

Swissquote Conference 2018 on Machine Learning

Rama Cont (University of Oxford)

Title: Universal feature of intraday price formation: perspectives from Deep Learning

Abstract: Using a large-scale Deep Learning approach applied to a high-frequency database containing billions of electronic market quotes and transactions for US equities, we uncover nonparametric evidence for the existence of a universal and stationary price formation mechanism relating the dynamics of supply and demand for a stock, as revealed through the order book, to subsequent variations in its market price. We assess the model by testing its out-of-sample predictions for the direction of price moves given the history of price and order flow, across a wide range of stocks and time periods. The universal price formation model is shown to exhibit a remarkably stable out-of-sample prediction accuracy across time, for a wide range of stocks from different sectors. Interestingly, these results also hold for stocks which are not part of the training sample, showing that the relations captured by the model are universal and not asset-specific.

The universal model --- trained on data from all stocks --- outperforms, in terms of out-of-sample prediction accuracy, asset-specific linear and nonlinear models trained on time series of any given stock, showing that the universal nature of price formation weighs in favour of pooling together financial data from various stocks, rather than designing asset or sector-specific models as commonly done.