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RISK MANAGEMENT

IN-HOUSE

CASE STUDY SERIES

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Case Study 19 Questions

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Case Study

Value at Risk is becoming a standard risk management tool for institutions worldwide, and is enjoying rapid and wide-ranging success. Its main appeal lies in its simplicity; a single number offers information about what a firm may expect to lose over a time horizon, uncovers uncertainities of the firm, and provides crucial information of the overall firm's risk profile to senior management, traders, shareholders, investors, auditors, rating agencies, and regulators.

However, institutional investors, and international equity investors in particular, have not embraced the Value at Risk methodology with particular enthusiasm, and few of them actively use it for portfolio and risk management purposes.

The severity of the Asian financial crisis has stressed the importance of understanding the assumptions and weaknesses of the different risk management methodologies, as managers that were implementing them without a thorough understanding of them, found that their losses were larger than the ones estimated by their quantitative systems.

One of the main criticisms of VaR is that it is an unidirectional analysis and, in the process of aggregating and simplifying the portfolio risk, we lose essential information that could be very useful to manage a portfolio actively. The real value of the VaR approach is not arriving at a single number. It is the process of identifying, quantifying, and managing risks that heretofore been ignored. The "drill – down" capabilities are an essential part of any VaR system, as they offer crucial insights to determine the main sources of risk of the portfolio ("hot spots"), and which components of the portfolio act as a natural hedge.

Initial VaR theory seems to permit to estimate only (I) diversified portfolio VaR or (2) undiversified VaR of a portfolio or component (e.g. a trade). These are non-additive, and reports that show the VaR by subcomponents of a portfolio treating them in isolation, are not taking into account the diversification effects. With the VaRdelta and Component VaR technology, developed by Garman (1996, 1997) we can take an entire portfolio's diversified VaR and additively allocate it to the individual components comprising the portfolio.

VaR encourages fund managers to think of the portfolio as a set of assets exposed to several sources of risk. Once the exposures to several risk factors have been identified and quantified, it is possible to analyze how those risk exposures interact with each other, which trades are acting as a natural hedge to the portfolio, and which exposures represent the largest sources of risk for the firm. With VaR it is possible to minimize the variability of portfolio P & L's, decide which risks are worth taking, and hedge those which may cause "too much" variability to portfolio returns to implement VaR for international equity portfolios. Fund managers should use volatility and correlation datasets customized to their own needs, and have the capabilities to perform a drill-down analysis on their main sources of portfolio risk. In order to do that, it is necessary to count with historical price series for the stock market sectors of each country (may be individual equities) in their portfolios, and exchange rate series. Once the data is available, it is possible to create correlation and volatility datasets from that historical data following commonly accepted methodologies. Individual equities introduce too many factors, but treating the different market sector indices as the risk factors for each country, adds a reasonable number of risk factors for which we can collect volatility and correlation information on a regular basis. So that we can have various asset codes which can be used for calculating VaR.

Multiple Choice Questions

(2 × 5 = 10 Marks)

1. Which of the following statements regarding linear and nonlinear derivatives is true?

A. The delta of a linear derivative is equal to one.
B. A forward contract is an example of a nonlinear derivative.
C. A linear derivative's delta must be constant for all levels of value for the underlying factor.
D. The value of the call option changes at a constant rate with the change in the value of the underlying stock.

2. Which of the following statements about governance structure is accurate?

A. Senior management has ultimate oversight responsibility and accountability for an entire institution.
B. The board of directors has responsibility for implementing authorized stress-testing activities.
C. The board of directors can change an institution's capital levels and exposures following a review of stress-test results.
D. Senior management should use scenario analysis, not stress testing, to evaluate an institution's risk decisions.

3. Various Reasons for incorporating stress testing results into a broader set of such risk and business applications:

A. Management Attention
B. Binding Constraint
C. Transparency
D. All of the above

4. $\rho(X + Y) \leq \rho(X) + \rho(Y)$ is the mathematical equation for which property of a coherent risk measure?

A. Monotonicity
B. Subadditivity
C. Positive homogeneity
D. Translation invariance

5. Management for Lever Bank has been tasked by its board of directors with updating the corporate governance process for stress testing. Updating this process is likely to exclude which of the following elements?

A. The actions that will be taken on the results
B. A plan for how senior management will assess the results
C. Revisiting the assumptions underlying the modeled scenarios
D. The alignment of institutionally defined stress tests to mirror those of external regulations

Descriptive Questions

6. What is Value at Risk (VaR)? Explain how VaR can be used to control risks.

4 Marks

7. How can you implement VaR for managing risks of international equity portfolios.

4 Marks

8. Discuss the limitations of VaR approach as a tool of risk management.

7 Marks