The self-exciting nature of the bid-ask spread dynamics

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Abstract

The bid-ask spread, defined at a given time in a Limit Order Book by the difference between the best selling price and the best buying price, is a quantity of great interest for financial securities. We design a "State-dependent Hawkes model" for spread fluctuations which takes account of different spread jump sizes and also the impact of the current spread state on the intensity functions. We then apply this model to the high-frequency data from the Cac40 french Euronext market. Many different statistical properties can be captured, mainly : the spread distribution, the inter-event time distribution and the autocorrelation function.