# Derivatives valuation in practice
## Market drivers for multi-curve pricing
## Supplementary data and results

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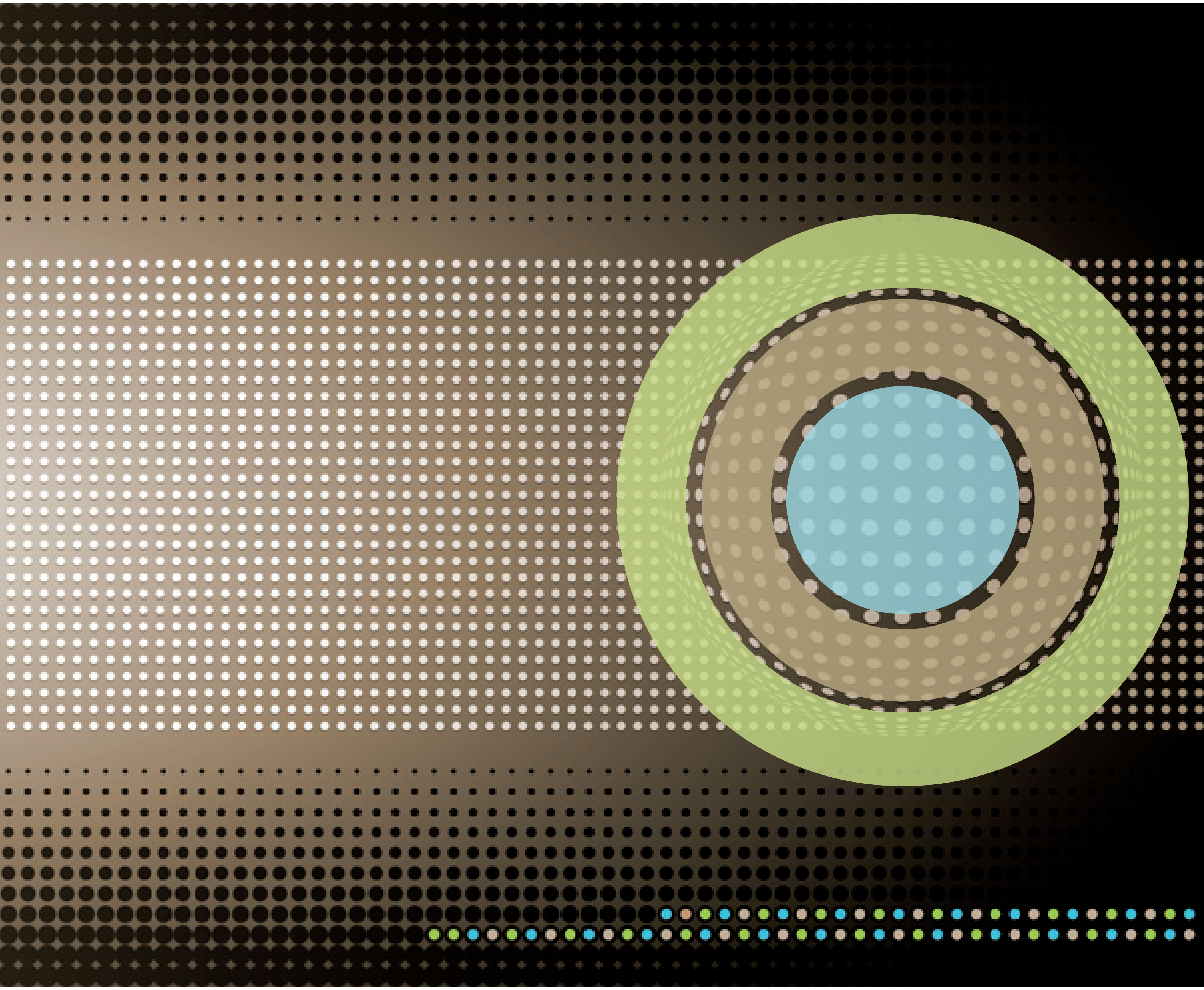


Paper 1a

PRINCIPIA

# Market drivers for multi-curve pricing

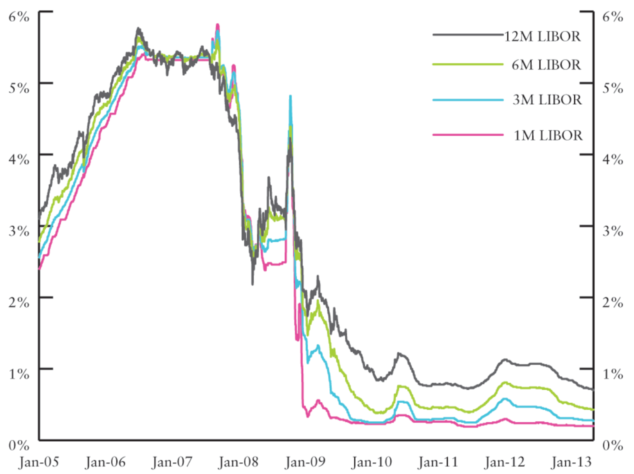
## Supplementary data and results

This document accompanies Principia's paper, `Market drivers for multi-curve pricing and OIS discounting', and provides additional data to support the analysis and understanding of the multi-curve environment now and across the pre-, peak- and post-credit crisis environments.

### Interest rates

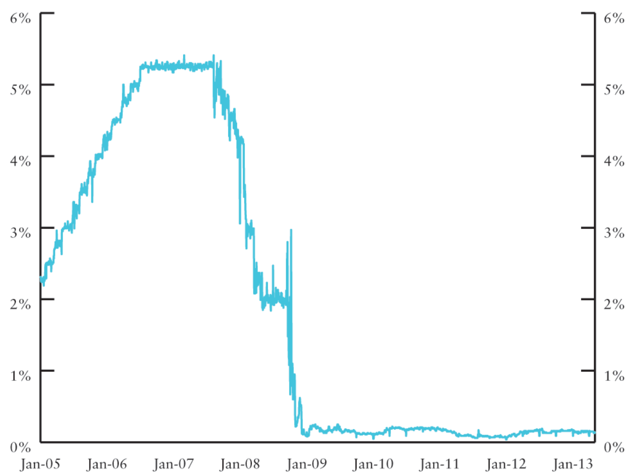
The following graphs plot the behavior of the 1M, 3M, 6M and 12M tenor USD LIBOR rates and the overnight Fed Funds effective rate from 2005 to present day.

Figure 1. 1M, 3M, 6M, 12M USD LIBOR Rates




Source: British Bankers Association

Figure 2. Overnight Fed Funds Rates (H.15)

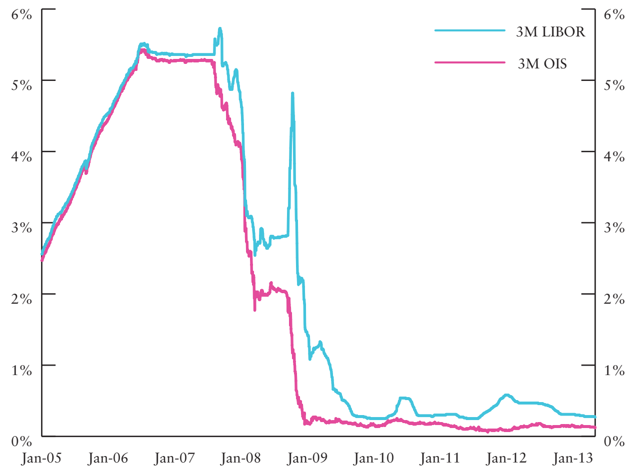



Source: Federal Reserve

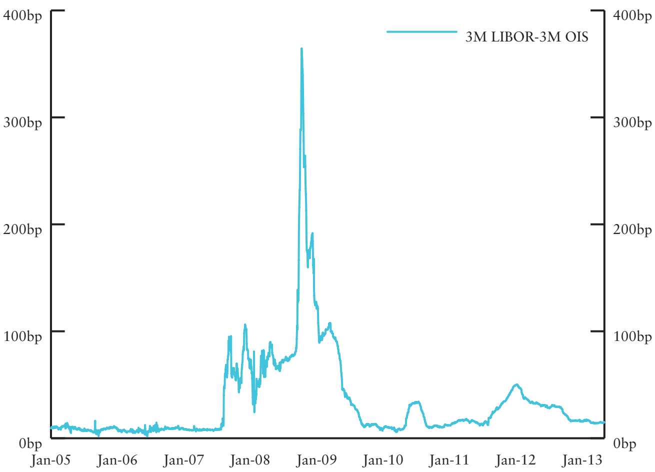
In Figure 3 we can see the difference between the 3M LIBOR and 3M OIS rate (the fixed rate paid in 3M vs. daily compounded Fed Funds rate paid in 3M).

Figure 3. 3M OIS & 3M LIBOR Comparisons

USD 3M OIS & 3M LIBOR




Spreads between USD 3M OIS & 3M LIBOR




Source: Bloomberg, Principia SFP

The spread hit over 300bp at the peak of the credit crisis, and from the table below you can see the increased spread volatility during this period.

Table 1. Statistics on the USD 3M LIBOR vs 3M OIS spread

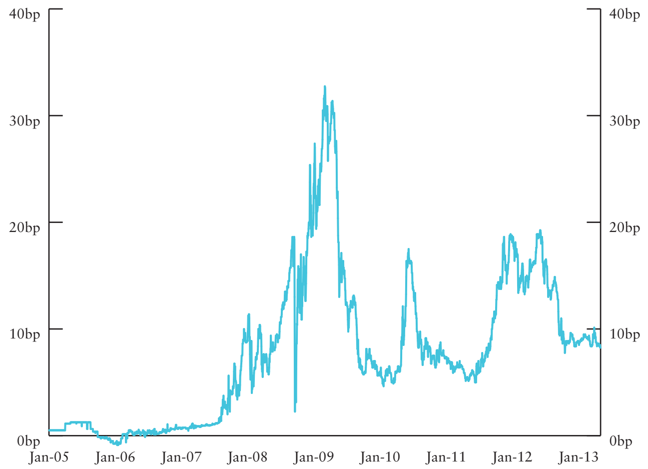
| | Minimum (bp) | Maximum (bp) | Mean (bp) | Standard Deviation (bp) |
|---|---|---|---|---|
| Pre-crisis: Jan 05 - Jul 07 | 2 | 16 | 8 | 2 |
| Peak-crisis: Aug 07 - Dec10 | 6 | 364 | 59 | 58 |
| Post-crisis: Jan 11 - May 13 | 12 | 50 | 24 | 10 |

# Market drivers for multi-curve pricing
## Supplementary data and results continued

### Tenor swap spreads

The initial whitepaper highlighted the impact of the market-observed basis between different tenor rates. The following graphs and statistics illustrate the core components of this dynamic relationship over time.

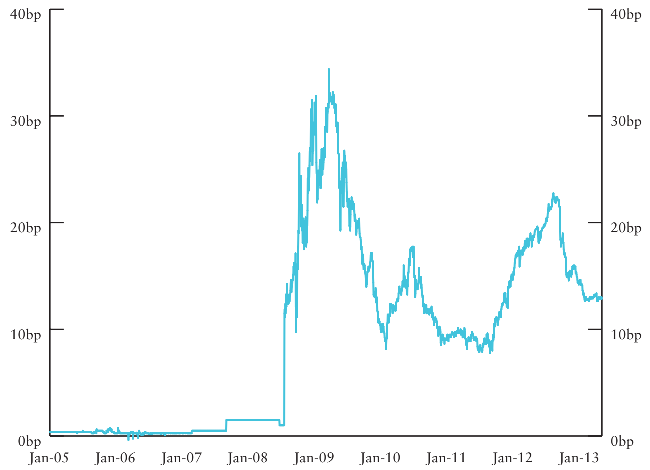
Figure 4. USD 2Y Tenor Basis Swap Spread 1M vs 3M




Source: Tullett Prebon, Principia SFP

The data demonstrates how this tenor swap spread basis has changed significantly through the crisis and that it appears now to be settling to a new norm.

Figure 5. USD 2Y Tenor Basis Swap Spread 3M vs 6M




Source: Tullett Prebon, Principia SFP

This can be clearly seen if we break down this data into the three distinct time periods: pre-, peak- and post-crisis and then examine the mean and standard deviation of this spread

Table 2. Statistics on the 2Y USD 1M vs 3M tenor swap spreads

| | Mean (bp) | Standard Deviation (bp) |
|---|---|---|
| Pre-crisis: Jan 05 - Jul 07 | 0.5 | 0.5 |
| Peak-crisis: Aug 07 - Dec10 | 11 | 7 |
| Post-crisis: Jan 11 - May 13 | 11 | 4 |

Table 3. Statistics on the 2Y USD 3M vs 6M tenor swap spreads

| | Mean (bp) | Standard Deviation (bp) |
|---|---|---|
| Pre-crisis: Jan 05 - Jul 07 | 0.4 | 0.1 |
| Peak-crisis: Aug 07 - Dec10 | 13 | 9 |
| Post-crisis: Jan 11 - May 13 | 14 | 4 |

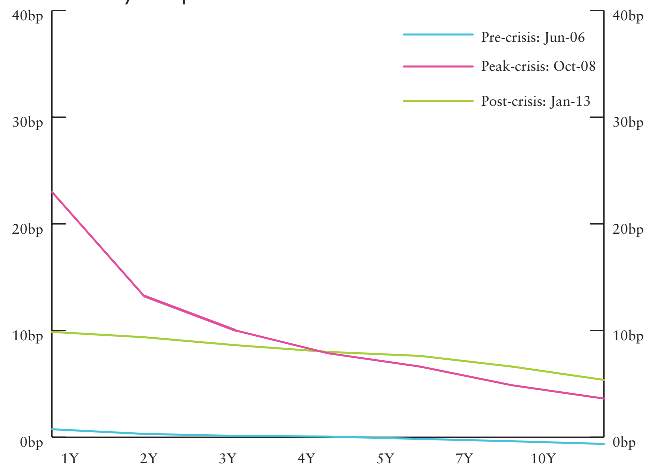
The data above is for 2Y tenor swap spreads. However there is also a marked term structure to the tenor basis swaps which can be seen more clearly in the next section.

# Market drivers for multi-curve pricing

## Supplementary data and results continued

The following two graphs display the 1M vs 3M and 3M vs 6M tenor basis swaps spreads for different maturities and illustrate the degree of tenor basis spread tightening expected by the market.

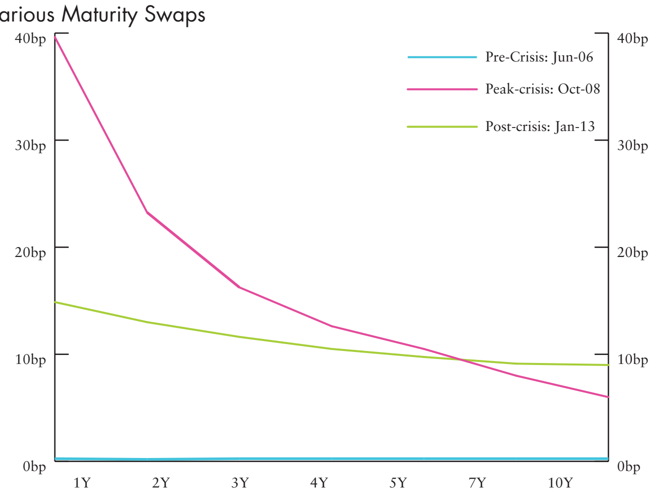
Figure 6. USD 1M vs 3M Tenor Basis Spreads
Various Maturity Swaps




Source: Tullett Prebon, Principia SFP

The results again highlight that while there is a new norm, spreads are not expected to return to pre-crisis levels.

Figure 7. USD 3M vs 6M Tenor Basis Spreads
Various Maturity Swaps




Source: Tullett Prebon, Principia SFP

# About Principia

Principia Partners LLC (Principia) provides a comprehensive single platform solution for the end-to-end management of structured finance and derivative investments. Global financial institutions and independent asset managers have used the award winning Principia Structured Finance Platform since 1995 to unify investment analysis, portfolio management, risk surveillance, accounting and operational control across the breadth of structured credit assets, fixed income investments and complex derivatives.

Dedicated support and continued development of functionality for credit and fixed income instruments is accompanied by a proven and fully integrated derivative valuation framework. This overall credit investment and market risk solution delivers the robust backbone necessary for deeper investment analysis, proactive risk surveillance and operational control across the credit investment and derivatives business.

Principia is based in New York, with an office in London and a technology center in Conshohocken, Pennsylvania.

For more information please visit:
www.ppllc.com

The full whitepaper series will be published online at:
www.ppllc.com/Principia_Derivatives_Valuation.htm

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