Quantitative Operational Risk Management: Properties of Operational Value at Risk (OpVaR)

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Operational risk is one of the financial risks and financial instruments (with international operations in particular) are required to measure an amount of operational risk. Especially, international regulation Basel II/III requires to measure 99.9% Operational Value at Risk (OpVaR).

In this talk basic concept of quantitative operational risk management and some measurement method of OpVaR will be described. Also the following two topics will be taken up:

1. Analytical methods for calculating OpVaR

Actually many banks adopt so-called Loss Distributional Approach (LDA) and calculate OpVaR by using Monte-Carlo (MC) simuiation. But MC is not so good from the viewpoints of computation speed and robustness. We will introduce some alternative analytical methods for calculating OpVaR in the LDA model.

2. Asymptotic behavior of OpVaR

It is well known that distributions of operational risk amount have fat-tail property. For such distributions Extreme Value Theory (EVT) works effectively. We will show the asymptotic behaviour of the difference between the Value at Risks $\mathrm{VaR}_\alpha(L+S)$ and $\mathrm{VaR}_\alpha(L)$ (α denotes a confidence level of VaR) for heavy tailed random variables L and S with $\alpha \to 1 (= 100\%)$ as an application to the sensitivity analysis of quantitative operational risk management in the framework of AMA.

Here the variable L describes the loss amount of the present risk profile and S means the loss amount caused by an additional loss factor. We have different types of results depending on the magnitude of the relationship of the thicknesses of the tails of L and S.

Especially if the tail of S is sufficiently thinner than that of L, then the difference between prior and posterior risk amounts is asymptotically equivalent to the expected loss of S i.e. $\mathrm{VaR}_\alpha(L+S) - \mathrm{VaR}_\alpha(L) \sim \mathrm{E}[S], \quad \alpha \to 1.$

The presentation material is available at:
`http://elis.sigmath.es.osaka-u.ac.jp/~kato/ope_RITS.pdf`

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