The Whys of the LOIS: Credit Skew and Funding Spread Volatility

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The 2007 subprime crisis has induced a persistent disconnection between the Libor derivative markets of different tenors and the OIS market.

Commonly proposed explanations for the corresponding spreads are a combination of credit risk and liquidity risk.

However in the literature the meaning of liquidity is either not precisely stated, or it is simply defined as a residual spread after removal of a credit component.

In this paper we propose a stylized equilibrium model in which a Libor-OIS spread (LOIS) emerges as a consequence of a credit component determined by the skew of the CDS curve of a representative Libor panelist (playing the role of the ``borrower" in an interbank loan) and a liquidity component corresponding to a volatility of the spread between the refinancing (or funding) rate of a representative Libor panelist (playing the role of the ``lender") and the overnight interbank rate.

The credit component is thus in fact a credit skew component, whilst the relevant notion of liquidity appears as the optionality, valued by the aforementioned volatility, of dynamically adjusting through time the amount of a rolling overnight loan, as opposed to lending a fixed amount up to the tenor horizon on Libor.

This option is ``At-the-money" when the funding rate of the lender and the overnight interbank rate match on average, this results, under diffusive features, in a square root term structure of the LOIS, with a square root coefficient given by the above-mentioned volatility.

Empirical observations reveal a square root term structure of the LOIS consistent with this theoretical analysis, with, on the EUR market studied in this paper on the period half-2007 half-2012, LOIS explained in a balanced way by credit and liquidity until the beginning of 2009 and dominantly explained by liquidity since then.