

## Bayesian Value at Risk Forecast Using Realized Conditional Autoregressive Expectile Model with an Application of Cryptocurrency

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**Abstract :** In the financial market, risk management helps to minimize potential loss and maximize profit. There are two ways to assess risks; the first way is to calculate the risk directly based on the volatility. The most common risk measurements are Value at Risk (VaR), sharp ratio, and beta. Alternatively, we could look at the quantile of the return to assess the risk. Popular return models such as GARCH and stochastic volatility (SV) focus on modeling the mean of the return distribution via capturing the volatility dynamics; however, the quantile/expectile method will give us an idea of the distribution with the extreme return value. It will allow us to forecast VaR using return which is direct information. The advantage of using these non-parametric methods is that it is not bounded by the distribution assumptions from the parametric method. But the difference between them is that expectile uses a second-order loss function while quantile regression uses a first-order loss function. We consider several quantile functions, different volatility measures, and estimates from some volatility models. To estimate the expectile of the model, we use Realized Conditional Autoregressive Expectile (CARE) model with the bayesian method to achieve this. We would like to see if our proposed models outperform existing models in cryptocurrency, and we will test it by using Bitcoin mainly as well as Ethereum.

**Keywords :** expectile, CARE Model, CARR Model, quantile, cryptocurrency, Value at Risk

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