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Connecting Markets East & West

How to use vol reports

Eyeballing Relative Value

Nick Firoozye
Jelena Skulic (London)
Qilong Zhang (HK)
Xiaowei Zheng (London)
Global Derivatives Research

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What we have done and why

Trying to capture market snapshot in limited but ultimately useful way

- **Goals:**
  - Attempting to give **updated and transparent view of Vanilla and Flow Exotics Markets** (e.g., OTC and Exchange traded Midcurves and CMS spread options in time).
  - **Limited** scope, highlighting most frequently used trade idea formation metrics. (We don't try to show everything when scanning a trade.) Further analysis is needed before deciding to put on a trade. We cannot provide it in a simple report.
  - **Eyeball-scans** – make it feasible to scan trades (approximately) by differencing two or more numbers. We try to make the views appealing enough (with the excel constraint) that they are useful.

- **Background:**
  - In this document we reference our publication Derivative Reports – Vanilla and Flow Exotics Trade Reports: Searching for Value (12/12/2014).
  - We also attempt to link to our older primarily Rates trade ideas in Derivative Focus which had their impetus in some of these current reports.

- This is an area of ongoing work. We will update scans and add more tables over time. We will move some or all to Nomura Now' over time (See http://go.nomuranow.com/fixedincome/tools/composite/nnpage/fi/rates/deriv/home for currently available report types).
- This is collaborative. We like input. Please let us know what you like and do not like. We cannot accommodate every request but sometimes we can all learn.

Swaption Carry Breakdowns

Looking for sources of carry

Carry Decomposition – The background

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Looking for more stable sources of returns

- **Goals:**
  - Decompose returns along the 'carry' path.
  - **Note**: most trading desks have some form of return attribution for daily P&L. While this can be complex, we consider simple versions, for example,

    $PV(t+1) = PV(t) + Delta(t)*\Delta rates + Theta(t)*\Delta time + \frac{1}{2}Gamma(t)*\Delta rates^2 + Vega * \Delta Vol + Unexp$
  - **We wanted to do the same decomposition along the 'carry' path, i.e., where rates, vols, etc, all age.**

- **Rationale:**
  - Some investors see curve carry as intrinsically less stable than vol carry
  - This allows investors to consider trades with more or less **stable sources of carry**.
  - Investors ultimately want to construct pv01 neutral and vega neutral trades:
    - We expanded the reports with vega weights and pv01 weights, so it is easy to 'eyeball' vega neutral and pv01 neutral trades.

- **Note:** This decomposition only works for **Vanilla Swaptions**. We will extend to midcurves without much hassle (with correlation terms). Other options (e.g., CMS, contingent CMS) are considerably harder and require a fair amount more computation.

USD Straddles Carry

Straddle- total carry by risk, curve carry, vega slide, and time decay.
Carry as percentage of initial premium for 6m (or until expiry)
Carry breakdown is mostly in 1st order risks, using monthly changes

Fig. 1: USD Straddles - premium weighted, 6-month horizon

USD (Straddle) - Total Carry (6m horizon) / Premium

	1y	2y	5y	10y	15y	20y	30y
1m	-9.3%	-47.5%	-74.3%	-83.0%	-87.1%	-89.8%	-92.4%
3m	1.6%	-21.5%	-58.1%	-72.8%	-79.5%	-83.9%	-87.8%
6m	26.1%	4.2%	-43.2%	-63.3%	-72.1%	-77.9%	-83.4%
9m	8.8%	-8.5%	-34.5%	-42.4%	-43.9%	-44.0%	-44.4%
1y	-0.6%	-11.8%	-25.9%	-29.9%	-30.9%	-30.9%	-30.0%
18m	-8.8%	-12.9%	-15.6%	-17.9%	-17.6%	-18.0%	-18.3%
2y	-13.2%	-13.1%	-12.3%	-13.0%	-13.1%	-12.9%	-12.8%
3y	-8.4%	-7.3%	-7.8%	-8.1%	-7.7%	-7.3%	-7.3%
5y	-3.4%	-2.8%	-3.3%	-3.4%	-3.2%	-3.0%	-3.2%
7y	-1.2%	-1.0%	-1.1%	-1.2%	-1.1%	-1.1%	-1.0%
10y	0.5%	-0.1%	0.4%	0.4%	0.4%	0.4%	0.4%
15y	1.7%	1.8%	1.6%	1.3%	1.4%	1.3%	1.3%
20y	1.6%	1.7%	1.7%	1.6%	1.5%	1.2%	1.3%
30y	1.4%	1.2%	1.0%	0.8%	0.7%	0.6%	0.5%

USD (Straddle) - Vega Carry (6m horizon) / Premium

	1y	2y	5y	10y	15y	20y	30y
1m	-4.5%	-6.9%	-9.6%	-10.0%	-10.0%	-10.0%	-10.1%
3m	-18.2%	-1.3%	-3.8%	-6.3%	-7.4%	-8.1%	-7.9%
6m	-9.9%	0.6%	-2.9%	-6.6%	-7.2%	-7.1%	-7.3%
9m	-4.5%	0.0%	-3.2%	-5.7%	-5.1%	-3.9%	-3.2%
1y	-4.0%	-1.6%	-3.1%	-4.3%	-4.3%	-3.8%	-2.3%
18m	-3.2%	-1.6%	-0.1%	-1.6%	-1.0%	-1.1%	-1.3%
2y	-5.3%	-3.0%	-0.7%	-1.2%	-1.2%	-0.8%	-0.7%
3y	-1.2%	0.1%	-0.3%	-0.7%	-0.3%	0.2%	0.1%
5y	1.0%	0.9%	0.5%	0.4%	0.6%	0.8%	0.5%
7y	1.1%	1.3%	1.1%	1.0%	1.1%	1.2%	1.3%
10y	1.6%	1.3%	1.5%	1.5%	1.5%	1.5%	1.5%
15y	1.9%	2.0%	1.8%	1.5%	1.6%	1.6%	1.6%
20y	1.4%	1.5%	1.5%	1.4%	1.3%	1.1%	1.2%
30y	0.8%	0.7%	0.5%	0.3%	0.2%	0.2%	0.1%

USD (Straddle) - Curve Carry (6m horizon) / Premium

	1y	2y	5y	10y	15y	20y	30y
1m	30.8%	11.8%	3.2%	1.5%	1.0%	0.7%	0.4%
3m	46.3%	27.5%	9.7%	4.7%	3.0%	2.1%	1.4%
6m	65.2%	46.6%	17.8%	9.0%	5.9%	4.1%	2.8%
9m	44.4%	28.4%	9.4%	4.7%	3.1%	2.4%	1.8%
1y	28.2%	16.8%	5.6%	3.0%	2.2%	1.8%	1.5%
18m	11.3%	6.2%	2.4%	1.6%	1.3%	1.1%	1.1%
2y	4.4%	2.4%	1.2%	1.0%	0.9%	0.8%	0.8%
3y	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
5y	-0.4%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
7y	0.0%	0.1%	0.2%	0.2%	0.2%	0.1%	0.1%
10y	0.0%	-0.2%	0.0%	0.0%	0.1%	0.0%	0.0%
15y	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
20y	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
30y	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.2%

USD (Straddle) - Theta (6m horizon) / Premium

	1y	2y	5y	10y	15y	20y	30y
1m	-26.4%	-53.7%	-76.4%	-84.6%	-88.6%	-91.2%	-93.8%
3m	-27.7%	-45.1%	-62.9%	-73.3%	-78.7%	-82.5%	-86.7%
6m	-29.9%	-43.6%	-56.5%	-63.4%	-69.4%	-74.7%	-79.8%
9m	-36.7%	-35.7%	-39.4%	-40.1%	-40.7%	-41.3%	-41.7%
1y	-24.5%	-26.6%	-28.1%	-28.3%	-28.4%	-28.6%	-28.9%
18m	-16.8%	-17.4%	-17.9%	-17.9%	-17.9%	-18.0%	-18.0%
2y	-12.4%	-12.7%	-12.9%	-12.9%	-12.9%	-12.9%	-13.0%
3y	-7.7%	-7.7%	-7.7%	-7.7%	-7.7%	-7.8%	-7.8%
5y	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%	-4.0%
7y	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%
10y	-1.1%	-1.1%	-1.1%	-1.1%	-1.1%	-1.1%	-1.1%
15y	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
20y	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
30y	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%

6m1y carry (over 6m) is 26.1% of initial premium. 26.1%= -9.9%(vega) + 65.2%(curve) -29.9%(time decay)

Total Carry = Vega Carry + Delta (curve) carry + Theta Carry + Unexplained

Many clients look to vega / theta carry as 'good' carry while delta carry is less certain.

Initially, we look as a percentage of premium to get a sense of which trades have decent carry of each type.

We could also use this to construct zero-cost trades with positive carry by differencing two entries in the table.

Source: Nomura Research

USD Straddles – Vega Weighted

Straddle- total carry by risk, curve carry, vega slide, and time decay.

Carry as percentage of initial vega for 6m (or until expiry)

Any two straddled can be differenced to find a vega neutral trade

Fig. 2: USD Straddles – Vega weighted, 6-month horizon

USD (Straddle) - Total Carry (6m horizon) / Vega

	1y	2y	5y	10y	15y	20y	30y
1m	-2.4	-27.6	-54.7	-56.1	-56.0	-57.6	-58.0
3m	0.7	-13.6	-44.1	-51.4	-54.0	-57.3	-58.4
6m	13.8	3.0	-34.2	-46.9	-51.0	-54.9	-57.3
9m	5.5	-6.5	-28.4	-32.6	-32.0	-31.8	-30.9
1y	-0.4	-9.7	-22.0	-23.6	-23.1	-22.8	-21.1
18m	-7.3	-11.4	-13.5	-14.5	-13.4	-13.5	-13.1
2y	-12.4	-12.4	-10.9	-10.7	-10.1	-9.7	-9.2
3y	-8.3	-7.0	-7.0	-6.8	-6.0	-5.5	-5.3
5y	-3.3	-2.7	-3.0	-2.8	-2.5	-2.2	-2.3
7y	-1.1	-0.9	-1.0	-1.0	-0.8	-0.8	-0.6
10y	0.4	0.0	0.3	0.3	0.3	0.2	0.2
15y	1.2	1.3	1.1	0.8	0.8	0.7	0.7
20y	1.0	1.0	1.0	0.9	0.7	0.6	0.6
30y	0.7	0.7	0.5	0.4	0.4	0.3	0.2

USD (Straddle) - Vega Carry (6m horizon) / Vega

	1y	2y	5y	10y	15y	20y	30y
1m	-1.1	-4.0	-7.0	-6.7	-6.4	-6.4	-6.3
3m	-7.4	-0.8	-2.9	-4.5	-5.0	-5.5	-5.2
6m	-5.3	0.4	-2.3	-4.9	-5.1	-5.0	-5.0
9m	-2.8	0.0	-2.7	-4.4	-3.7	-2.8	-2.3
1y	-2.9	-1.3	-2.6	-3.4	-3.2	-2.8	-1.6
18m	-2.7	-1.4	-0.1	-1.3	-0.7	-0.9	-1.0
2y	-5.0	-2.8	-0.7	-1.0	-0.9	-0.6	-0.5
3y	-1.2	0.0	-0.3	-0.6	-0.3	0.1	0.1
5y	1.0	0.9	0.5	0.3	0.4	0.6	0.4
7y	1.0	1.2	1.0	0.8	0.8	0.8	0.9
10y	1.3	1.1	1.2	1.1	1.0	0.9	0.9
15y	1.3	1.4	1.2	1.0	0.9	0.9	0.8
20y	0.9	0.9	0.9	0.8	0.7	0.5	0.6
30y	0.4	0.4	0.2	0.2	0.1	0.1	0.0

USD (Straddle) - Curve Carry (6m horizon) / Vega

	1y	2y	5y	10y	15y	20y	30y
1m	7.8	6.9	2.3	1.0	0.6	0.4	0.3
3m	18.7	17.4	7.4	3.3	2.0	1.4	0.9
6m	34.6	32.8	14.1	6.7	4.1	2.9	1.9
9m	28.0	21.8	7.7	3.6	2.3	1.7	1.3
1y	20.2	13.8	4.7	2.4	1.6	1.3	1.0
18m	9.5	5.5	2.1	1.3	1.0	0.9	0.8
2y	4.2	2.3	1.1	0.8	0.7	0.6	0.6
3y	0.5	0.4	0.3	0.3	0.3	0.3	0.3
5y	-0.4	0.2	0.1	0.2	0.2	0.2	0.2
7y	0.0	0.1	0.1	0.1	0.1	0.1	0.1
10y	0.0	-0.2	0.0	0.0	0.0	0.0	0.0
15y	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
20y	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
30y	0.0	0.0	0.0	0.0	0.0	-0.1	-0.1

USD (Straddle) - Theta (6m horizon) / Vega

	1y	2y	5y	10y	15y	20y	30y
1m	-6.7	-31.2	-56.2	-57.2	-57.0	-58.6	-58.9
3m	-11.2	-28.6	-47.7	-51.8	-53.5	-56.3	-57.7
6m	-15.9	-30.7	-44.7	-47.0	-49.1	-52.6	-54.8
9m	-19.2	-27.5	-32.4	-30.8	-29.7	-29.8	-29.1
1y	-17.5	-21.9	-23.8	-22.3	-21.3	-21.1	-20.4
18m	-14.1	-15.5	-15.6	-14.5	-13.6	-13.5	-12.9
2y	-11.6	-12.0	-11.4	-10.6	-9.9	-9.8	-9.4
3y	-7.6	-7.4	-7.0	-6.5	-6.0	-5.9	-5.6
5y	-3.8	-3.7	-3.6	-3.3	-3.1	-2.9	-2.8
7y	-2.2	-2.1	-2.0	-1.9	-1.7	-1.7	-1.6
10y	-1.0	-0.9	-0.9	-0.8	-0.8	-0.7	-0.7
15y	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
20y	0.1	0.1	0.1	0.1	0.1	0.1	0.1
30y	0.3	0.3	0.3	0.3	0.3	0.3	0.3

If we reweight the carry by vega (i.e., cts carry [cts/6m]/vega [cts/bp vol] we can then use the table to construct vega-neutral trades by differencing two entries. The resulting carry is cts over 6m horizon for a 1ct/bp vol risk.

Example: We see the trade Short 2y10y ATMF straddles Long 5y10y ATMF straddles

results in

Total -2.8 – (-10.7)= 7.9 cts

Vega 0.3 – (-1.0) = 1.3cts

Curve 0.2 – 0.8 = - 0.6 cts

Theta: -3.3 – (-10.6)=7.3 cts

In [cts/bpvega risk]

Conclusion: This is a viable carry trade (but we have to check vol-spread and payoff profile over various horizons), especially since the majority of carry is not from curve.

A fifth table is available on the report = premium / vega. The 2y10y-5y10y cal spread cost is 83.5-82.4ct=0.9ct/vega mid

Source: Nomura Research

USD Payers Carry (similar to EUR Receivers Carry)

Payers - total carry by risk, curve carry, vega slide, and time decay.

Carry as percentage of initial pv01 (of the underlying forward) for 6m (or until expiry)

Any two payers can be differenced for a pv01 neutral trade

Fig. 3: USD Payers – PV01 weighted, 6-month horizon

USD (Payer) - Total Carry (6m horizon) / PV01

	1y	2y	5y	10y	15y	20y	30y
1m	-3.0	-7.0	-8.8	-8.1	-7.7	-7.7	-7.5
3m	-7.9	-12.4	-14.9	-13.9	-13.3	-13.4	-13.1
6m	-14.9	-19.8	-22.3	-20.9	-19.9	-19.8	-19.3
9m	-21.1	-24.2	-22.4	-19.0	-16.6	-15.4	-13.9
1y	-24.5	-25.2	-20.6	-16.7	-14.4	-13.2	-11.5
18m	-26.2	-22.9	-16.1	-13.0	-10.8	-9.9	-8.8
2y	-25.1	-19.9	-13.5	-10.8	-9.1	-8.1	-7.1
3y	-13.2	-10.8	-8.9	-7.5	-6.1	-5.3	-4.7
5y	-6.2	-5.4	-5.0	-4.1	-3.2	-2.7	-2.5
7y	-3.2	-2.9	-2.7	-2.0	-1.4	-1.1	-0.8
10y	-1.6	-1.4	-0.3	0.1	0.3	0.3	0.5
15y	1.8	1.9	1.9	1.7	1.6	1.5	1.6
20y	2.5	2.4	2.2	2.0	1.8	1.6	1.6
30y	1.5	1.5	1.7	1.6	1.5	1.2	1.0

USD (Payer) - Vega Carry (6m horizon) / PV01

	1y	2y	5y	10y	15y	20y	30y
1m	-0.1	-0.5	-0.8	-0.8	-0.8	-0.8	-0.8
3m	-1.4	-0.2	-0.6	-0.9	-1.0	-1.1	-1.0
6m	-1.5	0.1	-0.7	-1.4	-1.4	-1.4	-1.4
9m	-1.0	0.0	-0.9	-1.5	-1.3	-1.0	-0.8
1y	-1.1	-0.5	-1.1	-1.4	-1.3	-1.1	-0.6
18m	-1.3	-0.7	0.0	-0.6	-0.4	-0.4	-0.5
2y	-2.8	-1.6	-0.4	-0.6	-0.5	-0.4	-0.3
3y	-0.8	0.0	-0.2	-0.4	-0.2	0.1	0.1
5y	0.9	0.8	0.4	0.3	0.4	0.5	0.3
7y	1.1	1.3	1.0	0.8	0.8	0.9	0.9
10y	1.7	1.4	1.5	1.4	1.3	1.2	1.2
15y	2.1	2.2	1.9	1.5	1.4	1.4	1.3
20y	1.6	1.6	1.5	1.4	1.2	1.0	1.0
30y	0.9	0.8	0.5	0.3	0.3	0.2	0.1

USD (Payer) - Curve Carry (6m horizon) / PV01

	1y	2y	5y	10y	15y	20y	30y
1m	-1.3	-2.2	-1.5	-1.0	-0.7	-0.6	-0.4
3m	-3.9	-5.6	-4.3	-2.8	-2.1	-1.7	-1.3
6m	-8.6	-10.7	-8.2	-5.5	-4.1	-3.4	-2.5
9m	-13.2	-14.4	-9.9	-6.4	-4.7	-3.7	-2.7
1y	-16.2	-15.8	-9.9	-6.3	-4.5	-3.5	-2.6
18m	-17.9	-14.5	-8.5	-5.3	-3.8	-2.9	-2.1
2y	-15.7	-11.5	-6.7	-4.2	-3.0	-2.2	-1.6
3y	-7.1	-5.7	-3.8	-2.5	-1.7	-1.2	-0.8
5y	-3.7	-2.8	-2.2	-1.4	-0.9	-0.6	-0.3
7y	-2.0	-1.9	-1.5	-0.8	-0.4	-0.3	0.0
10y	-2.1	-1.6	-0.6	-0.2	0.0	0.1	0.2
15y	-0.1	-0.1	0.2	0.3	0.3	0.3	0.4
20y	0.6	0.6	0.4	0.4	0.4	0.4	0.4
30y	-0.1	0.0	0.5	0.6	0.6	0.4	0.3

USD (Payer) - Theta (6m horizon) / PV01

	1y	2y	5y	10y	15y	20y	30y
1m	-1.3	-4.4	-7.2	-7.1	-7.0	-7.2	-7.2
3m	-2.7	-6.3	-9.9	-10.5	-10.7	-11.2	-11.5
6m	-5.0	-9.3	-13.1	-13.5	-14.0	-15.0	-15.5
9m	-6.7	-9.5	-11.3	-10.7	-10.3	-10.3	-10.1
1y	-7.0	-8.8	-9.5	-8.9	-8.5	-8.4	-8.2
18m	-6.9	-7.6	-7.6	-7.1	-6.7	-6.6	-6.3
2y	-6.6	-6.8	-6.5	-6.0	-5.6	-5.5	-5.3
3y	-5.3	-5.2	-4.8	-4.5	-4.2	-4.1	-3.9
5y	-3.4	-3.4	-3.2	-3.0	-2.7	-2.6	-2.5
7y	-2.3	-2.3	-2.2	-2.0	-1.8	-1.8	-1.7
10y	-1.2	-1.2	-1.1	-1.1	-1.0	-0.9	-0.9
15y	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
20y	0.2	0.2	0.2	0.2	0.2	0.2	0.2
30y	0.7	0.7	0.7	0.7	0.6	0.6	0.6

Carry [cts/6m]/Pv01 [cts/bp parallel move]

for

We identified a vertical triangle using this sheet.

Long 6m2y, Short 2x18m2y, Long 3y2y ATMF payers, PV01 neutral

For

Total: -19.8 – 2(-22.9)-10.8 = 15.2ct

Vega: 0.1-2(-0.7)+0.0=1.5ct

Curve: -10.7-2(-14.5)-5.7= 12.6ct

Theta: -9.3-2(-7.6)-5.2=0.7ct

In [cts/bp parallel move risk]

Source: Nomura Research

Carry Breakdown – the method

Breaking down carry in (mostly) 1st Order risks

- Carry breakdown involves monthly calculations of risks, multiplied by (carry based) changes in underlying drivers (i.e., vol-agedvol, forward-aged forward, etc).
- Residual term is calculated and generally 2 orders of magnitude smaller.

$$
\begin{aligned}
\mathbf{d}\text{SwaptionPV} &= C\mathbf{d}A + A\mathbf{d}C + \mathbf{d}A\mathbf{d}C \\
&\approx C\mathbf{d}A + A\mathbf{d}C \\
&\approx C \times (CashPV01 \times \mathbf{d}DiscFactor + DiscFactor \times \mathbf{d}CashPV01) + \\
&\quad A \times (\Delta \mathbf{d}F + \nu \mathbf{d}\sigma + \Theta \mathbf{d}t + \frac{1}{2}\gamma \mathbf{d^2}F) \\
&= \underbrace{\left[C \times DiscFactor \times CashPV01 + A \times (\Delta \mathbf{d}F + \frac{1}{2}\gamma \mathbf{d^2}F)\right]}_{\text{Curve Carry (delta and gamma etc.)}} + \underbrace{A \times \nu \mathbf{d}\sigma}_{\text{Vol Carry}} \\
&\quad + \underbrace{(C \times CashPV01 \times \mathbf{d}DiscFactor + A \times \Theta \mathbf{d}t)}_{Theta}
\end{aligned}
$$

- **Note:** on individual trades we also do monthly carry breakdowns as timeseries plots. We usually include them in our research

Papers where Carry breakdown was used

Papers where the carry breakdown was used as inspiration for the initial trade idea

Derivative Focus - Another USD vertical fly

Additional flies on 2y tails offer value

Derivative Focus - Long USD front end with large breakeven ranges

Alternatives to receivers through payer vertical butterflies

Derivative Focus- Trading distortion in the EUR long-end

EUR 10y10y-15y20y vega bear steepener

Derivative Focus – Trading the vega hump in 30y tails

EUR 5y5y – 7y30y vega neutral calendar spreads

Conditional Curve Trade Pickups

Vanilla Only and Vanilla + Midcurve

Approximate pickups for conditional curve trades

Exact pickup when 10y swaption is ATMF. Otherwise the pickup is approximate.

We wanted to find a way to give a first pass view of conditional curve trades. We focused on carry (to term), pickup to forwards (vol based pickup) and total pickup, all measured in basis points for zero cost trades.

We refer to Derivative Focus: Conditional Curve Trades: Eyeballing relative value (26 Nov 2013) for more details on the vanilla trades.

Our goal was a top-down approach to conditional curve trades. We did not want a report with hundreds of measures calculated for each trade (e.g., with separate pickups for 6m expiries for 2s10s, 2s5s, 5s10s, 10s30s, 2s30s, etc). We preferred a calculation of an approximate pickup

Typically, the 10y should have value of 0 under payer and receivers moneyness. We only consider €10k notional in 10y swaption.

We have adjusted notionals for all swaptions by ratio of pv01s to that of the10y. We then report the number of bp higher or lower the strike is to give these swaptions the same PV as the 10y. Details are in the report cited above.

EUR Vanilla Conditional Curve Trade Pickups

Payers (left) and Receivers (right). Zero-cost trade pickups (bps)

All notionals are Pv01 adjusted (for $10k notional in 10y tail), with 10y tail ATMF (as of 22 Dec 2014).

Fig. 8: EUR Vanilla Swaptions

EUR Yield Curve Carry (Spot - Fwd) (bp) (for Payers)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	-0	-1	-1	-1	-2	-2	-1	-1	-1
3m	0	-1	-2	-3	-4	-4	-4	-2	-2
6m	0	-3	-5	-7	-8	-8	-7	-5	-3
1y	-4	-9	-12	-15	-18	-17	-15	-9	-6
2y	-17	-25	-29	-34	-38	-34	-30	-18	-13
3y	-36	-43	-49	-56	-59	-51	-44	-27	-19
5y	-76	-86	-93	-100	-96	-79	-68	-41	-29
7y	-124	-134	-138	-135	-124	-99	-85	-52	-36
10y	-173	-174	-171	-159	-142	-112	-95	-57	-38
12y	-182	-182	-178	-163	-145	-113	-95	-57	-37
15y	-186	-184	-179	-163	-143	-111	-93	-55	-32
20y	-181	-178	-172	-156	-137	-106	-88	-49	-24
30y	-172	-170	-164	-148	-128	-95	-75	-30	-15

EUR Yield Curve Carry (Fwd - Spot) (bp) (for Receivers)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	0	1	1	1	2	2	1	1	1
3m	-0	1	2	3	4	4	4	2	2
6m	-0	3	5	7	8	8	7	5	3
1y	4	9	12	15	18	17	15	9	6
2y	17	25	29	34	38	34	30	18	13
3y	36	43	49	56	59	51	44	27	19
5y	76	86	93	100	96	79	68	41	29
7y	124	134	138	135	124	99	85	52	36
10y	173	174	171	159	142	112	95	57	38
12y	182	182	178	163	145	113	95	57	37
15y	186	184	179	163	143	111	93	55	32
20y	181	178	172	156	137	106	88	49	24
30y	172	170	164	148	128	95	75	30	15

Payers Moneyness (Fwd - Strike) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.3	5.2	4.8	3.8	2.2	-	-0.6	-2.7	-2.6
3m	9.7	9.7	9.1	7.4	4.4	-	-1.1	-4.4	-4.7
6m	14.4	14.3	13.5	10.9	6.5	-	-1.2	-5.6	-6.2
1y	21.6	20.9	19.6	15.3	8.9	-	-0.9	-4.6	-5.4
2y	31.3	28.4	25.1	17.5	10.0	-	-0.4	-1.7	-1.1
3y	34.4	28.9	24.7	16.2	9.4	-	0.7	1.8	4.6
5y	23.0	16.5	12.9	7.4	4.1	-	2.9	10.5	18.4
7y	5.7	2.5	2.0	1.9	0.8	-	4.5	17.3	28.9
10y	-3.8	-7.4	-6.3	-2.8	-2.0	-	6.2	26.0	40.7
12y	-4.9	-8.1	-6.8	-2.9	-2.1	-	7.2	30.6	45.2
15y	-6.1	-8.3	-6.7	-2.6	-2.1	-	8.5	37.2	51.2
20y	-9.4	-11.7	-9.7	-4.5	-3.3	-	9.7	42.8	56.0
30y	-20.9	-22.6	-19.3	-11.6	-7.6	-	10.0	44.0	55.2

Receivers Moneyness (Strike - Fwd) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.0	4.8	4.4	3.4	2.0	-	-0.6	-2.7	-2.8
3m	8.3	8.5	7.9	6.2	3.6	-	-1.0	-4.2	-5.0
6m	11.9	12.3	11.4	8.7	5.1	-	-1.0	-5.2	-6.3
1y	18.0	17.3	15.7	11.6	6.7	-	-0.8	-4.0	-5.0
2y	24.0	20.6	18.1	12.8	7.4	-	-0.4	-1.4	-1.0
3y	23.5	19.0	16.2	10.9	6.7	-	0.5	1.5	3.9
5y	13.7	10.0	8.3	5.2	3.0	-	2.3	8.4	15.1
7y	3.4	1.5	1.3	1.3	0.6	-	3.3	13.4	23.1
10y	-2.4	-4.8	-4.1	-1.9	-1.4	-	4.4	19.0	30.6
12y	-3.1	-5.2	-4.4	-1.9	-1.4	-	4.8	21.9	33.5
15y	-3.8	-5.1	-4.1	-1.6	-1.3	-	5.5	26.4	37.3
20y	-5.7	-7.1	-5.9	-2.8	-2.0	-	6.0	29.9	40.6
30y	-12.1	-12.9	-11.1	-6.8	-4.4	-	5.9	28.5	36.5

Payers Total Pickup (Spot - Strike) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.1	4.5	3.9	2.5	0.7	-1.5	-2.0	-3.6	-3.2
3m	9.8	8.2	6.7	4.0	0.3	-4.1	-4.8	-6.7	-6.3
6m	14.4	11.2	8.5	4.0	-1.8	-8.3	-8.6	-10.2	-9.3
1y	17.7	12.3	7.7	0.2	-8.8	-17.0	-15.8	-13.8	-11.7
2y	14.0	3.6	-3.7	-16.9	-28.0	-34.4	-30.5	-20.1	-13.9
3y	-1.6	-14.5	-23.9	-39.6	-49.5	-50.8	-43.5	-25.2	-14.1
5y	-53.3	-69.7	-80.2	-92.3	-92.0	-79.2	-65.2	-31.0	-10.5
7y	-118.7	-131.6	-135.9	-133.0	-122.9	-99.3	-80.7	-34.3	-6.6
10y	-176.8	-181.5	-177.3	-161.8	-143.7	-112.0	-88.7	-31.0	2.6
12y	-187.2	-190.5	-184.5	-166.0	-146.8	-113.0	-88.3	-26.3	8.6
15y	-191.7	-192.3	-185.8	-165.7	-145.1	-110.7	-84.9	-17.4	18.9
20y	-190.0	-189.7	-181.7	-160.4	-140.3	-105.7	-78.7	-5.7	31.5
30y	-192.8	-192.5	-183.7	-159.9	-135.8	-94.6	-65.1	13.8	39.7

Receivers Total Pickup (Strike - Spot) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.2	5.4	5.3	4.6	3.5	1.5	0.8	-1.8	-2.2
3m	8.2	10.0	10.4	9.6	7.7	4.1	2.7	-1.9	-3.4
6m	11.9	15.3	16.4	15.6	13.4	8.3	6.3	-0.6	-3.2
1y	21.9	25.9	27.6	26.8	24.4	17.0	14.1	5.2	1.4
2y	41.3	45.3	46.9	47.2	45.4	34.4	29.7	17.0	11.8
3y	59.5	62.4	64.7	66.8	65.5	50.8	44.7	28.5	22.7
5y	90.0	96.3	101.4	104.9	99.0	79.2	70.4	49.8	44.0
7y	127.8	135.5	139.2	136.1	124.3	99.3	88.5	64.9	58.6
10y	170.6	169.2	166.9	157.1	140.3	112.0	99.3	76.0	68.8
12y	179.3	177.2	173.4	161.2	143.2	113.0	100.2	78.8	70.1
15y	181.8	178.9	175.0	161.5	141.8	110.7	99.0	81.0	69.5
20y	175.0	170.9	166.2	153.2	134.9	105.7	94.4	78.5	65.0
30y	159.8	156.9	153.3	141.6	123.8	94.6	81.0	58.7	52.0

3m 3s10s bear flattener

Curve Carry: -2 – (-4) = 2bp curve carry

Vol Pickup: 9.1 – 0 = 9.1bp better than fwds

Total Pickup: 6.7 – (-4.1) = 11.1bp carry to term

6m 2s7s30y bull tightener

Curve Carry: -3 +2(8)-3 = 10bp curve carry

Vol Pickup: -12.3+2*5.1-(-6.3) = 4.2bp better than fwds

Total Pickup: -15.3+2*13.4-(-3.2) = 14.2bp

The vol pickup (and total pickup) is approximate and corresponds to a trade which is not ATMF.

Source: Nomura Research

EUR Conditional Curve Trade by sector

Payers (left) and Receivers (right). Zero-cost trade pickups (bps)

All notionals are Pv01 adjusted (for $10k notional in 10y tail), with 10y tail ATMF (as of 22 Dec 2014).

Fig. 8: EUR Vanilla Swaptions

EUR Yield Curve Carry (Spot - Fwd) (bp) (for Payers)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	-0	-1	-1	-1	-2	-2	-1	-1	-1
3m	0	-1	-2	-3	-4	-4	-4	-2	-2
6m	0	-3	-5	-7	-8	-8	-7	-5	-3
1y	-4	-9	-12	-15	-18	-17	-15	-9	-6
2y	-17	-25	-29	-34	-38	-34	-30	-18	-13
3y	-36	-43	-49	-56	-59	-51	-44	-27	-19
5y	-76	-86	-93	-100	-96	-79	-68	-41	-29
7y	-124	-134	-138	-135	-124	-99	-85	-52	-36
10y	-173	-174	-171	-159	-142	-112	-95	-57	-38
12y	-182	-182	-178	-163	-145	-113	-95	-57	-37
15y	-186	-184	-179	-163	-143	-111	-93	-55	-32
20y	-181	-178	-172	-156	-137	-106	-88	-49	-24
30y	-172	-170	-164	-148	-128	-95	-75	-30	-15

EUR Yield Curve Carry (Fwd - Spot) (bp) (for Receivers)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	0	1	1	1	2	2	1	1	1
3m	-0	1	2	3	4	4	4	2	2
6m	-0	3	5	7	8	8	7	5	3
1y	4	9	12	15	18	17	15	9	6
2y	17	25	29	34	38	34	30	18	13
3y	36	43	49	56	59	51	44	27	19
5y	76	86	93	100	96	79	68	41	29
7y	124	134	138	135	124	99	85	52	36
10y	173	174	171	159	142	112	95	57	38
12y	182	182	178	163	145	113	95	57	37
15y	186	184	179	163	143	111	93	55	32
20y	181	178	172	156	137	106	88	49	24
30y	172	170	164	148	128	95	75	30	15

Payers Moneyness (Fwd - Strike) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.3	5.2	4.8	3.8	2.2	-	-0.6	-2.7	-2.6
3m	9.7	9.7	9.1	7.4	4.4	-	-1.1	-4.4	-4.7
6m	14.4	14.3	13.5	10.9	6.5	-	-1.2	-5.6	-6.2
1y	21.6	20.9	19.6	15.3	8.9	-	-0.9	-4.6	-5.4
2y	31.3	28.4	25.1	17.5	10.0	-	-0.4	-1.7	-1.1
3y	34.4	28.9	24.7	16.2	9.4	-	0.7	1.8	4.6
5y	23.0	16.5	12.9	7.4	4.1	-	2.9	10.5	18.4
7y	5.7	2.5	2.0	1.9	0.8	-	4.5	17.3	28.9
10y	-3.8	-7.4	-6.3	-2.8	-2.0	-	6.2	26.0	40.7
12y	-4.9	-8.1	-6.8	-2.9	-2.1	-	7.2	30.6	45.2
15y	-6.1	-8.3	-6.7	-2.6	-2.1	-	8.5	37.2	51.2
20y	-9.4	-11.7	-9.7	-4.5	-3.3	-	9.7	42.8	56.0
30y	-20.9	-22.6	-19.3	-11.6	-7.6	-	10.0	44.0	55.2

Receivers Moneyness (Strike - Fwd) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.0	4.8	4.4	3.4	2.0	-	-0.6	-2.7	-2.8
3m	8.3	8.5	7.9	6.2	3.6	-	-1.0	-4.2	-5.0
6m	11.9	12.3	11.4	8.7	5.1	-	-1.0	-5.2	-6.3
1y	18.0	17.3	15.7	11.6	6.7	-	-0.8	-4.0	-5.0
2y	24.0	20.6	18.1	12.8	7.4	-	-0.4	-1.4	-1.0
3y	23.5	19.0	16.2	10.9	6.7	-	0.5	1.5	3.9
5y	13.7	10.0	8.3	5.2	3.0	-	2.3	8.4	15.1
7y	3.4	1.5	1.3	1.3	0.6	-	3.3	13.4	23.1
10y	-2.4	-4.8	-4.1	-1.9	-1.4	-	4.4	19.0	30.6
12y	-3.1	-5.2	-4.4	-1.9	-1.4	-	4.8	21.9	33.5
15y	-3.8	-5.1	-4.1	-1.6	-1.3	-	5.5	26.4	37.3
20y	-5.7	-7.1	-5.9	-2.8	-2.0	-	6.0	29.9	40.6
30y	-12.1	-12.9	-11.1	-6.8	-4.4	-	5.9	28.5	36.5

Payers Total Pickup (Spot - Strike) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.1	4.5	3.9	2.5	0.7	-1.5	-2.0	-3.6	-3.2
3m	9.8	8.2	6.7	4.0	0.3	-4.1	-4.8	-6.7	-6.3
6m	14.4	11.2	8.5	4.0	-1.8	-8.3	-8.6	-10.2	-9.3
1y	17.7	12.3	7.7	0.2	-8.8	-17.0	-15.8	-13.8	-11.7
2y	14.0	3.6	-3.7	-16.9	-28.0	-34.4	-30.5	-20.1	-13.9
3y	-1.6	-14.5	-23.9	-39.6	-49.5	-50.8	-43.5	-25.2	-14.1
5y	-53.3	-69.7	-80.2	-92.3	-92.0	-79.2	-65.2	-31.0	-10.5
7y	-118.7	-131.6	-135.9	-133.0	-122.9	-99.3	-80.7	-34.3	-6.6
10y	-176.8	-181.5	-177.3	-161.8	-143.7	-112.0	-88.7	-31.0	2.6
12y	-187.2	-190.5	-184.5	-166.0	-146.8	-113.0	-88.3	-26.3	8.6
15y	-191.7	-192.3	-185.8	-165.7	-145.1	-110.7	-84.9	-17.4	18.9
20y	-190.0	-189.7	-181.7	-160.4	-140.3	-105.7	-78.7	-5.7	31.5
30y	-192.8	-192.5	-183.7	-159.9	-135.8	-94.6	-65.1	13.8	39.7

Receivers Total Pickup (Strike - Spot) (bp)

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	5.2	5.4	5.3	4.6	3.5	1.5	0.8	-1.8	-2.2
3m	8.2	10.0	10.4	9.6	7.7	4.1	2.7	-1.9	-3.4
6m	11.9	15.3	16.4	15.6	13.4	8.3	6.3	-0.6	-3.2
1y	21.9	25.9	27.6	26.8	24.4	17.0	14.1	5.2	1.4
2y	41.3	45.3	46.9	47.2	45.4	34.4	29.7	17.0	11.8
3y	59.5	62.4	64.7	66.8	65.5	50.8	44.7	28.5	22.7
5y	90.0	96.3	101.4	104.9	99.0	79.2	70.4	49.8	44.0
7y	127.8	135.5	139.2	136.1	124.3	99.3	88.5	64.9	58.6
10y	170.6	169.2	166.9	157.1	140.3	112.0	99.3	76.0	68.8
12y	179.3	177.2	173.4	161.2	143.2	113.0	100.2	78.8	70.1
15y	181.8	178.9	175.0	161.5	141.8	110.7	99.0	81.0	69.5
20y	175.0	170.9	166.2	153.2	134.9	105.7	94.4	78.5	65.0
30y	159.8	156.9	153.3	141.6	123.8	94.6	81.0	58.7	52.0

Bear flatteners and bull steepeners up to 5y (2s10s,5s10s,1s10s etc all have positive pickup to forwards.

Note that curve carry hurts enough that only 2s10s, 1s10s bear flatteners have positive total pickup (i.e., carry to term) up to 6m, while bull flatteners all have positive carry.

Bear steepeners and bull flatteners over 10y and longer bear steepeners and bull flatteners have vol pickup.

Short dated long end (i.e.,10s30s) **bear steepeners** and **bull flatteners** have ok vol pickup.

Long dated long-end bear flatteners and bull steepeners have ok vol pickup

Source: Nomura Research

EUR Vanilla Conditional Curve Trade Value – Spot Measure

With no agreement on P-measure, we consider *candidate* P-measure, which we call the Spot measure. Spot(T)~N(Spot(0),σ_{spot}*T^{½}). This sometimes gives contradictory information and is a work in progress.

Price given 10K notional at 10y tail

Expected PV in Physicial measure — Payer

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
0	55.0	55.0	54.9	54.6	54.0	53.5	53.5	53.6	54.1
0	103.5	102.1	101.6	100.6	98.7	97.3	97.3	97.9	99.3
1m	149.4	146.3	145.4	143.7	140.2	137.9	138.2	139.4	141.6
3m	215.2	213.3	211.6	207.0	200.8	198.4	199.8	202.6	204.9
6m	317.5	310.9	303.9	292.4	285.8	288.0	291.9	299.9	303.8
1y	391.0	375.6	365.2	351.8	352.6	365.5	371.5	382.5	387.9
5y	445.5	429.1	429.3	443.8	456.0	474.9	486.1	508.0	518.6
7y	459.7	458.4	471.0	502.6	523.0	551.3	566.3	598.6	614.6
10y	521.4	524.1	536.1	564.7	589.2	625.4	644.8	690.6	712.7
12y	532.8	535.7	548.5	579.4	604.2	642.5	664.5	717.3	741.0
15y	533.3	536.7	550.9	584.7	609.7	650.0	675.3	736.7	761.8
20y	501.9	504.6	519.1	554.5	582.1	625.1	651.2	714.6	737.3
30y	408.2	409.0	422.4	455.0	482.3	523.9	546.9	604.5	620.0

Price given 10K notional at 10y tail

Receiver

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
1m	4.4	5.9	9.2	18.7	33.0	53.5	59.4	79.6	79.1
3m	11.2	10.0	14.8	30.5	57.2	97.3	107.9	140.1	144.3
6m	12.9	11.0	17.4	40.2	78.6	137.9	149.9	193.0	200.1
1y	11.1	15.7	26.4	62.1	116.7	198.4	208.7	246.0	255.7
2y	24.1	45.3	68.6	128.3	191.9	288.0	296.1	315.5	314.0
3y	71.3	107.1	136.2	200.9	265.6	365.5	365.3	365.8	344.7
5y	236.1	279.0	311.7	376.7	419.1	474.9	459.3	412.6	351.4
7y	409.1	436.6	453.3	486.1	515.4	551.3	526.6	445.0	357.7
10y	553.3	587.1	589.5	588.4	606.1	625.4	591.9	469.8	367.7
12y	572.9	602.1	603.8	603.2	621.8	642.5	605.9	467.0	370.4
15y	580.9	600.9	602.5	604.7	625.7	650.0	609.2	447.8	364.6
20y	568.4	587.7	587.5	586.4	605.8	625.1	582.7	411.9	341.2
30y	531.5	542.6	536.5	523.4	527.1	523.9	487.8	344.5	293.3

3m 3s10s bear flattener

P-measure PV: 101-97.3=4cts

Comparison: 2s10s bear flattener

P-measure PV: 102-97.3 = 5cts (comparable)

6m 2s7s30y bull tightener

P-measure PV: 2*78.6 -11.0-200.1 =-53.9.3cts

Comparison: 6m2s10s bull flattener

P—measure: PV: 137.9-11.0=126.9cts (i.e., much better)

Expected Return (i.e., Carry) in Physicial measure — Payer

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
0	1.8%	1.9%	2.0%	1.5%	0.4%	-0.5%	-0.6%	-0.2%	0.8%
0	3.8%	2.9%	2.8%	2.1%	0.1%	-1.3%	-1.3%	-0.6%	0.9%
1m	4.4%	3.0%	2.9%	1.8%	-0.7%	-2.3%	-2.0%	-1.1%	0.5%
3m	3.2%	2.8%	2.2%	0.1%	-2.9%	-4.0%	-3.3%	-1.8%	-0.6%
6m	3.0%	1.1%	-1.2%	-4.9%	-7.0%	-6.3%	-4.9%	-2.2%	-0.7%
1y	-0.4%	-4.4%	-7.0%	-10.4%	-10.2%	-6.9%	-5.2%	-2.3%	-0.7%
5y	-14.5%	-17.7%	-17.7%	-14.8%	-12.4%	-8.8%	-6.5%	-2.2%	0.1%
7y	-25.1%	-25.3%	-23.3%	-18.1%	-14.7%	-10.2%	-7.5%	-2.1%	0.6%
10y	-26.0%	-25.6%	-23.9%	-19.8%	-16.2%	-11.3%	-8.2%	-1.6%	1.7%
12y	-26.9%	-26.5%	-24.7%	-20.5%	-17.0%	-11.9%	-8.5%	-1.2%	2.3%
15y	-28.3%	-27.8%	-25.9%	-21.3%	-17.8%	-12.6%	-8.8%	-0.4%	3.4%
20y	-29.6%	-29.1%	-27.1%	-22.1%	-18.1%	-12.3%	-8.1%	0.8%	4.4%
30y	-30.6%	-30.4%	-28.1%	-22.5%	-17.7%	-11.0%	-6.7%	2.5%	5.0%

Receiver

Option Expiry \ Swap Tenor	1y	2y	3y	5y	7y	10y	12y	20Y	30Y
0.24	-91.8%	-89.1%	-82.9%	-65.1%	-38.6%	-0.5%	10.4%	48.1%	47.2%
0.29	-88.8%	-89.9%	-85.0%	-69.0%	-42.0%	-1.3%	9.5%	42.2%	46.5%
0.34	-91.0%	-92.3%	-87.7%	-71.6%	-44.4%	-2.3%	6.2%	36.9%	42.1%
0.45	-94.7%	-92.4%	-87.2%	-70.0%	-43.6%	-4.0%	1.0%	19.2%	24.1%
0.64	-92.2%	-85.3%	-77.7%	-58.3%	-37.6%	-6.3%	-3.6%	2.9%	2.6%
0.81	-81.8%	-72.7%	-65.3%	-48.8%	-32.3%	-6.9%	-6.8%	-6.5%	-11.7%
5y	-54.7%	-46.5%	-40.2%	-27.7%	-19.5%	-8.8%	-11.7%	-20.5%	-32.2%
7y	-33.4%	-28.9%	-26.2%	-20.8%	-16.0%	-10.2%	-14.0%	-27.3%	-41.4%
10y	-21.5%	-16.7%	-16.3%	-16.4%	-13.8%	-11.3%	-15.7%	-33.1%	-47.5%
12y	-21.5%	-17.4%	-17.1%	-17.2%	-14.6%	-11.9%	-16.6%	-35.7%	-48.8%
15y	-21.9%	-19.2%	-18.9%	-18.6%	-15.7%	-12.6%	-17.7%	-39.5%	-50.5%
20y	-20.2%	-17.5%	-17.5%	-17.6%	-14.7%	-12.3%	-17.8%	-41.9%	-51.7%
30y	-9.6%	-7.7%	-8.7%	-10.8%	-10.1%	-11.0%	-16.7%	-41.6%	-50.3%

	10y
1m	54
3m	99
6m	141
1y	207
2y	307
3y	392
5y	521
7y	614
10y	705
12y	729
15y	744
20y	713
30y	589

PV today for each row is the same as that of 10y. We can use this to calculate expected returns.

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We calculate the expected PV (in cts) under the measure where Spot(T)~N(Spot(0),σ_{spot}*T^{½}). We wanted to look at how to compare bp pickup across expiries and tenors. Our choice of measure is consistent with carry (which is just the expectation under the measure) but adjusts breakevens by an underlying volatility. **We use this same measure in optimizing short-dated MCCS/Turbo-carry trades.**

In general, we will look for trades which either have a positive Expected PV, or which have a better PV than canonical 2s10s, 2s30s, etc trades. But we do not consistently use this framework as a high pickup looks quite attractive, irrespective.

Source: Nomura Research

USD Vanilla and Midcurve Conditional Curve Trades

Focusing on 6m expiry, add midcurves to the mix. We keep 6m10y ATMF throughout.
All notionals Pv01 adjusted, options ITM or OTM to ensure same PV as 6m10y.

Fig. 9: USD vanilla and mid-curves, 6-month expiry

Currency: USD Expiry: 6m

Payers

Fwd Pickup (Spot-Fwd, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	-38	-41	-35	-25	-20	-15	-9	-6
1y	-45	-34	-26	-19				-5
18m	-35	-25	-20	-14		-9		-4
2y	-23	-27	-14	-10		-7		-3
30m	-15							
3y	-10	-9		-6				-2
4y	-8							
5y		-5		-4		-3	-1	1
7y							-1	
10y				-1		0	0	
15y								
20y						1		

Vol Pickup (Fwd-Strike, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	15	3	-2	-3	-2	0	2	3
1y	-10	-10	-11	-7				0
18m	-30	-13						
2y	-19	-17	-11	-8		-4		0
30m	-28							
3y	-14	-11		-6				0
4y	-9							
5y		-8		-6		-3	0	0
7y							0	
10y				0		-3	0	
15y								
20y						-3		

Total Pickup (Spot-Strike, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	-23	-39	-38	-28	-21	-15	-6	-3
1y	-55	-44	-37	-26				-5
18m	-65	-38						
2y	-42	-43	-25	-18		-11		-3
30m	-43							
3y	-24	-20		-12				-2
4y	-17							
5y		-13		-10		-6	-1	-1
7y							-1	
10y				-1		-3	0	
15y								
20y						-2		

Receivers

Fwd Pickup (Fwd-Spot, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	38	41	35	25	20	15	9	6
1y	45	34	26	19				5
18m	35	25	20	14		9		4
2y	23	17	14	10		7		3
30m	15							
3y	10	9		6				2
4y	8							
5y		5		4		3	1	1
7y							1	
10y				1		0	0	
15y								
20y						-1		

Vol Pickup (Strike-Fwd, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	11	2	-2	-3	-2	0	2	3
1y	-10	-10	-11	-7				0
18m	-23	-13						
2y	-15	-14	-11	-8		-4		0
30m	-22							
3y	-14	-11		-6				0
4y	-9							
5y		-8		-6		-3	0	0
7y							0	
10y				0		-3	0	
15y								
20y						-3		

Total Pickup (Strike-Spot, bp)

Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	49	44	33	22	18	15	11	9
1y	35	24	16	12				5
18m	12	13						
2y	8	2	3	2		3		3
30m	-7							
3y	-3	-2		1				2
4y	-1							
5y		-3		-2		-1	1	1
7y							1	
10y				1		-3	0	
15y								
20y						-3		

Source: Nomura Research. For more method details, please see link.

This is just the first pass in our analysis of a conditional curve trade.

We can extend our table to accommodate midcurves for a fixed expiry (here chosen as 6m) where we fix 6m10y spot to be ATMF.

We can see that **6m2y1y-6m10y5y** bear steepener has a

Curve carry of -1 – (-23) = 22bp

Vol pickup of 0 – (-19) = 19bp to forwards

Total pickup of -1 – (-42) = 41bp

which seems better than 6m2s10s total pickup of -15-(-39)=24bp.

Further work is needed to make sure it is a similar expression and is actually more likely to pay off than the standard trade. We will also usually restrike it so one leg is ATMF

Source: Nomura Research

ATM Vol snapshots

6m and 1y expiry midcurves and spot vols

Probably the highest pickups are here, relative to 10y. At the same time, shorting these seemingly rich vols may result in the riskiest trades.

ATM Vols

Fig. 10: USD ATM Normal Vol for 6m and 1y expiries

USD ATM Vol (bp) - 6-Month expiry								
Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	55	73	81	82	80	77	73	72
1y	95	95	96	90				74
18m	118	99						
2y	105	103	96	91		84		75
30m	117							
3y	101	97		88				75
4y	93							
5y		91		87		83	74	74
7y							76	
10y				76		83	78	
15y								
20y						82		

USD ATM Vol (bp) - 1-year expiry								
Fwd/Tenor	1y	2y	3y	5y	7y	10y	20y	30y
Spot	72	84	87	86	84	80	76	73
1y	101	96	97	92				74
18m	124	99						
2y	99	102	98	94		87		76
30m	118							
3y	100	101		91				76
4y	98							
5y		91		88		86	75	74
7y							77	
10y				78		81	78	
15y								
20y						80		

Source: Nomura Research

Note: There has been some interest in **representing the skew.** Our major problem is how to condense information to make it easily displayed. We plan to look at +/-25bp risk reversals and -25/0/25bp butterflies for both the 6m and 1y expiries, which probably suffices for giving an overview of skew for these short-dated spot and midcurve swaptions. Later we will look at showing the z-scores or percentiles of these measures with their multiple year histories.

We may also consider **implied** / **realized** ratios or differences to help give a sense of rich/cheap of a given volatility.

Exchange traded vanilla and midcurves

Both Vanilla (up to last white contract) and midcurves ATM calls and puts

Our front months rolldown here has not interpolated properly.

Fig. 13: USD listed vanilla and mid-curve options

Mid-Curve			Underlying	Futures	ATM	3-month aged contract			Call (Bull, ticks)			Put (Bear, ticks)		
Fwd Year	Contract	Expiry	Futures	Price	Strike	Expiry	Un. Futures	Fut. Px	PV	Aged Px	Rolldown	PV	Aged Px	Rolldown
0y	EDZ4	Fri, 12/12/14	EDZ4	99.759	99.750	12-Sep-14	EDU4	99.760	1.3	1.0	-0.3	0.4	0.0	-0.4
0y	EDF5	Fri, 01/16/15	EDH5	99.718	99.750	10-Oct-14	EDZ4	99.759	0.6	0.9	0.3	3.9	0.0	-3.9
0y	EDG5	Fri, 02/13/15	EDH5	99.718	99.750	14-Nov-14	EDZ4	99.759	1.0	0.9	-0.2	4.3	0.0	-4.3
0y	EDH5	Fri, 03/13/15	EDH5	99.718	99.750	12-Dec-14	EDZ4	99.759	3.5	1.3	-2.2	6.8	0.4	-6.4
0y	EDM5	Fri, 06/12/15	EDM5	99.563	99.625	13-Mar-15	EDH5	99.718	5.7	11.9	6.1	12.0	2.6	-9.4
0y	EDU5	Fri, 09/11/15	EDU5	99.358	99.375	12-Jun-15	EDM5	99.563	14.0	22.9	8.9	15.7	4.1	-11.6
1y	0EZ4	Fri, 12/12/14	EDZ5	99.108	99.125	12-Sep-14	EDU5	99.358	2.0	23.3	21.3	3.7	0.0	-3.7
1y	0EF5	Fri, 01/16/15	EDH6	98.863	98.875	10-Oct-14	EDZ5	99.108	9.7	23.3	13.5	11.0	0.0	-11.0
1y	0EG5	Fri, 02/13/15	EDH6	98.863	98.875	14-Nov-14	EDZ5	99.108	12.8	23.3	10.4	14.1	0.0	-14.1
1y	0EH5	Fri, 03/13/15	EDH6	98.863	98.875	12-Dec-14	EDZ5	99.108	14.8	23.3	8.4	16.1	0.0	-16.1
1y	0EM5	Fri, 06/12/15	EDM6	98.608	98.625	13-Mar-15	EDH6	98.863	23.4	32.0	8.6	25.1	8.2	-16.9
1y	0EU5	Fri, 09/11/15	EDU6	98.363	98.375	12-Jun-15	EDM6	98.608	31.1	40.1	9.0	32.3	16.8	-15.5
2y	2EZ4	Fri, 12/12/14	EDZ6	98.143	98.125	12-Sep-14	EDU6	98.363	4.8	23.7	19.0	3.0	0.0	-3.0
2y	2EF5	Fri, 01/16/15	EDH7	97.973	98.000	10-Oct-14	EDZ6	98.143	11.8	14.2	2.4	14.6	0.0	-14.6
2y	2EG5	Fri, 02/13/15	EDH7	97.973	98.000	14-Nov-14	EDZ6	98.143	15.8	14.2	-1.5	18.5	0.0	-18.5
2y	2EH5	Fri, 03/13/15	EDH7	97.973	98.000	12-Dec-14	EDZ6	98.143	18.5	14.6	-3.9	21.3	0.3	-20.9
2y	2EM5	Fri, 06/12/15	EDM7	97.813	97.875	13-Mar-15	EDH7	97.973	25.0	25.9	0.9	31.3	16.1	-15.1
2y	2EU5	Fri, 09/11/15	EDU7	97.688	97.750	12-Jun-15	EDM7	97.813	31.4	32.1	0.7	37.7	25.9	-11.8
3y	3EZ4	Fri, 12/12/14	EDZ7	97.578	97.625	12-Sep-14	EDU7	97.688	1.8	6.3	4.5	6.5	0.0	-6.5
3y	3EF5	Fri, 01/16/15	EDH8	97.498	97.500	10-Oct-14	EDZ7	97.578	12.8	7.8	-5.1	13.1	0.0	-13.1
3y	3EG5	Fri, 02/13/15	EDH8	97.498	97.500	14-Nov-14	EDZ7	97.578	16.2	7.8	-8.4	16.4	0.0	-16.4
3y	3EH5	Fri, 03/13/15	EDH8	97.498	97.500	12-Dec-14	EDZ7	97.578	19.6	8.8	-10.8	19.9	1.1	-18.8
3y	3EM5	Fri, 06/12/15	EDM8	97.428	97.375	13-Mar-15	EDH8	97.498	31.1	27.0	-4.0	25.8	14.8	-11.0
3y	3EU5	Fri, 09/11/15	EDU8	97.358	97.375	12-Jun-15	EDM8	97.428	33.3	31.1	-2.3	35.1	25.8	-9.3
4y	4EZ4	Fri, 12/12/14	EDZ8	97.293	97.250	12-Sep-14	EDU8	97.358	6.1	10.8	4.6	1.9	0.0	-1.9
4y	4EF5	Fri, 01/16/15	EDH9	97.243	97.250	10-Oct-14	EDZ8	97.293	11.8	4.3	-7.5	12.5	0.0	-12.5
4y	4EG5	Fri, 02/13/15	EDH9	97.243	97.250	14-Nov-14	EDZ8	97.293	15.6	4.3	-11.4	16.4	0.0	-16.4
4y	4EH5	Fri, 03/13/15	EDH9	97.243	97.250	12-Dec-14	EDZ8	97.293	18.4	6.1	-12.2	19.1	1.9	-17.2
4y	4EM5	Fri, 06/12/15	EDM9	97.198	97.250	13-Mar-15	EDH9	97.243	23.9	18.4	-5.5	29.1	19.1	-10.0
4y	4EU5	Fri, 09/11/15	EDU9	97.148	97.125	12-Jun-15	EDM9	97.198	33.6	30.8	-2.7	31.3	23.6	-7.7

Source: Nomura Research, tick size of vanilla contract is aligned to midcurve contract. Tick size = $25 throughout (convention of $12.5 in front contract is ignored)

Carry and Roll: We look at carry and roll of ATM calls and puts.

The rolldown can only be computed for 3m intervals or until expiry since we match contracts.

So the 1y Mar 15 Midcurve

- 0EM5 97.875, Jun 15 x Jun 16,

will roll both option and future, i.e., into

- 0EH5 97.875, Mar 15 x Mar 16.

All front months and the first quarterly contract should roll into intrinsic value. If expiry is <3m, we must interpolate underlying futures contract using our internal curves. So calls

- 0EF5C 98.875 Jan 15 x Mar 16

rolls to

Intrinsic value (Interpolated), i.e.,

- (EDH6(in Jan 15) – strike)$^+$

Sep Reds-Greens Bear flatteners

Long 2EUP 97.750/ Short 0EU5P 98.375 has

3m carry of -11.8 – (-15.8) = 4 ticks for initial mid price of 37.7-32.3=5.4 ticks

Papers where Conditional Trade Reports were used

Papers where the carry breakdown was used as inspiration for the initial trade idea

Derivative Focus - EUR Bull tighteners (6 pages)

Strong pickup in a weak environment

Derivative Focus - A better USD bearish flattening trade (5 pages)

USD 2s7s30s bear tighteners as positive carry alternatives

Derivative Focus - Conditional Euribor bull flatteners (6 pages)

Already full up on steepeners? Try some front-end bull flatteners for a change

Derivative Focus - Correction: More attractive bear flatteners in USD (6 pages)

Using midcurves to add value to conditional curve trades

Derivative Focus - Looking for the best bear steepeners in USD (10 pages)

Using midcurves to outperform

Long dated Triangles and Midcurve Calendar Spread (MCCS, aka turbo-carry, Flip-flop or “tent”) Trades

Carry, Breakevens, and Historic Percentiles

Triangles and MCCS trades

NOMURA

Concentrating only on longer dated trades

- **Goals:**
  - Present regular report on a few comparable 2y and 5y trades in Triangles and Mid-Curve Calendar Spread Trades
  - We will only look at those triangles which also have liquid MCCS trades.
  - We will present standard analyses (Carry, Carry Breakdowns where available, Breakevens where available) together with historical percentile ranking

- **Rationale:**
  - Present historical analysis as succinctly as possible.
  - As a table—most of our MCCS/Turbo-carry analysis is optimized scans, mostly focused on 1m and 3m expiries.
  - This allows investors to consider trades with more or less **stable sources of carry**.
  - Investors ultimately want to construct pv01 neutral and vega neutral trades:
    - We expanded the reports with vega weights and pv01 weights, so it is easy to ‘eyeball’ vega neutral and pv01 neutral trades.

- **Note:** This decomposition only works for **Vanilla Swaptions**. We will extend to midcurves without much hassle (with correlation terms). Other options (e.g., CMS, contingent CMS) are considerably harder and require a fair amount more computation.

USD Liquid Vol Triangles

Carry, Historic carry, etc for Vanilla versions of forward vol

Fig. 15: USD Liquid Vol Triangles (correspond to traded mid-curves)

		Package PV (cts)		1y Carry/PV		1Y Vol Carry/PV		Term Carry/PV		Fwd Vol		Spot-Fwd Vol Spread	
Triangle	Swaptions	Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile
2y10y10y	+2y10y-2y20y+12y10y	797.5	51%	19%	4%	5%	50%	62%	8%	70.64	1%	4.83	45%
2y10y20y	+2y10y-2y30y+12y20y	1,131.3	54%	23%	12%	6%	68%	74%	8%	59.66	2%	5.78	38%
2y10y5y	+2y10y-2y15y+12y5y	486.3	63%	17%	0%	5%	50%	53%	3%	75.78	2%	4.68	39%
2y1y1y	+2y1y-2y2y+3y1y	31.7	65%	26%	95%	2%	66%	-70%	87%	90.18	85%	-26.16	64%
2y1y2y	+2y1y-2y3y+3y2y	59.3	54%	38%	99%	5%	90%	-45%	93%	89.99	72%	-14.57	73%
2y1y30y	+2y1y-2y31y+3y30y	417.0	83%	37%	35%	9%	83%	113%	38%	68.05	0%	5.44	30%
2y1y5y	+2y1y-2y6y+3y5y	135.8	81%	10%	20%	1%	66%	4%	92%	86.10	62%	-4.38	41%
2y2y1y	+2y2y-2y3y+4y1y	53.9	62%	21%	75%	4%	68%	11%	100%	95.28	71%	-5.64	65%
2y2y2y	+2y2y-2y4y+4y2y	100.5	62%	29%	75%	6%	79%	32%	100%	89.34	52%	0.49	67%
2y2y30y	+2y2y-2y32y+4y30y	700.1	77%	33%	20%	8%	76%	110%	33%	68.09	1%	6.08	25%
2y2y3y	+2y2y-2y5y+4y3y	152.9	84%	22%	48%	3%	72%	34%	100%	92.46	55%	-2.65	49%
2y2y5y	+2y2y-2y7y+4y5y	233.5	81%	25%	51%	5%	76%	47%	87%	86.90	47%	1.63	42%
2y3y1y	+2y3y-2y4y+5y1y	69.6	67%	27%	63%	9%	78%	47%	100%	92.64	51%	6.34	65%
2y3y2y	+2y3y-2y5y+5y2y	139.7	83%	20%	39%	3%	74%	44%	92%	90.33	46%	5.23	59%
2y3y30y	+2y3y-2y33y+5y30y	917.7	73%	30%	9%	7%	70%	100%	25%	68.08	2%	5.42	22%
2y3y5y	+2y3y-2y8y+5y5y	310.7	80%	23%	25%	6%	75%	54%	62%	88.07	40%	3.13	36%
2y4y1y	+2y4y-2y5y+6y1y	89.4	87%	13%	8%	0%	43%	39%	56%	95.50	56%	3.66	38%
2y5y10y	+2y5y-2y15y+7y10y	702.5	66%	22%	2%	7%	63%	61%	16%	82.85	20%	3.02	16%
2y5y20y	+2y5y-2y25y+7y20y	970.6	62%	26%	3%	7%	54%	82%	15%	69.46	1%	6.14	28%
2y5y2y	+2y5y-2y7y+7y2y	173.8	61%	25%	30%	9%	69%	58%	50%	89.28	26%	5.46	33%
2y5y30y	+2y5y-2y35y+7y30y	1,168.1	57%	29%	12%	8%	67%	93%	18%	65.38	2%	6.40	20%
2y5y5y	+2y5y-2y10y+7y5y	404.5	84%	24%	4%	9%	76%	56%	20%	86.84	35%	4.50	15%
2y7y20y	+2y7y-2y27y+9y20y	1,082.0	60%	25%	6%	7%	54%	78%	10%	65.43	2%	6.43	20%
2y8y20y	+2y8y-2y28y+10y20y	1,109.9	56%	24%	6%	7%	54%	77%	10%	63.24	2%	6.50	21%
5y10y10y	+5y10y-5y20y+15y10y	574.2	52%	10%	30%	2%	52%	130%	1%	65.34	5%	9.39	45%
5y10y20y	+5y10y-5y30y+15y20y	716.9	49%	15%	61%	4%	74%	181%	14%	51.80	5%	13.38	47%
5y10y5y	+5y10y-5y15y+15y5y	346.5	49%	11%	44%	4%	71%	115%	0%	70.27	11%	10.20	49%
5y1y1y	+5y1y-5y2y+6y1y	21.6	79%	19%	9%	7%	11%	-77%	89%	94.34	100%	-23.32	43%
5y1y2y	+5y1y-5y3y+6y2y	37.2	50%	29%	22%	15%	22%	-54%	98%	81.08	90%	0.53	76%
5y1y30y	+5y1y-5y31y+6y30y	249.9	55%	20%	43%	10%	69%	213%	59%	58.45	7%	11.99	19%
5y1y5y	+5y1y-5y6y+6y5y	86.5	74%	-4%	7%	-2%	6%	-2%	97%	75.97	54%	8.50	57%
5y2y1y	+5y2y-5y3y+7y1y	34.0	66%	12%	8%	5%	11%	27%	97%	88.50	95%	6.77	62%
5y2y2y	+5y2y-5y4y+7y2y	59.9	33%	20%	31%	10%	48%	67%	100%	78.43	57%	16.69	78%
5y2y30y	+5y2y-5y32y+7y30y	401.4	51%	21%	41%	8%	69%	249%	47%	57.59	10%	15.05	22%
5y2y3y	+5y2y-5y5y+7y3y	89.3	43%	20%	45%	11%	68%	77%	100%	80.69	49%	12.90	69%
5y2y5y	+5y2y-5y7y+7y5y	144.6	72%	17%	44%	9%	67%	85%	91%	76.38	43%	12.81	47%
5y3y1y	+5y3y-5y4y+8y1y	43.2	62%	20%	45%	10%	67%	97%	97%	84.31	74%	15.87	52%
5y3y2y	+5y3y-5y5y+8y2y	82.4	51%	17%	48%	10%	73%	105%	95%	79.54	45%	17.46	60%
5y3y30y	+5y3y-5y33y+8y30y	516.7	50%	20%	42%	8%	72%	249%	39%	56.58	5%	16.01	23%
5y3y5y	+5y3y-5y8y+8y5y	189.9	76%	18%	47%	10%	75%	115%	71%	76.76	34%	14.01	38%
5y4y1y	+5y4y-5y5y+9y1y	53.9	72%	15%	54%	10%	81%	103%	80%	84.71	69%	13.93	38%
5y5y10y	+5y5y-5y15y+10y10y	479.5	76%	12%	26%	5%	57%	126%	14%	75.57	10%	8.40	19%
5y5y20y	+5y5y-5y25y+10y20y	604.3	62%	15%	22%	5%	49%	190%	12%	60.46	10%	13.14	16%
5y5y2y	+5y5y-5y7y+10y2y	112.2	75%	15%	22%	6%	48%	117%	40%	78.58	38%	15.66	29%
5y5y30y	+5y5y-5y35y+10y30y	664.4	52%	20%	39%	7%	62%	242%	29%	54.12	6%	16.66	27%
5y5y5y	+5y5y-5y10y+10y5y	255.8	82%	16%	33%	7%	64%	129%	26%	76.14	38%	13.90	22%
5y7y20y	+5y7y-5y27y+12y20y	683.8	54%	15%	42%	4%	69%	185%	5%	57.56	6%	13.32	16%
5y8y20y	+5y8y-5y28y+13y20y	705.3	52%	15%	48%	4%	72%	183%	5%	55.89	6%	13.15	21%

Source: Nomura Research, stats are based on the recent 4-year history till 5-Dec-2014

We show **1 year carry %, 1y vol carry %** (definition consistent with carry breakdown shown earlier)**, Term carry %** (not annualized)**, Forward vol and Spot-Forward Vol** (as a spread)

Focusing on 2y1y2y, we see that the 1y carry at 38% is at the 99th percentile for the past four years of weekly history). 1y Vol carry of 5% is also high by historical standards. The extremely negative term carry of -45% is close to its historical highs, as is the Spot-Forward spread of -14.57bp. This trade may be feasible and seems to have decent entry points, but it definitely needs to be revisited after 1y.

5y3y20y has decent 1y carry of 21% which is middling relative to history. It's 1y vol carry at 8% is relatively high, and its term carry of 249% is one of the highest among the 5y trades and not bad according to its own history at 47th percentile.

Source: Nomura Research

USD Liquid 2y and 5y Midcurve Calendar Spreads

Historic carry, and breakeven ranges for Midcurve vs Spot vol versions of forward vol

Fig. 17: USD Mid-curve calendar spread trades

MidCurve Calendar Sprd	Trade	1y Carry/PV %		Term Carry/PV %		Fwd Vol		Spot-Fwd Vol Spread		Upper B/E Buffer (high B/E - Spot) bp		Lower B/E Buffer (Spot- low B/E) bp	
		Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile	Current	Percentile
2y1y1y	-2y1y1y + 3y1y struck @ 1y1y fwd	32%	17.3%	271%	44.1%	91.9	88.7%	-20.9	79.3%	0.87	76.0%	0.50	83.5%
2y2y1y	-2y2y1y + 4y1y struck @ 2y1y fwd	43%	33.8%	171%	23.9%	95.6	72.7%	-0.4	76.9%	1.09	44.6%	0.82	69.9%
2y3y1y	-2y3y1y + 5y1y struck @ 3y1y fwd	43%	62.4%	157%	23.4%	92.6	51.6%	7.6	74.1%	1.28	24.4%	1.02	58.6%
2y4y1y	-2y4y1y + 6y1y struck @ 4y1y fwd	19%	0.9%	104%	2.8%	96.2	58.6%	2.5	29.5%	1.11	1.8%	0.92	30.5%
2y1y2y	-2y1y2y + 3y2y struck @ 1y2y fwd	53%	49.7%	283%	43.6%	89.4	70.4%	-7.8	84.9%	0.88	49.2%	0.63	79.8%
2y2y2y	-2y2y2y + 4y2y struck @ 2y2y fwd	41%	15.4%	193%	28.1%	90.5	53.9%	4.6	80.2%	1.13	35.2%	0.88	63.3%
2y3y2y	-2y3y2y + 5y2y struck @ 3y2y fwd	29%	10.7%	141%	5.1%	92.3	52.1%	4.7	54.4%	1.15	7.5%	0.94	46.0%
2y5y2y	-2y5y2y + 7y2y struck @ 5y2y fwd	36%	80.2%	116%	26.7%	87.6	22.0%	6.6	44.1%	1.28	9.8%	1.05	39.4%
2y2y3y	-2y2y3y + 4y3y struck @ 2y3y fwd	25%	1.8%	154%	6.1%	94.2	61.0%	-0.6	58.2%	0.96	15.0%	0.78	49.2%
2y1y5y	-2y1y5y + 3y5y struck @ 1y5y fwd	40%	30.9%	261%	17.8%	86.2	63.3%	-1.7	53.9%	0.80	20.1%	0.66	47.4%
2y2y5y	-2y2y5y + 4y5y struck @ 2y5y fwd	37%	26.7%	178%	7.0%	86.7	46.9%	2.5	47.8%	0.97	6.1%	0.82	42.7%
2y3y5y	-2y3y5y + 5y5y struck @ 3y5y fwd	34%	62.9%	139%	10.7%	87.6	40.3%	3.2	35.6%	1.03	4.2%	0.90	34.2%
2y5y5y	-2y5y5y + 7y5y struck @ 5y5y fwd	24%	1.8%	99%	8.9%	86.9	36.6%	3.2	9.3%	1.09	4.6%	0.92	4.6%
2y10y5y	-2y10y5y + 12y5y struck @ 10y5y fwd	17%	0.0%	68%	6.5%	76.4	5.1%	4.1	18.7%	1.11	7.5%	0.89	0.4%
2y5y10y	-2y5y10y + 7y10y struck @ 5y10y fwd	20%	1.8%	98%	14.0%	81.0	15.4%	2.9	16.9%	0.96	6.1%	0.91	9.3%
2y10y10y	-2y10y10y + 12y10y struck @ 10y10y fwd	17%	0.4%	76%	25.3%	70.4	3.2%	4.3	30.9%	1.07	15.0%	0.99	7.0%
2y5y20y	-2y5y20y + 7y20y struck @ 5y20y fwd	33%	54.4%	116%	19.2%	69.0	2.3%	4.6	15.4%	0.89	8.4%	0.96	8.4%
2y7y20y	-2y7y20y + 9y20y struck @ 7y20y fwd	26%	7.0%	101%	12.6%	65.5	4.6%	5.3	12.6%	0.94	6.1%	1.02	5.6%
2y8y20y	-2y8y20y + 10y20y struck @ 8y20y fwd	25%	8.4%	97%	12.6%	63.6	5.6%	5.4	13.1%	0.96	7.0%	1.04	4.6%
2y10y20y	-2y10y20y + 12y20y struck @ 10y20y fwd	19%	0.9%	88%	16.9%	60.1	4.6%	5.1	23.0%	0.98	11.7%	1.04	5.1%
2y1y30y	-2y1y30y + 3y30y struck @ 1y30y fwd	52%	45.0%	266%	14.5%	68.7	3.7%	1.7	18.7%	0.60	10.3%	0.66	14.5%
2y2y30y	-2y2y30y + 4y30y struck @ 2y30y fwd	43%	41.7%	192%	17.3%	68.2	3.7%	4.4	20.1%	0.73	11.7%	0.81	13.1%
2y3y30y	-2y3y30y + 5y30y struck @ 3y30y fwd	37%	37.0%	155%	16.4%	67.9	3.7%	4.7	21.5%	0.79	13.1%	0.89	10.3%
2y5y30y	-2y5y30y + 7y30y struck @ 5y30y fwd	34%	46.4%	125%	16.4%	64.9	2.3%	5.9	16.9%	0.87	9.3%	1.01	7.9%
5y2y1y	-5y2y1y + 7y1y struck @ 2y1y fwd	15%	3.2%	376%	0.9%	88.5	95.3%	6.8	62.4%	1.66	69.0%	1.16	74.1%
5y3y1y	-5y3y1y + 8y1y struck @ 3y1y fwd	21%	6.1%	342%	5.1%	84.3	74.1%	15.9	52.1%	1.94	46.9%	1.48	58.6%
5y4y1y	-5y4y1y + 9y1y struck @ 4y1y fwd	20%	31.4%	273%	3.7%	84.7	68.5%	13.9	38.4%	1.95	22.5%	1.54	46.9%
5y1y2y	-5y1y2y + 6y2y struck @ 1y2y fwd	21%	6.1%	619%	7.0%	81.1	90.1%	0.5	76.0%	1.27	70.4%	0.83	82.1%
5y2y2y	-5y2y2y + 7y2y struck @ 2y2y fwd	24%	13.6%	479%	13.1%	78.4	56.8%	16.7	77.9%	1.81	60.5%	1.30	75.5%
5y3y2y	-5y3y2y + 8y2y struck @ 3y2y fwd	22%	18.7%	367%	9.3%	79.5	45.0%	17.5	60.0%	1.91	37.5%	1.47	56.3%
5y5y2y	-5y5y2y + 10y2y struck @ 5y2y fwd	19%	25.3%	268%	9.3%	78.6	37.5%	15.7	29.1%	2.11	0.0%	1.63	29.1%
5y2y3y	-5y2y3y + 7y3y struck @ 2y3y fwd	26%	27.2%	424%	10.3%	80.7	49.2%	12.9	69.4%	1.64	43.6%	1.24	62.9%
5y1y5y	-5y1y5y + 6y5y struck @ 1y5y fwd	27%	15.9%	637%	1.8%	76.0	53.5%	8.5	56.8%	1.19	11.7%	0.92	47.4%
5y2y5y	-5y2y5y + 7y5y struck @ 2y5y fwd	25%	26.7%	443%	6.5%	76.4	42.7%	12.8	46.9%	1.54	5.6%	1.23	41.7%
5y3y5y	-5y3y5y + 8y5y struck @ 3y5y fwd	25%	43.1%	350%	11.7%	76.8	33.8%	14.0	37.5%	1.70	0.0%	1.40	33.3%
5y5y5y	-5y5y5y + 10y5y struck @ 5y5y fwd	21%	41.3%	255%	7.9%	76.1	38.4%	13.9	21.5%	1.96	0.4%	1.55	18.3%
5y10y5y	-5y10y5y + 15y5y struck @ 10y5y fwd	12%	61.0%	143%	14.5%	70.3	10.7%	10.2	48.8%	1.98	2.3%	1.45	0.4%
5y5y10y	-5y5y10y + 10y10y struck @ 5y10y fwd	14%	45.5%	207%	3.7%	75.6	10.3%	8.4	19.2%	1.55	0.4%	1.40	6.1%
5y10y10y	-5y10y10y + 15y10y struck @ 10y10y fwd	11%	43.1%	154%	15.0%	65.3	5.1%	9.4	44.6%	1.83	4.2%	1.55	0.4%
5y5y20y	-5y5y20y + 10y20y struck @ 5y20y fwd	19%	39.4%	279%	13.1%	60.5	10.3%	13.1	15.9%	1.51	0.9%	1.55	2.8%
5y7y20y	-5y7y20y + 12y20y struck @ 7y20y fwd	17%	67.6%	241%	10.3%	57.6	6.1%	13.3	15.9%	1.66	2.3%	1.68	1.4%
5y8y20y	-5y8y20y + 13y20y struck @ 8y20y fwd	17%	70.8%	230%	16.4%	55.9	6.1%	13.2	21.1%	1.74	2.8%	1.73	1.4%
5y10y20y	-5y10y20y + 15y20y struck @ 10y20y fwd	19%	75.1%	223%	44.6%	51.8	4.6%	13.4	46.9%	1.94	23.0%	1.84	2.8%
5y1y30y	-5y1y30y + 6y30y struck @ 1y30y fwd	32%	52.5%	685%	16.4%	58.5	7.0%	12.0	18.7%	0.90	8.9%	0.98	17.3%
5y2y30y	-5y2y30y + 7y30y struck @ 2y30y fwd	29%	57.2%	506%	22.5%	57.6	9.8%	15.0	22.0%	1.16	10.7%	1.24	14.5%
5y3y30y	-5y3y30y + 8y30y struck @ 3y30y fwd	27%	63.8%	420%	25.3%	56.6	4.6%	16.0	23.0%	1.34	10.7%	1.44	13.6%
5y5y30y	-5y5y30y + 10y30y struck @ 5y30y fwd	24%	58.2%	337%	30.0%	54.1	6.1%	16.7	26.7%	1.56	8.4%	1.69	5.6%
5y1y1y	-5y1y1y + 6y1y struck @ 1y1y fwd	8%	3.7%	430%	0.0%	94.3	99.5%	-23.3	43.3%	1.14	88.6%	0.60	79.7%

Source: Nomura Research, stats are based on the recent 4-year history till 5-Dec-2014

For midcurves, we have **1y** and **term carry** (we do not produce carry breakdown yet). We also (repeat) the **vol** and **fwd vol spread** analysis. In addition, we have breakeven buffers and report **upper b/e – spot** (number of bp spot would have to rise to lose money) and **spot-lower b/e** vs historical values.

For **5y10y20y**, we see 1y carry of 19% at 75th percentile, is relatively high. The term carry at 223% and 44.6th percentile, is decent. Balancing this, the b/e ranges are high but not by historical standards: upper b/e buffer 194bp is only 23rd percentile, and lower b/e buffer of 184bp is close to four year lows.

Note: the upper (lower) B/E buffer is upper B/E – Spot (Spot – Lower B/E) and gives the number of basis points which spot can rise (fall) for the trade to make money at constant vol (using rho to adjust for the 'backbone', i.e., also called *volta-adjusted*).

Discussion on Triangle and Midcurve Cal Spread Reports

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How to use the Triangle and MCCS tables

We note that Midcurve Calendar Spread Trades (MCCS) are also known as Turbo Carry, Flip-Flop, or Tent trades (because of the tent like payoff).

Triangles are a vanilla method for obtaining forward vol, using the same three underlying swaptions (e.g., 5y10y20y MCCS involves . One big difference between triangles and MCCS trades is that MCCS locks in correlation.

For a better, trade, one should seek to have some of the following:

- A High percentile for 1y Carry, Total Carry and Spot-Fwd Vol. Also for Upper B/E buffer, Lower B/E buffer
- A Low percentile for Forward vol and for premium
- low package PV and forward vol
- High carry, term carry, b/e buffers and vol carry

Papers on MCCS / Turbo carry and Triangles

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Papers which cover MCCS/Turbo-carry or Vol Triangles

Derivative Focus - Forward Volatility Strategies

Long-dated USD volatility opportunities,

Derivative Focus - Turbo carry in USD and EUR forward vol (12 pages)

Searching 3000+ midcurve calendar spreads for maximum carry

Derivative Focus - EUR liquid vol triangles (7 pages)

One year carry of 36% in liquid vanilla vols

Derivative Focus - Turbo carry zooms ahead, part 2 (8 pages)

Performance review and new trade ideas

Derivative Focus - Summertime and the carry is easy (7 pages)

New mid-curve trades that should work while you don’t

Next steps

Summary and Next Steps

A snapshot on vol strategy but still work in progress

This is meant as a scan of relevant Midcurve and Vanilla vol markets to ease trade idea identification.

We have further work on

1. Skew trades in vanilla and midcurve vols
2. Exchange traded options contracts (ED, ER, RX, TY, etc)
3. Simple means of showing CMS trade reports
4. More work on historical P-measure candidates for trade idea selection
5. etc

A few other publications which use the same analysis

Derivative Focus: RV Vol Update, August 2014 (57 pages)

Flow Exotics RV: Higher returns through EUR and USD through vanilla and mild exotics (51 pages)

Publications which track trade performance

Derivative Focus - Trade Performance Update (6 pages)

Derivative Focus - Portfolio Performance Update (5 pages)

Appendix A1 - I

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• 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.

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Appendix A1 - II

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