Collateral Valuation in Clearing and Settlement System Using CVaR Model under EVT Framework: Evidence from Thailand and Singapore Markets

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ABSTRACT

Clearing and settlement system intently concentrates on collateral valuation for extreme market events to ensure its survival in the event of adverse phenomenon. The framework using conditional value-at-risk (CVaR) as an alternative measure and extreme value theory (EVT) i.e. peak-over-threshold as the estimation method for estimating tail risk distribution is proposed to study on Thailand and Singapore markets, representing emerging and developed countries respectively in the ASEAN. In this study, not only equity collaterals are considered for haircut calculation, but also fixed income instrument i.e. government bond indices, available in the markets as it is also a major component of many institutional investors. The use of well-known backtestings and risk-cost frontier analysis are conducted to compare different methods for calculating haircuts with different levels of tail risk. For the purpose of capturing extreme event, CVaR with normality assumption is sufficient for haircut valuation but particularly for the indices, there is still some tendency for under-collaterization while CVaR with EVT-based model could adequately cover the adverse loss but it tends to over-collaterize haircuts. Eventually, the decision of appropriate method for calculating haircut not only relies on the trade-off between risk and cost, but also depends upon human judgment and decision making from risk managers.

Keywords: Collateral valuation; haircuts; financial risk measurements; extreme value theory