QF609 (AY2024-2025): Group Assignment

February 9, 2025

Problem

Suppose that we have the following portfolio of positions as of 30/10/2023:

(a) a payer (i.e. pay fixed leg and receive float leg) SOFR swap with the following contract parameters:

- Notional: $100 million
- Starting Date: 30/10/2023
- Maturity: 10Y
- Strike: 4.2%
- FloatLeg Frequency: Annual
- FixedLeg Frequency: Annual

(b) $1 million in each of the four stocks: AAPL, MSFT, F (Ford Motor) and BAC (Bank of America)

An Excel workbook consisting of one-year of historical data (31/10/2022 - 30/10/2023) of the SOFR curve and the share prices of the four stocks above, and an Excel workbook demonstrating the pricing of a SOFR swap have been provided. Using the data, calculate the 1-day 95% VaR for the portfolio as of 30/10/2023 using each of the following models:

(a) Parametric VaR Model

(b) Monte Carlo VaR Model (under both the full revaluation and the sensitivity-based approaches). You may assume the risk factor changes are Normally distributed.

(c) Historical VaR Model (under both the the full revaluation and the sensitivity-based approaches)

Format, Assessment, and Due-Date

The assigment should be completed in groups each of which consists of 7-8 people. You are free to choose the group members to make up your group. Once the groupl members are decided, please let your TA know your group contact and group members. For those who cannot find a group, please let the TA know and we will try to allocate you to other groups accordingly.

The assessment is based on your group presentation in class (about 10-15 minutes per group). The presentation date is **March 10** for **Group 1** and **March 11** for **Group 2**.