

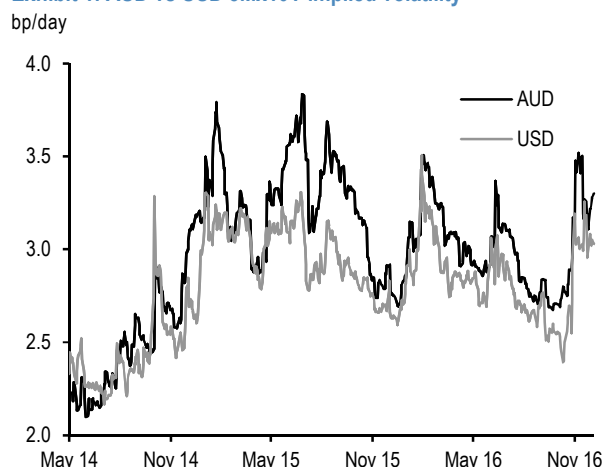
21 December 2016

## Systematic short gamma strategies in the AUD swaptions market

- Structural richness in swaptions markets due to hedging flows tend to provide opportunities to profit from systematic short gamma trading strategies
- We find that selling unhedged AUD straddles offers positive risk adjusted daily returns for investors over a 2 year trading horizon, exceeding the average risk adjusted returns from undertaking the same strategy in the USD market
- The risk-adjusted pickup on selling gamma in AUD over USD is particularly high for 3 year tails

As discussed in [Younger et al.](#) (June 2016), the combination of large hedging flows of interest rate risk by fixed income investors, and of prepayment and refinancing risk in fixed-rate US mortgage backed securities, has embedded a structural richness into the USD swaptions market. To this end, systematic short gamma strategies tend to consistently generate positive risk-adjusted earnings, a phenomenon that has increased in the post-GFC period. Despite the absence of a liquid MBS market in Australia, the AUD swaption market similarly embeds a structural richness, historically trading at a premium above its USD equivalent (**Exhibit 1**). In Australia, this richness is more likely a function of the high-beta nature of the Australian rates market, the supply-demand balance of long vol investors, and the tendency for AUD vol to mirror global trends.

**Exhibit 1: AUD vs USD 3Mx10Y implied volatility**

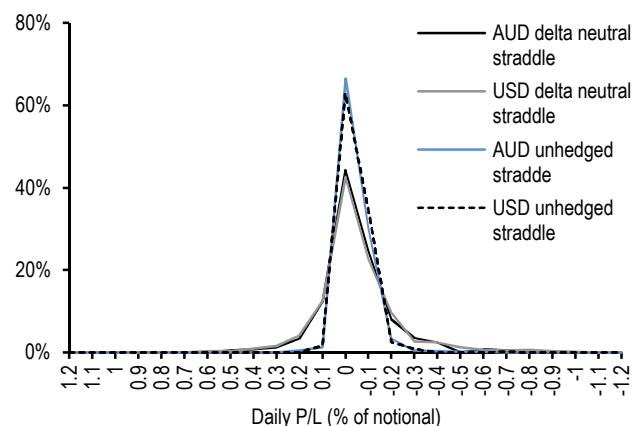


Source: J.P. Morgan.

Given the non-normal distribution of swaptions returns, Younger et al. employ a non-parametric gauge of risk-adjusted returns; the 5 year rolling median return divided by the interquartile range. **Exhibit 2** suggests similar non-normality holds in the Australian market, with the distribution of daily returns for the two strategies, exhibiting peakedness and tail fatness contrary to the standard normal distribution. We therefore adopt a similar methodology, but use the 6 month rolling median return to adjust for the smaller data set on hand for the Australian market. Naturally, returns over this time horizon will be less stable, but the key results remain robust. It is worth noting that while the simulation in Younger et al. assumes that the portfolio involves selling a new option for each day of the sample period, the simulation undertaken in this note assumes that the seller takes a short position in a 3 month swaption, holds it for 1 month, and then rolls it.

## Exhibit 2: Frequency histogram of AUD and USD daily returns

% of observations



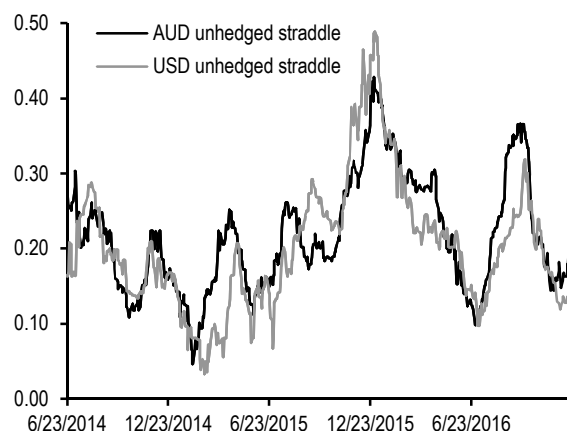
Source: J.P. Morgan.

Note: Using 2 years of daily P/L for the described short gamma strategies, using 3Mx10Y swaptions.

A short gamma position via an unhedged ATMF straddle tends to generate risk-adjusted daily returns on average of 0.2% of notional; 0.22% for AUD and 0.2% for USD swaptions over the past 2 years. As **Exhibit 2** shows, the returns on offer for shorting AUD gamma are only slightly more variable than those for USD using a 3Mx10Y swaption, with daily returns persistently outperforming over the last 9 months of the series.

## Exhibit 3: Risk adjusted returns from selling 3Mx10Y unhedged straddles

% of notional



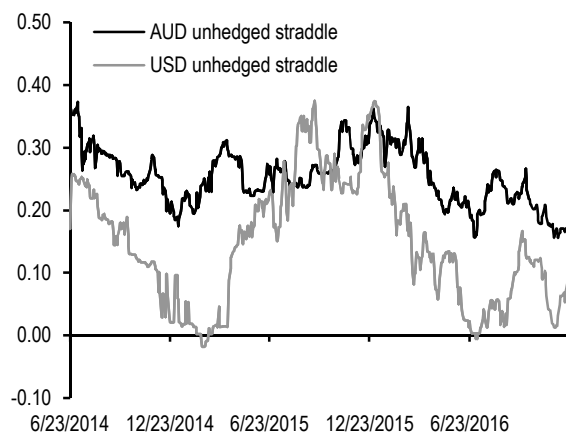
Source: J.P. Morgan.

Note: 6 month rolling median of daily P/L divided by the 6 month interquartile range. Straddles are struck ATMF, with zero transaction costs assumed.

An interesting aspect of the structural richness in the USD swaptions market is its variance across the vol surface, and this is evidenced when we re-model the aforementioned strategy using 3Mx3Y swaptions. Selling unhedged AUD 3Mx3Y ATMF straddles generates an average daily profit of 0.25% of notional, well above the 0.15% return on the USD equivalent. As shown in **Exhibit 3**, the daily risk-adjusted returns from selling AUD gamma consistently outperforms relative to the US market over the sample period. These results indicate that systematic short gamma strategies in Australian swaptions offer consistently positive risk-adjusted returns, and represent a good value opportunity within rangebound markets.

#### Exhibit 4: Risk adjusted returns from selling 3Mx3Y unhedged straddles

% of notional



Source: J.P. Morgan.

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#### Australian and New Zealand Interest Rate Strategy

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