Series 6

Introduction to Computational Finance

return no later than April 7th, 2020 at 8:00

For this series, we are using the data form series 3 and 4.

For each of the following algorithm, you need to consider at least 20 randomly picked times:

TWAP algorithm

Implement a TWAP algorithm that splits a fictitious order to buy 12 million euros into 12 slices. A slice is executed every 15 minutes.

Compute the execution prices using at the times picked .

- Compare the prices obtained with the decision price.

VWAP algorithm

Implement a VWAP algorithm trading an order that is similar to the one above, i.e. buy 12 million euros, split into 12 slices and each slice executed every 15 minutes.

You can use the daily distribution of ticks as "historical data" to estimate volumes traded at each interval of time.

Picking the same times as in your TWAP implementation, compute the execution prices obtained with VWAP.

- Compare the prices obtained with the TWAP and the VWAP.

Algorithm based on price evolution

Finally, implement an algorithm that considers the evolution of prices. One way to do is to split the order similarly to the TWAP algorithm, and trade a slice at each directional change δ (buying when downwards, selling when upwards in order to reduce *slippage* to a minimum).

Picking the same initial times as in the last two cases, compute the execution prices and compare them with the ones obtained using previous methods.

- How should you choose δ in order to execute the full order over 3 hours ?
- Compare the prices obtained with the price evolution with the ones obtained using previous methods.

Report

Each student is expected to give back a personal work consisting of a report in PDF format presenting his/her results and answering the questions of the exercise, as well as the script used to generate the presented results. Both report and script have to be uploaded on Moodle (IFC/Series6).