LCH.CLEARNET

SwapClear

Liquidity Margin

June 2013

Liquidity Margin

- **Two methods of calculation**
- **Concentration Margin (Method One) – based on a portfolio's total IM level**
- **Concentrated Currency Margin (Method two) – based on concentrated risk in a particular currency**
- **Portfolios are charged the higher of method one or method two**
- **Example: if a portfolio's method one liability is 50M and the method two liability is 53M, the resulting liquidity margin will be 53M**

Concentration Margin (IMM1)

- **Called due to a portfolio's total IM balance breaching the set IM threshold limits**

Threshold*	Multiplier
£700 million	1
£800 million	1.3
£900 million	1.4
£1 billion	1.5
£1.1 billion	1.75
£1.2 billion	2

There are defined levels in USD for LLC

Example: Total IM £1 billion

•Breach of £1 billion threshold, the multiplier is 1.5

•£1,000,000,000 * 1.5 = £1,500,000,000

•Extra margin called in liquidity margin: £500,000,000

Currency Liquidity Margin (IMM2)

- **Captures additional risk not captured in the IM model for closing out positions that are larger than what the market can absorb**

- **First principles method: A direct cost of close out for executing hedge trades and determining if these are larger than the market can absorb**

Survey

Liquidity questionnaire sent to SwapClear membership to assess

1. **The maximum trade size the market can absorb without a price impact**
2. **The cost (bp) for executing trades that are x2, x5 and x10 the maximum size**

- **Submissions are scrutinized for accuracy, outliers results removed from the data set, and the average of the results taken**
- **The results of the survey form the basis for calculating the liquidity cost for closing out a position**
- **The results of the survey are reviewed by the DMG and are assessed in respect of fire drill portfolios and subsequent hedging costs**
- **In 2013's survey LCH will also ask for bid/ask cost (bp) for x1 maximum market can absorb "without price impact"**

First Principles Calc – Step 1

- **PV01s are bucketed for the key hedge trade maturities (2Y, 5Y, 10Y, 30Y), aligned with the hedge buckets used in the DMP process for macro hedging**
- **Bucketing algorithm is based on time apportionment of delta**

Maturity Point	Member Zero PV01 *	Member Basket Zero PV01
2Y	-2,294,918	-1,390,860
3Y	625,886	
4Y	1,460,401	
5Y	3,477,374	5,248,443
6Y	-1,046,951	
7Y	2,200,000	
8Y	-934,000	
9Y	2,400,000	
10Y	5,694,699	8,579,904
12Y	2,700,000	
15Y	-2,400,006	
20Y	-1,800,000	
25Y	4,500,000	
30Y	3,400,000	3,110,960
35Y	2,765,961	
40Y	-5,000,000	
45Y	-4,200,000	
50Y	4,000,000	
Total	**15,548,446**	**15,548,446**

*** PV01 is calculated from zero coupon yield curve using VM sensitivities**

Delta bucketing *				
	2Y	**5Y**	**10Y**	30Y
<2Y	1.00	0	0	0
2Y	1.00	0.00	0.00	0.00
3Y	0.67	0.33	0.00	0.00
4Y	0.33	0.67	0.00	0.00
5Y	0.00	1.00	0.00	0.00
6Y	0.00	0.80	0.20	0.00
7Y	0.00	0.60	0.40	0.00
8Y	0.00	0.40	0.60	0.00
9Y	0.00	0.20	0.80	0.00
10Y	0.00	0.00	1.00	0.00
12Y	0.00	0.00	0.90	0.10
15Y	0.00	0.00	0.75	0.25
20Y	0.00	0.00	0.50	0.50
25Y	0.00	0.00	0.25	0.75
30Y	0.00	0.00	0.00	1.00
35Y	0.00	0.00	0.00	1.00
40Y	0.00	0.00	0.00	1.00
45Y	0.00	0.00	0.00	1.00
50Y	0.00	0.00	0.00	1.00

*** Note: The weights in the above matrix for the actual bucketing algorithm are based on the exact underlying maturity dates. This matrix is for demonstrative purposes assuming a fixed grid of maturity dates the same we use for IM sensitivities.**

First Principles Calc – Step 2

- **From the bucketed PV01s the corresponding hedge trade required to fully hedge the position can be determined**

Maturity Point	Member Zero PV01 (GBP) *	Hedge Notional (GBP)
2Y	-1,390,850	6,989,247,312
5Y	5,248,443	10,799,263,352
10Y	8,579,907	9,449,233,716
30Y	3,110,960	1,480,000,000

*** PV01 is calculated from the VM zero coupon yield curve**

- **Note: The hedge notionals are first calculated from the appropriate VM curve (1M, 3M, 6M, 12M where applicable). Once the hedge notional has been determined for each of these curves the resulting hedge notionals are then aggregated by currency index**
- **The aggregated hedge notional can then be compared against the survey results**
- **If the required hedge notional is larger than what the market can absorb this indicates that additional margin needs to be called for the outsized position**

First Principles Calc – Step 3

- **Linearly interpolate the hedge notional size against the survey to determine the pricing impact of executing a trade if it is larger than what the market can absorb**

The maximum trade size executable in the market without a pricing impact. Taken directly from LCH annual liquidity survey to SwapClear dealers

Cost for executing trades larger than the maximum trade size that the market can absorb with no price impact

Maturity Points	Maximum size mkt can absorb in 2-day	Size cost (BP) 1x size	2x size	5x size	10x size	Positon Size 1x size	2x size		10x size
2Y	5,000,000,000	0	1.80	4.00	6.70	-	10,000,000,000	25,000,000,000	50,000,000,000
5Y	3,000,000,000	0	1.90	4.20	6.80	-	6,000,000,000	15,000,000,000	30,000,000,000
10Y	2,000,000,000	0	2.00	4.50	6.90	-	4,000,000,000	10,000,000,000	20,000,000,000
30Y	1,500,000,000	0	2.10	5.00	8.00	-	3,000,000,000	7,500,000,000	15,000,000,000

(1) The maximum trade sizes absorbed by market and the size cost came from the member liquidity survey
(2) The 2Y the maximum size is 5bn. For executing 10bn the cost is 1.8bp. For executing 25bn the cost is 4bp, for executing 50bn the cost is 6.7bp

Lineraly interpolated from 1 above

Maturity Point	Member Par PV01 (GBP) *	Hedge Notional (GBP)	Size cost (BP) to absorb notional	1st Principle Liquidity Cost (Absolute Value)
2Y	-1,396,350	6,989,247,312	0.72	1,005,372
5Y	5,253,443	10,799,263,352	3.13	16,424,776
10Y	8,585,307	9,449,233,716	4.27	36,663,674
30Y	3,116,660	1,480,000,000	-	-
			Total 1st principle cost	**53,088,450**

As this hedge notional is below the maximum trade size (1,500,000,000) that the market can absorb, there is no hedge cost, and therefore no liqudity charge for this bucket

*** PV01 is calculated from par sensitivities**

- **The resulting cost for each maturity point =**

Size cost (bp) * par sensitivity

First Principles Calc – Step 4

- **Maturity offsets are allowed between 2Y v 5Y and 10Y v 30Y if the risk is offsetting (long/short) between the buckets.**

- **If the risk is offsetting then:**

  The larger of the 2Y or 5Y cost is charged

  The larger of the 10Y or 30Y cost is charged

Maturity Point	Member Zero PV01 (GBP) *	1st Principle Liquidity Cost (Absolute Value)
2Y	-1,390,850	1,005,372
5Y	5,248,443	16,424,776

*** PV01 is calculated from zero coupon yield curve**

- **In the example the 2Y sensitivity is risk offsetting. Therefore only the 5Y cost would be charged**

First Principles Conclusion

- **Therefore, the total liquidity margin charged for this portfolio is the 2Y and 5Y costs plus 10Y cost - GBP 53m**

Maturity Point	1st Principle Liquidity Cost (Absolute Value)
2Y	1,005,372
5Y	16,424,776
10Y	36,663,674
30Y	-
Total 1st principle cost	**53,088,450**

- **The calculation is performed at the currency and index level, meaning LCH is measuring the additional liquidity costs inherent in each currency and index cleared.**
- **Members/clients are called one total liquidity margin amount daily in base currency (GBP), covering all currencies where there they may have a charge.**

Disclaimer

The contents of this document have been provided to you for informational purposes only and are intended as a broad overview of certain aspects of SwapClear, a service of LCH.Clearnet Limited.

LCH.Clearnet Limited is a “recognised clearing house” registered with the Bank of England and a “derivatives clearing organization” registered with the U.S. Commodity Futures Trading Commission, whose relationship with its members and clients is governed solely by its Rulebook and certain other ancillary documentation.

This document does not, and does not purport to, contain a detailed description of the SwapClear service, any part of such service or any other topics discussed herein and has not been prepared for any specific person. Accordingly, you may not rely upon the contents of this document and should seek your own independent legal advice. Nothing in this document should be considered as legal advice.

The information and any opinion contained in this document do not constitute investment advice or a recommendation with respect to any applicable financial instruments or securities. Nothing in this document should be taken as a public offer to sell or to buy any applicable financial instruments or securities.