 1y-2y steepener**	Open	17bp		
		Current	18.9bp		
Swap Curve	Receive NZD 9m1y	**P&L**	**1.9bp**		
	Pay NZD 9m2y	Target	34bp		
		Stop	0bp	*APAC DMRS 07 Febuary 2013*	
AUD	**AUD 1y fwd 2y-10y conditional bear steepener**	Open	0		
		Current	-39bp		
Volatility	Sell 4.17 x AUD 1y2y ATM payer (3.26% strike)	**P&L**	**-39bp**		
	Buy 1 x AUD 1y10y ATM payer (4.29% strike)	Target	150bp		
		Stop	-50bp	*APAC DMRS 07 Febuary 2013*	
AUD	**Buy QTC 6% Feb 2018. Sell QTC 6% Sep 2017**	Open	11bp		
		Current	10.75bp		
Cash Curve	Buy QTC 6% Feb 2018 @ 3.65%	**P&L**	**0.25bp**		
	Sell QTC 6% Sep 2017 @ 3.54%	Target	3bp		
		Stop	15bp	*APAC DMRS 17 January 2013*	
AUD/USD	**Receive AUD 5y5y. Pay USD 5y5y**	Open	177bp		
		Current	162.98bp		
Cross-market	Receive AUD 5y5y	**P&L**	**14bp**		
	Pay USD 5y5y	Target	140bp		
		Stop	200bp	*APAC DMRS 28 November 2012*	
AUD/USD	**Sell 1.11 x AUD 6m10y 4% payer. Buy 1 x USD 6m10y ATM payer**	Open	0c		
		Current	4.1c		
Cross-market	Sell 1.11 x AUD 6m10y 4% payer	**P&L**	**4.1c**		
	Buy 1 x USD 6m10y ATM payer	Target	210c		
		Stop	-70c	*APAC DMRS 22 November 2012*	
AUD	**Sell AUD 3m3y 50bp wide strangle. Buy 1y3y 50bp OTM receiver**	Open	0c		
		Current	9.88c		
Volatility	Sell AUD 3m3y 50bp wide strangle (2.75% and 3.25% strike)	**P&L**	**9.88c**		
	Buy AUD 1y3y 50bp OTM receiver (2.64% strike)	Target	180c		
		Stop	-85c	*APAC DMRS 27 September 2012*	

Source: Citi Research

Appendix

Figure 24. Australia relative value by sector

Versus Fitted Yield Curve

Sector		Rank	Bond	ZScore	Issued	Size (bn)
ACGB	Richest	1	AUT 5.25 Mar19	-2.16	Sep05	13.9
ACGB		2	AUT 2.75 Apr24	-1.93	Apr12	0.0
ACGB		3	AUT 3.25 Apr29	-1.58	Oct12	3.3
ACGB		4	AUT 6.25 Apr15	-0.84	Apr02	14.1
ACGB		5	AUT 5.50 Apr23	-0.84	Apr11	14.6
ACGB		5	AUT 4.75 Oct15	1.03	Apr11	2.2
ACGB		4	AUT 4.50 Apr20	1.20	Apr09	14.5
ACGB		3	AUT 4.75 Apr27	1.36	Oct11	3.3
ACGB		2	AUT 5.75 May21	1.76	May07	12.8
ACGB	Cheapest	1	AUT 5.50 Dec13	1.88	Dec09	9.3
NSW	Richest	1	NSW 5.50 Aug13	-1.74	Feb10	5.0
NSW		2	NSW 6.00 Jun20	-1.62	Jun09	1.1
NSW		3	NSW 5.50 Mar17	-1.10	Mar06	3.3
NSW		4	NSW 5.25 May13	-0.72	May09	0.6
NSW		5	NSW 6.00 Apr15	-0.71	Apr11	2.0
NSW		5	NSW 6.00 May20	1.10	Nov09	4.5
NSW		4	NSW 6.00 Mar22	1.82	Sep11	0.6
NSW		3	NSW 5.00 Aug24	1.91	Feb12	0.9
NSW		2	NSW 6.00 May23	2.05	May07	2.6
NSW	Cheapest	1	NSW 6.00 May30	2.38	May10	0.2
QTC	Richest	1	QTC 6.00 Aug13	-1.08	Aug10	3.5
QTC		2	QTC 6.00 Apr16	-0.75	Apr10	5.1
QTC		3	QTC 6.00 Feb18	-0.54	Feb11	4.4
QTC		4	QTC 6.00 Oct15	-0.34	Oct10	6.9
QTC		5	QTC 5.75 Nov14	-0.09	Nov09	7.8
QTC		5	QTC 6.25 Feb20	0.33	Feb10	5.9
QTC		4	QTC 5.50 Jun21	0.85	Jun11	1.5
QTC		3	QTC 6.00 Jul22	1.18	Jan11	3.8
QTC		2	QTC 6.50 Mar33	1.34	Mar08	0.7
QTC	Cheapest	1	QTC 5.75 Jul24	2.02	Jan11	1.1
TCV	Richest	1	TCV 4.75 Oct14	-0.44	Apr03	4.0
TCV		2	TCV 5.75 Nov16	-0.33	Nov04	3.5
TCV		3	TCV 6.50 Mar33	0.00	Sep10	0.1
TCV		4	TCV 5.50 Nov18	0.22	Nov08	3.0
TCV		4	TCV 6.00 Jun20	1.50	Jun09	3.4
TCV		3	TCV 6.00 Oct22	2.01	Oct03	3.1
TCV		2	TCV 5.50 Dec24	2.20	Jun10	2.3
TCV	Cheapest	1	TCV 5.50 Nov26	2.54	May11	0.6
WATC	Richest	1	WATC 5.50 Apr14	-0.37	Apr10	1.9
WATC		2	WATC 7.00 Apr15	-0.33	Oct06	2.6
WATC		3	WATC 8.00 Jul17	0.12	Jan01	2.5
WATC		3	WATC 7.00 Oct19	0.96	Apr01	1.8
WATC		2	WATC 7.00 Jul21	1.47	Jul02	0.8
WATC	Cheapest	1	WATC 6.00 Oct23	2.92	Mar05	0.2

Versus Swap Curve (CAS)

Sector		Rank	Bond	ZScore	Issued	Size (bn)
ACGB	Richest	1	AUT 2.75 Apr24	-2.18	Apr12	0.0
ACGB		2	AUT 5.50 Apr23	-1.82	Apr11	14.6
ACGB		3	AUT 4.75 Apr27	-1.48	Oct11	3.3
ACGB		4	AUT 5.75 Jul22	-1.37	Jan10	7.4
ACGB		5	AUT 3.25 Apr29	-1.04	Oct12	3.3
ACGB		5	AUT 6.25 Jun14	0.11	Jun08	11.9
ACGB		4	AUT 4.75 Jun16	0.21	Jun10	11.0
ACGB		3	AUT 6.50 May13	0.26	May00	16.7
ACGB		2	AUT 4.75 Oct15	0.31	Apr11	2.2
ACGB	Cheapest	1	AUT 5.50 Dec13	0.76	Dec09	9.3
NSW	Richest	1	NSW 5.50 Mar17	-2.40	Mar06	3.3
NSW		2	NSW 6.00 Jun20	-1.34	Jun09	1.1
NSW		3	NSW 6.00 Apr15	-1.32	Apr11	2.0
NSW		4	NSW 6.00 Apr16	-1.02	Oct09	1.0
NSW		5	NSW 6.00 Apr19	-0.78	Apr08	3.5
NSW		5	NSW 6.00 Mar22	0.13	Sep11	0.6
NSW		4	NSW 5.00 Aug24	0.41	Feb12	0.9
NSW		3	NSW 6.00 May20	0.65	Nov09	4.5
NSW		2	NSW 5.25 May13	1.22	May09	0.6
NSW	Cheapest	1	NSW 6.00 May30	1.95	May10	0.2
QTC	Richest	1	QTC 6.00 Apr16	-1.58	Apr10	5.1
QTC		2	QTC 6.00 Feb18	-1.18	Feb11	4.4
QTC		3	QTC 6.00 Oct15	-0.48	Oct10	6.9
QTC		4	QTC 6.00 Jul22	-0.19	Jan11	3.8
QTC		5	QTC 5.50 Jun21	-0.17	Jun11	1.5
QTC		5	QTC 5.75 Nov14	0.01	Nov09	7.8
QTC		4	QTC 6.00 Aug13	0.02	Aug10	3.5
QTC		3	QTC 6.25 Feb20	0.07	Feb10	5.9
QTC		2	QTC 6.00 Aug13	0.67	Feb02	3.3
QTC	Cheapest	1	QTC 6.50 Mar33	0.68	Mar08	0.7
TCV	Richest	1	TCV 5.75 Nov16	-0.48	Nov04	3.5
TCV		2	TCV 4.75 Oct14	-0.33	Apr03	4.0
TCV		3	TCV 5.50 Nov18	0.14	Nov08	3.0
TCV		4	TCV 6.00 Oct22	0.16	Oct03	3.1
TCV		4	TCV 6.50 Mar33	0.59	Sep10	0.1
TCV		3	TCV 5.50 Dec24	0.64	Jun10	2.3
TCV		2	TCV 6.00 Jun20	0.85	Jun09	3.4
TCV	Cheapest	1	TCV 5.50 Nov26	1.49	May11	0.6
WATC	Richest	1	WATC 7.00 Apr15	-0.49	Oct06	2.6
WATC		2	WATC 5.50 Apr14	-0.01	Apr10	1.9
WATC		3	WATC 8.00 Jul17	0.19	Jan01	2.5
WATC		3	WATC 7.00 Jul21	0.46	Jul02	0.8
WATC		2	WATC 7.00 Oct19	1.23	Apr01	1.8
WATC	Cheapest	1	WATC 6.00 Oct23	1.79	Mar05	0.2

ZScore calculated using 6M history
2y,5y,7y,10y,20y,30y denote the OTR bonds
Analytics as of 3-Apr-13

Source: Citi Research

Figure 25. Australia relative value by sector

SAFA

Versus Fitted Yield Curve

	Rank		ZScore	Issued	Size (bn)
Richest	1	**SAFA 5.75 Sep17**	-0.99	Mar10	2.0
	2	**SAFA 5.75 Apr15**	-0.74	Apr09	2.0
	2	**SAFA 5.00 May21**	**-0.15**	May11	1.0
Cheapest	1	**SAFA 6.00 May13**	**0.00**	Nov06	2.2

Versus Swap Curve (CAS)

	Rank		ZScore	Issued	Size (bn)
Richest	1	**SAFA 5.75 Sep17**	**-1.63**	Mar10	2.0
	2	**SAFA 5.75 Apr15**	-1.46	Apr09	2.0
	2	**SAFA 5.25 Jun14**	**-0.50**	Dec10	2.0
Cheapest	1	**SAFA 6.00 May13**	**0.91**	Nov06	2.2

NTER

Versus Fitted Yield Curve

	Rank		ZScore	Issued	Size (bn)
Richest	1	**NTER 6.75 Oct13**	**-2.14**	Apr08	0.4
			-6.00		
Cheapest	1	**NTER 5.75 Jul14**	**-0.89**	Jul09	0.5

Versus Swap Curve (CAS)

	Rank		ZScore	Issued	Size (bn)
Richest	1	**NTER 6.25 Oct15**	**-3.09**	Apr10	0.5
			-10.00		
Cheapest	1	**NTER 5.75 Jul14**	**-1.72**	Jul09	0.5

TASM

Versus Fitted Yield Curve

	Rank		ZScore	Issued	Size (bn)
Richest	1	**TASM 5.50 Jun14**	-0.69	Jun10	0.8
	2	**TASM 6.50 Apr15**	-0.53	Oct06	0.5
	2	**TASM 6.00 Jun20**	**-0.08**	Jun09	0.1
Cheapest	1	**TASM 6.50 May13**	**0.00**	Nov06	0.8

Versus Swap Curve (CAS)

	Rank		ZScore	Issued	Size (bn)
Richest	1	**TASM 6.50 May13**	**-1.51**	Nov06	0.8
	2	**TASM 5.00 Sep17**	-1.06	Sep11	0.5
	2	**TASM 5.50 Jun14**	**-0.86**	Jun10	0.8
Cheapest	1	**TASM 6.50 Apr15**	**-0.85**	Oct06	0.5

ZScore calculated using 6M history
2y,5y,7y,10y,20y,30y denote the OTR bonds
Analytics as of 3-Apr-13

Source: Citi Research

Figure 26. Australia relative value by maturity

Versus Fitted Yield Curve

Bucket		Rank	Bond	ZScore	Issued	Size (bn)
AUS 1-3	Richest	1	NSWX 5.50 Aug14	-1.95	Aug03	1.0
		2	NTER 6.25 Oct15	-1.57	Apr10	0.5
		3	NSWN 5.50 Aug14	-1.09	Aug03	2.8
		4	NTER 5.75 Jul14	-0.89	Jul09	0.5
		5	AUT 6.25 Apr15 (2y)	-0.84	Apr02	14.1
		5	WATC 7.00 Apr15	-0.33	Oct06	2.6
		4	AUT 6.25 Jun14	-0.31	Jun08	11.9
		3	AUT 4.50 Oct14	-0.25	Apr10	9.2
		2	QTC 5.75 Nov14	-0.09	Nov09	7.8
	Cheapest	1	AUT 4.75 Oct15	1.03	Apr11	2.2
AUS 4-7	Richest	1	AUT 5.25 Mar19	-2.16	Sep05	13.9
		2	QTCX 6.00 Sep17	-1.08	Sep06	0.6
		3	QTCN 6.00 Sep17	-1.07	Sep06	4.6
		4	SAFA 5.75 Sep17	-0.99	Mar10	2.0
		5	AUT 5.50 Jan18 (5y)	-0.70	Jul10	8.3
		5	AUT 4.25 Jul17	0.08	Jul11	0.0
		4	WATC 8.00 Jul17	0.12	Jan01	2.5
		3	TCV 5.50 Nov18	0.22	Nov08	3.0
		2	QTC 6.25 Feb20	0.33	Feb10	5.9
	Cheapest	1	WATC 7.00 Oct19	0.94	Apr01	1.8
AUS 8-10	Richest	1	SAFA 5.00 May21	-0.13	May11	1.0
		2	AUT 5.75 Jul22	0.65	Jan10	7.4
		3	QTC 5.50 Jun21	0.84	Jun11	1.5
		4	QTC 6.00 Jul22	1.19	Jan11	3.8
					#N/A	
		4	WATC 7.00 Jul21	1.47	Jul02	0.8
		3	AUT 5.75 May21	1.76	May07	12.8
		2	NSW 6.00 Mar22	1.82	Sep11	0.6
	Cheapest	1	TCV 6.00 Oct22	2.03	Oct03	3.1
AUS >10	Richest	1	AUT 2.75 Apr24	-1.93	Apr12	0.0
		2	AUT 3.25 Apr29	-1.58	Oct12	3.3
		3	AUT 5.50 Apr23 (10y)	-0.85	Apr11	14.6
		4	TCV 6.50 Mar33	0.00	Sep10	0.1
		5	QTC 6.50 Mar33	1.33	Mar08	0.7
		5	NSW 6.00 May23	2.05	May07	2.6
		4	TCV 5.50 Dec24	2.25	Jun10	2.3
		3	NSW 6.00 May30	2.38	May10	0.2
		2	TCV 5.50 Nov26	2.50	May11	0.6
	Cheapest	1	WATC 6.00 Oct23	2.92	Mar05	0.2

Versus Swap Curve (CAS)

Bucket		Rank	Bond	ZScore	Issued	Size (bn)
AUS 1-3	Richest	1	NTER 6.25 Oct15	-3.09	Apr10	0.5
		2	NSWX 5.50 Aug14	-2.36	Aug03	1.0
		3	NTER 5.75 Jul14	-1.72	Jul09	0.5
		4	SAFA 5.75 Apr15	-1.46	Apr09	2.0
		5	NSW 6.00 Apr15	-1.32	Apr11	2.0
		5	QTC 5.75 Nov14	0.01	Nov09	7.8
		4	AUT 6.25 Apr15 (2y)	0.04	Apr02	14.1
		3	AUT 4.50 Oct14	0.09	Apr10	9.2
		2	AUT 6.25 Jun14	0.11	Jun08	11.9
	Cheapest	1	AUT 4.75 Oct15	0.31	Apr11	2.2
AUS 4-7	Richest	1	QTCN 6.00 Sep17	-2.86	Sep06	4.6
		2	QTCX 6.00 Sep17	-2.86	Sep06	0.6
		3	SAFA 5.75 Sep17	-1.63	Mar10	2.0
		4	ACT 5.50 Jun18	-1.32	Jun11	0.3
		5	QTC 6.00 Feb18	-1.18	Feb11	4.4
		5	AUT 4.25 Jul17	-0.01	Jul11	0.0
		4	QTC 6.25 Feb20	0.07	Feb10	5.9
		3	TCV 5.50 Nov18	0.14	Nov08	3.0
		2	WATC 8.00 Jul17	0.19	Jan01	2.5
	Cheapest	1	WATC 7.00 Oct19	1.23	Apr01	1.8
AUS 8-10	Richest	1	AUT 5.75 Jul22	-1.37	Jan10	7.4
		2	SAFA 5.00 May21	-1.04	May11	1.0
		3	AUT 5.75 May21	-0.75	May07	12.8
		4	QTC 6.00 Jul22	-0.19	Jan11	3.8
					#N/A	
		4	QTC 5.50 Jun21	-0.17	Jun11	1.5
		3	NSW 6.00 Mar22	0.13	Sep11	0.6
		2	TCV 6.00 Oct22	0.16	Oct03	3.1
	Cheapest	1	WATC 7.00 Jul21	0.46	Jul02	0.8
AUS >10	Richest	1	AUT 2.75 Apr24	-2.18	Apr12	0.0
		2	AUT 5.50 Apr23 (10y)	-1.82	Apr11	14.6
		3	AUT 4.75 Apr27	-1.48	Oct11	3.3
		4	AUT 3.25 Apr29	-1.04	Oct12	3.3
		5	NSW 6.00 May23	-0.27	May07	2.6
		5	TCV 5.50 Dec24	0.64	Jun10	2.3
		4	QTC 6.50 Mar33	0.68	Mar08	0.7
		3	TCV 5.50 Nov26	1.49	May11	0.6
		2	WATC 6.00 Oct23	1.79	Mar05	0.2
	Cheapest	1	NSW 6.00 May30	1.95	May10	0.2

ZScore calculated using 6M history
2y,5y,7y,10y,20y,30y denote the OTR bonds
Analytics as of 3-Apr-13

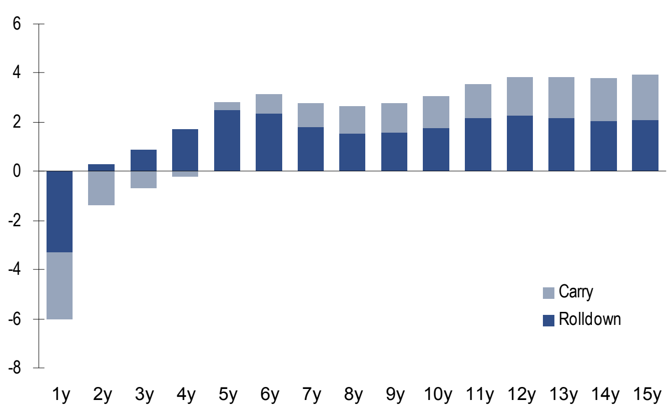
Source: Citi Research

Figure 27. 3M carry in AUD swaps[1]

Fwd/Tenor	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	12Y	15Y	20Y	25Y	30Y
SPOT	- 1.2	4.1	5.5	5.4	5.6	5.7	5.5	5.3	5.0	4.7	4.3	3.6	2.7	2.2	2.0
3M	0.7	4.6	5.4	5.6	5.8	5.7	5.4	5.3	4.9	4.8	4.3	3.6	2.7	2.3	2.0
6M	4.1	6.6	6.3	6.3	6.4	6.2	5.8	5.6	5.1	5.1	4.5	3.8	2.8	2.4	2.1
9M	6.7	7.9	7.1	7.0	7.0	6.6	6.1	5.9	5.4	5.5	4.6	4.0	2.9	2.5	2.2
1Y	8.1	8.0	7.0	6.7	6.6	6.3	5.9	5.5	5.1	5.1	4.4	3.7	2.7	2.3	2.0
2Y	8.3	6.8	6.9	6.6	6.2	5.7	5.4	5.1	5.1	4.5	3.9	3.3	2.3	2.0	1.7
3Y	5.2	6.0	6.2	5.6	5.2	4.8	4.4	4.5	4.0	3.7	3.1	2.6	1.7	1.5	1.3
4Y	6.9	6.8	6.0	5.1	4.7	4.2	4.4	3.8	3.4	3.1	2.7	2.1	1.4	1.2	1.0
5Y	6.7	5.6	4.9	4.3	3.8	4.0	3.4	3.0	2.7	2.4	2.2	1.5	1.0	0.8	0.6
6Y	4.4	4.0	3.8	3.1	3.5	2.9	2.5	2.2	1.9	1.8	1.5	0.8	0.6	0.4	0.3
7Y	3.5	3.4	2.9	3.4	2.6	2.1	1.8	1.6	1.5	1.4	1.0	0.4	0.3	0.1	0.0
8Y	3.4	2.6	3.6	2.4	1.9	1.5	1.3	1.2	1.1	0.9	0.4	- 0.0	0.0	- 0.2	- 0.2
9Y	1.6	3.6	2.3	1.5	1.1	0.9	0.9	0.8	0.6	0.4	- 0.1	- 0.3	- 0.3	- 0.4	- 0.4
10Y	5.6	2.6	1.6	1.0	0.8	0.8	0.7	0.5	0.2	- 0.1	- 0.5	- 0.4	- 0.4	- 0.6	- 0.5

Source: Citi Research

Figure 28. 3M carry profile of ACGB[2]



Source: Citi Research

Figure 29. 3M carry table of ACGB

ACGB	Carry	Rolldown	Total
1y	-2.7	-3.3	-6.0
2y	-1.4	0.3	-1.1
3y	-0.7	0.9	0.2
4y	-0.2	1.7	1.5
5y	0.3	2.5	2.8
6y	0.8	2.4	3.1
7y	1.0	1.8	2.8
8y	1.1	1.5	2.6
9y	1.2	1.6	2.8
10y	1.3	1.8	3.0
11y	1.4	2.2	3.6
12y	1.5	2.3	3.8
13y	1.7	2.2	3.9
14y	1.8	2.0	3.8
15y	1.8	2.1	3.9

Source: Citi Research

[1] Sectors with carry more than 5bp is highlighted in green while the carry less than 5bp is highlighted in red.

[2] ACGB carry profile and table is calculated from the relative value curve and it may vary from individual bonds given the repo rate.

Figure 30. 3M carry in NZD swaps[3]

Fwd/Tenor	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	12Y	15Y	20Y
SPOT	5.5	7.4	8.9	8.6	8.3	8.0	7.7	7.2	6.6	6.2	5.2	4.1	3.8
3M	7.5	8.3	8.8	8.6	8.3	8.0	7.6	7.0	6.6	6.2	5.1	4.1	3.8
6M	10.8	10.2	9.7	9.5	9.0	8.6	8.0	7.4	6.9	6.5	5.2	4.3	4.0
9M	11.3	10.7	9.8	9.3	8.8	8.4	7.8	7.1	6.7	6.2	4.9	4.1	3.8
1Y	8.7	10.3	9.5	9.0	8.5	8.1	7.4	6.8	6.5	5.9	4.6	4.0	3.7
2Y	11.9	10.0	9.3	8.6	8.1	7.3	6.6	6.2	5.7	4.9	3.8	3.6	3.2
3Y	8.0	7.7	7.3	7.0	6.3	5.6	5.2	4.7	4.0	3.3	2.7	2.9	2.4
4Y	7.5	6.9	6.6	5.8	5.0	4.6	4.1	3.3	2.6	2.2	2.1	2.3	1.9
5Y	6.4	6.1	5.1	4.4	4.0	3.5	2.7	1.9	1.5	1.4	1.7	1.7	1.4
6Y	5.6	4.3	3.6	3.2	2.7	1.9	1.1	0.7	0.6	0.9	1.3	1.2	0.9
7Y	3.0	2.5	2.4	1.9	1.0	0.2	- 0.2	- 0.1	0.2	0.6	0.9	0.7	0.5
8Y	2.0	2.1	1.6	0.5	- 0.5	- 0.8	- 0.7	- 0.2	0.2	0.5	0.5	0.4	0.3
9Y	2.1	1.3	- 0.1	- 1.2	- 1.5	- 1.2	- 0.6	- 0.1	0.3	0.4	0.3	0.3	0.1
10Y	0.4	- 1.3	- 2.4	- 2.5	- 1.9	- 1.1	- 0.4	0.0	0.2	0.1	0.1	0.0	- 0.1

Source: Citi Research

[3] Sectors with carry more than 5bp is highlighted in green while the carry less than 5bp is highlighted in red.

Figure 31. Japan relative value by maturity

Versus Fitted Yield Curve

JGB 2-7

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#300 1.50 Mar19	-2.11	May09	2.28
	2	#299 1.30 Mar19	-2.09	Mar09	3.87
	3	#302 1.40 Jun19	-1.87	Jul09	2.25
	4	#305 1.30 Dec19	-1.87	Dec09	7.14
	5	#301 1.50 Jun19	-1.87	Jun09	4.31
	5	#287 1.90 Jun17	1.46	Jul07	2.40
	4	#288 1.70 Sep17	1.82	Sep07	6.71
	3	#289 1.50 Dec17	2.26	Dec07	6.49
	2	#98 0.30 Jun16	2.32	Aug11	2.40
Cheapest	1	#97 0.40 Jun16	2.33	Jun11	5.16

JGB 7-10

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#54 2.20 Dec21	-2.22	Feb02	0.90
	2	#309 1.10 Jun20	-1.90	Jul10	4.76
	3	#47 2.20 Sep20	-1.37	Jul00	0.69
	4	#49 2.10 Mar21	-1.08	Jan01	0.69
	5	#308 1.30 Jun20 (JB)	-0.95	Jun10	2.25
	5	#316 1.10 Jun21	1.32	Aug11	2.48
	4	#60 1.40 Dec22	1.44	Feb03	1.12
	3	#50 1.90 Mar21	1.61	Apr01	1.35
	2	#61 1.00 Mar23	2.33	Apr03	1.21
Cheapest	1	#48 2.50 Dec20	2.36	Oct00	0.66

JGB 10-15

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#92 2.10 Dec26	-2.95	Dec06	2.71
	2	#94 2.10 Mar27	-2.94	Apr07	1.83
	3	#93 2.00 Mar27	-2.61	Mar07	1.15
	4	#95 2.30 Jun27	-2.53	Jun07	1.77
	5	#97 2.20 Sep27	-2.04	Sep07	1.66
	5	#75 2.10 Mar25	2.37	Mar05	0.73
	4	#80 2.10 Jun25	2.44	Aug05	0.86
	3	#85 2.10 Mar26	2.54	Mar06	1.11
	2	#82 2.10 Sep25	2.62	Oct05	1.53
Cheapest	1	#76 1.90 Mar25	2.66	Apr05	0.95

JGB 15-20

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#115 2.20 Dec29	-2.79	Feb10	1.18
	2	#6 2.40 Nov31	-2.76	Nov01	0.55
	3	#4 2.90 Nov30	-2.54	Nov00	0.50
	4	#113 2.10 Sep29	-2.39	Sep09	3.46
	5	#128 1.90 Jun31	-2.21	Jun11	2.23
	5	#8 1.80 Nov32	1.18	Nov02	0.52
	4	#141 1.70 Dec32	1.47	Dec12	1.27
	3	#140 1.70 Sep32	1.51	Sep12	1.25
	2	#9 1.40 Dec32	2.08	Jan03	0.32
Cheapest	1	#10 1.10 Mar33	2.48	May03	0.53

JGB >20

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#34 2.20 Mar41	-0.47	Mar11	2.77
	2	#36 2.00 Mar42	-0.35	Mar12	0.79
	3	#35 2.00 Sep41	-0.10	Sep11	3.01
	4	#37 1.90 Sep42	-0.08	Sep12	0.75
	5	#15 2.50 Jun34	-0.01	Aug04	0.93
	5	#29 2.40 Sep38	1.19	Oct08	2.02
	4	#21 2.30 Dec35	1.26	Jan06	0.78
	3	#11 1.70 Jun33	1.29	Jul03	0.58
	2	#19 2.30 Jun35	1.60	Jul05	0.72
Cheapest	1	#13 2.00 Dec33	1.98	Feb04	0.72

Versus Swap Curve (YYS)

JGB 2-7

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#307 1.30 Mar20	-2.43	May10	2.57
	2	#306 1.40 Mar20	-2.43	Mar10	4.77
	3	#305 1.30 Dec19	-2.33	Dec09	7.14
	4	#45 2.40 Mar20	-2.32	Jan00	0.87
	5	#304 1.30 Sep19	-2.03	Oct09	2.39
	5	#98 0.30 Jun16	0.56	Aug11	2.40
	4	#97 0.40 Jun16	0.57	Jun11	5.16
	3	#327 0.10 Apr15	0.99	Apr13	2.90
	2	#109 0.10 Mar18 (5y)	2.01	Mar13	2.70
Cheapest	1	#108 0.10 Dec17	2.71	Feb13	2.70

JGB 7-10

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#57 1.90 Jun22	-3.38	Aug02	0.97
	2	#59 1.70 Dec22	-3.31	Dec02	1.07
	3	#56 2.00 Jun22	-3.31	Jun02	0.91
	4	#319 1.10 Dec21	-3.31	Dec11	2.44
	5	#324 0.80 Jun22	-3.30	Jul12	2.63
	5	#309 1.10 Jun20	-2.70	Jul10	4.76
	4	#311 0.80 Sep20	-2.69	Oct10	2.61
	3	#46 2.20 Jun20	-2.54	Apr00	0.70
	2	#308 1.30 Jun20 (JB)	-2.51	Jun10	2.25
Cheapest	1	#327 0.80 Dec22	-2.43	Jan13	2.48

JGB 10-15

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#95 2.30 Jun27	-3.46	Jun07	1.77
	2	#101 2.40 Mar28	-3.44	May08	0.86
	3	#97 2.20 Sep27	-3.41	Sep07	1.66
	4	#100 2.20 Mar28	-3.39	Mar08	1.84
	5	#92 2.10 Dec26	-3.38	Dec06	2.71
	5	#70 2.40 Jun24	-3.09	Jun04	1.44
	4	#85 2.10 Mar26	-3.08	Mar06	1.11
	3	#68 2.20 Mar24	-3.07	Apr04	0.68
	2	#82 2.10 Sep25	-3.06	Oct05	1.53
Cheapest	1	#76 1.90 Mar25	-3.04	Apr05	0.95

JGB 15-20

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#141 1.70 Dec32	-4.60	Dec12	1.27
	2	#8 1.80 Nov32	-4.27	Nov02	0.52
	3	#6 2.40 Nov31	-4.23	Nov01	0.55
	4	#4 2.90 Nov30	-4.20	Nov00	0.50
	5	#5 2.20 May31	-4.17	May01	0.37
	5	#102 2.40 Jun28	-3.45	Jun08	1.04
	4	#105 2.10 Sep28	-3.44	Sep08	1.90
	3	#103 2.30 Jun28	-3.42	Jul08	0.91
	2	#104 2.10 Jun28	-3.40	Aug08	0.92
Cheapest	1	#143 1.60 Mar33 (20y)	-3.15	Mar13	1.29

JGB >20

	Rank	Bond	ZScore	Issued	Size (¥tln)
Richest	1	#11 1.70 Jun33	-4.19	Jul03	0.58
	2	#12 2.10 Sep33	-4.10	Nov03	0.52
	3	#13 2.00 Dec33	-3.88	Feb04	0.72
	4	#14 2.40 Mar34	-3.84	Apr04	0.87
	5	#15 2.50 Jun34	-3.80	Aug04	0.93
	5	#31 2.20 Sep39	-3.04	Oct09	2.21
	4	#36 2.00 Mar42	-3.02	Mar12	0.79
	3	#35 2.00 Sep41	-2.99	Sep11	3.01
	2	#33 2.00 Sep40	-2.99	Sep10	2.74
Cheapest	1	#37 1.90 Sep42	-2.98	Sep12	0.75

ZScore calculated using 6M history
2y,5y,7y,10y,20y,30y denote the OTR bonds
Analytis as of 3-Apr-13

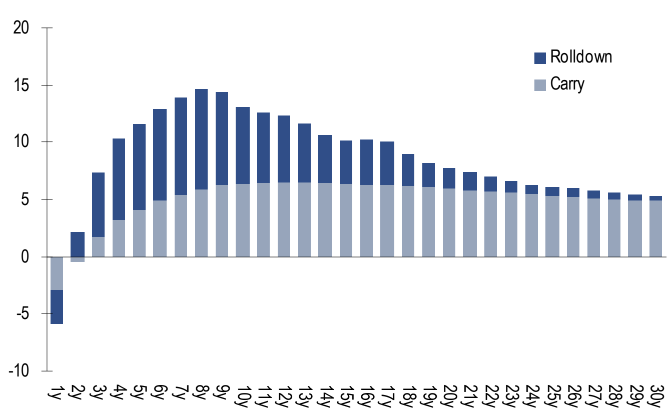
Source: Citi Research

Figure 32. 6M carry in JPY swaps[4]

Fwd/Tenor	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	12Y	15Y	20Y	25Y	30Y	40Y
SPOT	- 7.1	- 1.9	- 0.2	1.1	2.5	3.8	5.0	5.7	6.2	6.6	7.2	7.4	5.8	4.2	3.6	3.1
6M	- 3.2	- 1.1	0.5	1.8	3.1	4.5	5.4	5.9	6.4	6.8	7.3	7.4	5.6	4.1	3.6	3.0
9M	- 4.1	- 1.4	0.4	1.9	3.4	4.8	5.5	6.1	6.5	7.0	7.4	7.3	5.5	4.0	3.5	3.0
1Y	0.7	1.5	2.4	3.6	4.8	6.0	6.5	6.9	7.3	7.5	7.9	7.5	5.7	4.2	3.7	3.2
2Y	2.4	3.3	4.6	5.9	7.1	7.5	7.9	8.2	8.5	8.6	8.7	7.8	5.7	4.3	3.9	3.3
3Y	4.3	5.7	7.1	8.3	8.6	8.8	9.0	9.2	9.3	9.4	9.1	7.8	5.6	4.3	3.9	3.3
4Y	7.1	8.5	9.6	9.7	9.8	9.8	9.9	10.0	10.0	9.8	9.1	7.6	5.3	4.2	3.9	3.2
5Y	9.9	10.9	10.6	10.5	10.4	10.4	10.5	10.5	10.2	9.9	8.8	7.1	4.9	4.0	3.7	3.1
6Y	11.9	11.0	10.7	10.5	10.6	10.6	10.6	10.3	9.9	9.4	8.2	6.4	4.4	3.7	3.4	2.8
7Y	9.9	10.1	10.0	10.2	10.4	10.3	10.1	9.7	9.0	8.5	7.2	5.4	3.7	3.3	3.0	2.5
8Y	10.3	10.2	10.5	10.6	10.5	10.2	9.8	9.1	8.5	7.7	6.4	4.7	3.2	3.0	2.7	2.2
9Y	10.0	10.5	10.6	10.6	10.2	9.7	8.9	8.2	7.4	6.7	5.3	3.8	2.7	2.5	2.3	1.9
10Y	10.9	11.0	10.8	10.3	9.6	8.8	7.9	7.1	6.3	5.5	4.3	3.0	2.2	2.1	1.9	1.6
12Y	10.3	9.6	8.7	7.6	6.6	5.7	4.9	4.1	3.3	2.7	1.8	1.1	1.1	1.0	0.9	0.8
15Y	4.5	3.5	2.7	1.8	1.1	0.4	- 0.1	- 0.5	- 0.8	- 1.0	- 1.2	- 0.9	- 0.4	- 0.3	- 0.3	- 0.2
20Y	- 3.1	- 3.3	- 3.4	- 3.4	- 3.3	- 3.2	- 3.0	- 2.7	- 2.4	- 2.0	- 1.5	- 1.0	- 0.7	- 0.6	- 0.5	- 0.4
25Y	- 2.6	- 2.1	- 1.6	- 1.1	- 0.6	- 0.2	0.1	0.2	0.3	0.4	0.4	0.3	0.3	0.2	0.2	0.2
30Y	1.9	1.9	1.8	1.6	1.5	1.3	1.2	1.1	1.0	0.9	0.8	0.6	0.5	0.4	0.4	0.3

Source: Citi Research

Figure 33. 6M carry profile of JGB[5]



Source: Citi Research

Figure 34. 6M carry table of JGB

JGB	Carry	Rolldown	Total
1y	-2.9	-3.0	-5.9
2y	-0.4	2.1	1.7
3y	1.7	5.6	7.4
4y	3.2	7.1	10.3
5y	4.1	7.5	11.6
6y	4.9	8.1	12.9
7y	5.4	8.5	13.9
8y	5.9	8.8	14.7
9y	6.3	8.1	14.3
10y	6.4	6.7	13.1
20y	5.9	1.8	7.8
30y	4.9	0.4	5.3

Source: Citi Research

[4] Sectors with carry more than 5bp is highlighted in green while the carry less than 5bp is highlighted in red.

[5] JGB carry profile and table is calculated from the relative value curve and it may vary from individual bonds given the repo rate.

Appendix A-1

Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

IMPORTANT DISCLOSURES

Analysts' compensation is determined based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates ("the Firm"). Like all Firm employees, analysts receive compensation that is impacted by overall firm profitability which includes investment banking revenues.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 28th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Historical disclosures (for up to the past three years) will be provided upon request.

NON-US RESEARCH ANALYST DISCLOSURES

Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization and therefore may not be subject to the NYSE Rule 472 and NASD Rule 2711 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account. The legal entities employing the authors of this report are listed below:

Citicorp Pty Ltd	Steven Mansell; Carl Ang
Citigroup Global Markets Japan Inc.	Maki Shimizu

OTHER DISCLOSURES

For securities recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in the issuers' financial instruments and may act as principal in connection with such transactions. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental research report, it is the intention of Citi Research to provide research coverage of the/those issuer(s) mentioned therein, including in response to news affecting this issuer, subject to applicable quiet periods and capacity constraints. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

Important Disclosures for Morgan Stanley Smith Barney LLC Customers: Morgan Stanley & Co. LLC (Morgan Stanley) research reports may be available about the companies that are the subject of this Citi Research research report. Ask your Financial Advisor or use smithbarney.com to view any

available Morgan Stanley research reports in addition to Citi Research research reports.
Important disclosure regarding the relationship between the companies that are the subject of this Citi Research research report and Morgan Stanley Smith Barney LLC and its affiliates are available at the Morgan Stanley Smith Barney disclosure website at www.morganstanleysmithbarney.com/researchdisclosures.
For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to www.morganstanley.com/researchdisclosures and https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.
This Citi Research research report has been reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval was conducted by the same person who reviewed this research report on behalf of Citi Research. This could create a conflict of interest.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by. The Product is made available in **Australia** through Citi Global Markets Australia Pty Ltd. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in Australia to Private Banking wholesale clients through Citigroup Pty Limited (ABN 88 004 325 080 and AFSL 238098). Citigroup Pty Limited provides all financial product advice to Australian Private Banking wholesale clients through bankers and relationship managers. If there is any doubt about the suitability of investments held in Citigroup Private Bank accounts, investors should contact the Citigroup Private Bank in Australia. Citigroup companies may compensate affiliates and their representatives for providing products and services to clients. The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários, BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de Investimento do Mercado de Capitais and ANBID - Associação Nacional dos Bancos de Investimento. Av. Paulista, 1111 - 11º andar - CEP. 01311920 - São Paulo - SP. If the Product is being made available in certain provinces of **Canada** by Citigroup Global Markets (Canada) Inc. ("CGM Canada"), CGM Canada has approved the Product. Citigroup Place, 123 Front Street West, Suite 1100, Toronto, Ontario M5J 2M3. This product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Superintendencia de Valores y Seguros. Agustinas 975, piso 2, Santiago, Chile. The Product is made available in **France** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 1-5 Rue Paul Cézanne, 8ème, Paris, France. The Product is distributed in **Germany** by Citigroup Global Markets Deutschland AG ("CGMD"), which is regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin). CGMD, Reuterweg 16, 60323 Frankfurt am Main. Research which relates to "securities" (as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong)) is issued in **Hong Kong** by, or on behalf of, Citigroup Global Markets Asia Limited which takes full responsibility for its content. Citigroup Global Markets Asia Ltd. is regulated by Hong Kong Securities and Futures Commission. If the Research is made available through Citibank, N.A., Hong Kong Branch, for its clients in Citi Private Bank, it is made available by Citibank N.A., Citibank Tower, Citibank Plaza, 3 Garden Road, Hong Kong. Citibank N.A. is regulated by the Hong Kong Monetary Authority. Please contact your Private Banker in Citibank N.A., Hong Kong, Branch if you have any queries on or any matters arising from or in connection with this document. The Product is made available in **India** by Citigroup Global Markets India Private Limited, which is regulated by Securities and Exchange Board of India. Bakhtawar, Nariman Point, Mumbai 400-021. The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. 5/F, Citibank Tower, Bapindo Plaza, Jl. Jend. Sudirman Kav. 54-55, Jakarta 12190. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations. The Product is made available in **Israel** through Citibank NA, regulated by the Bank of Israel and the Israeli Securities Authority. Citibank, N.A, Platinum Building, 21 Ha'arba'ah St, Tel Aviv, Israel. The Product is made available in **Italy** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. Via dei Mercanti, 12, Milan, 20121, Italy. The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Shin-Marunouchi Building, 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-6520 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help. The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd., which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of Citigroup Global Markets Korea Securities Ltd. http://dis.kofia.or.kr/fs/dis2/fundMgr/DISFundMgrAnalystPop.jsp?companyCd2=A03030&pageDiv=02. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Building, 39 Da-dong, Jung-gu, Seoul 100-180, Korea. The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Company No. 460819-D) ("CGMM") to its clients and CGMM takes responsibility for its contents. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product. The Product is made available in **Mexico** by Acciones y Valores Banamex, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Banamex ("Accival") which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Reforma 398, Col. Juarez, 06600 Mexico, D.F. In **New Zealand** the Product is made available to 'wholesale clients' only as defined by s5C(1) of the Financial Advisers Act 2008 ('FAA') through Citigroup Global Markets Australia Pty Ltd (ABN 64 003 114 832 and AFSL No. 240992), an overseas financial adviser as defined by the FAA, participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. The Product is made available in **Pakistan** by Citibank N.A. Pakistan branch, which is regulated by the State Bank of Pakistan and Securities Exchange Commission, Pakistan. AWT Plaza, 1.1. Chundrigar Road, P.O. Box 4889, Karachi-74200. The Product is made available in the **Philippines** through Citicorp Financial Services and Insurance Brokerage Philippines, Inc., which is regulated by the Philippines Securities and Exchange Commission. 20th Floor Citibank Square Bldg. The Product is made available in the Philippines through Citibank NA Philippines branch, Citibank Tower, 8741 Paseo De Roxas, Makati City, Manila. Citibank NA Philippines NA is regulated by The Bangko Sentral ng Pilipinas. The Product is made available in **Poland** by Dom Maklerski Banku Handlowego SA an indirect subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Dom Maklerski Banku Handlowego S.A. ul.Senatorska 16, 00-923 Warszawa. The Product is made available in the **Russian Federation** through ZAO Citibank, which is licensed to carry out banking activities in the Russian Federation in accordance with the general banking license issued by the Central Bank of the Russian

Federation and brokerage activities in accordance with the license issued by the Federal Service for Financial Markets. Neither the Product nor any information contained in the Product shall be considered as advertising the securities mentioned in this report within the territory of the Russian Federation or outside the Russian Federation. The Product does not constitute an appraisal within the meaning of the Federal Law of the Russian Federation of 29 July 1998 No. 135-FZ (as amended) On Appraisal Activities in the Russian Federation. 8-10 Gasheka Street, 125047 Moscow. The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. (“CGMSPL”), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold//Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289). Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa. The Product is made available in **Spain** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. 29 Jose Ortega Y Gasset, 4th Floor, Madrid, 28006, Spain. The Product is made available in the **Republic of China** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan and/or through Citibank Securities (Taiwan) Company Limited ("CSTL"), 14 and 15F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the respective license scope of each entity and the applicable laws and regulations in the Republic of China. CGMTS and CSTL are both regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China. No portion of the Product may be reproduced or quoted in the Republic of China by the press or any third parties [without the written authorization of CGMTS and CSTL]. If the Product covers securities which are not allowed to be offered or traded in the Republic of China, neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus. The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 18/F, 22/F and 29/F, 82 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand. The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey. In the **U.A.E**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties. The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised and regulated by Financial Services Authority. This material may relate to investments or services of a person outside of the UK or to other matters which are not regulated by the FSA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB. The Product is made available in **United States** by Citigroup Global Markets Inc, which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013. Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Limited, which is regulated by Financial Services Authority.

Pursuant to Comissão de Valores Mobiliários Rule 483, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Many European regulators require that a firm must establish, implement and make available a policy for managing conflicts of interest arising as a result of publication or distribution of investment research. The policy applicable to Citi Research's Products can be found at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.

Compensation of equity research analysts is determined by equity research management and Citigroup's senior management and is not linked to specific transactions or recommendations.

The Product may have been distributed simultaneously, in multiple formats, to the Firm's worldwide institutional and retail customers. The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to sudden and large falls in value that could equal or exceed the amount invested. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product.

With the exception of our product that is made available only to Qualified Institutional Buyers (QIBs) and other product that is made available through other distribution channels only to certain categories of clients to satisfy legal or regulatory requirements, Citi Research concurrently disseminates its research via proprietary and non-proprietary electronic distribution platforms. Periodically, individual Citi Research analysts may also opt to circulate research posted on such platforms to one or more clients by email. Such email distribution is discretionary and is done only after the research has been disseminated via the aforementioned distribution channels. Citi Research simultaneously distributes product that is limited to QIBs only through email distribution.