MFE 409; Homework 6

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Problem 1.

Write a short essay describing the approach of the bank is following for risk management. In particular, describe how it computes the various risk measures to respect the Basel regulations.

Bank of America

Bank of America's approach to risk management, with respect to Basel regulations, involves a comprehensive process that includes several quantitative measures to ensure robust risk assessment:

- VaR: a primary statistical measure used by Bank of America to assess market risk. VaR estimates the potential loss in value of a portfolio due to market movements over a specific time period, given a certain confidence level. The bank uses a historical simulation approach for VaR, which incorporates three years of historical data and operates on a 99% confidence level.

- Stress Testing: in recognition of VaR's limitations, such as its inability to capture the magnitude of extreme events, Bank of America complements it with stress testing. Stress testing involves evaluating the portfolio under severe but plausible adverse conditions. This helps in understanding potential losses in extreme scenarios, such as the financial dislocations experienced during the 2007-2008 credit crisis.

- Credit Risk Assessment: managed through periodic and systematic reviews of lending portfolios. The allowance for loan and lease losses is determined by a combination of individual loan assessments and loss forecast models. These models incorporate factors like historical loss experience, current economic conditions, and credit scores. For commercial portfolios, loans are reviewed individually and classified according to an internal risk rating scale

- Basel 2: require capital adequacy assessments that cover credit risk, market risk, and operational risk. The Basel 2 framework includes Pillar 1 (minimum capital requirements), Pillar 2 (supervisory review), and Pillar 3 (market discipline through disclosure). The bank has made significant efforts to ensure compliance with Basel 2, including the development of a formal implementation plan and parallel reporting under both Basel 1 and Basel 2 guidelines during the transition period.

The risk management process at Bank of America is supported by a governance structure that includes several committees at the board level. The Audit Committee oversees the effectiveness of internal controls and compliance with legal and regulatory requirements, while the Finance Committee reviews policies related to credit, market, and liquidity risk. Additionally, the Global Markets Risk Committee and the Compliance and Operational Risk Committee focus on specific risk categories and ensure that comprehensive risk management policies are in place and effectively implemented.

Problem 2

Question 1

You are long an option that promises to pay the square of the stock price in three months (S_{t+3}^{2} months). Does the delta approach to computing VaR underestimate or overestimate your risk?

- May underestimate risk as delta approach primarily considers the linear sensitivity of the option price to changes in the underlying asset's price.

Question 2

Stock has been going up 10% each year for the past three years. What is the three-month forward price of this stock today?

- It is a discounted martingale $E[S_{t+1}] = e^{.25r}E[S_t]$

Question 3

You are trading quanto options. What are the important sources of risks to include in your risk management model. If you are not familiar with quanto options, you can find information online.

- Quando options are the ones that are based on one currency while settling happens in the other. In that case, it is important to consider geopolitical and economical risks in both countries (which currencies are being used), essentially this would become a regression with two betas instead of one.