

Economic Capital Analytics

Economic capital is an estimate of capital needed by a financial organization to manage their own risk and allow the allocation of the cost of maintaining regulatory capital to different organizational units.

Economic capital differs from "Regulatory Capital". Economic capital is an internal allocation against risk while "Regulatory Capital" is mandated by financial regulators.

The risk exposure time horizon, for regulatory capital requirement, for a trading book is 10 business days. The risk exposure time horizon of economic capital for the trading book is one year.

Economic Capital is calculated from the modelling of credit losses as generally described in, but is typically over a 1 year time horizon, but may involve any number of interim credit nodes.

For Economic capital only losses due to default are considered not credit spread risk. Hence, risk management needs only specify the probability of default, and exclude other rating transition probabilities, although this is not required.

Market rates are still simulated. Moreover, trade exposure is only computed when there is a default event, with pricing disabled in non-default scenarios and do not contribute to the exposure.

The resulting distribution of default exposures are aggregated taking into account any credit mitigation effects such as netting/collateral agreements or right to break agreements.

The aggregation of results in Razor is derived from this distribution of credit losses, and is equal to the maximum unexpected loss greater than the expected (mean) loss to a specified confidence level.

A model derives discount factor to use for present value from the simulated rates along each path, and this discount factor is used with the specific loss generated along this path. The distribution of credit losses as used for calculation of economic capital is derived from those losses where the credit entity has transitioned to default, and the credit exposure aggregated for that portfolio is positive.

In other words an actual loss has been simulated. The value for that actual loss is calculated from the positive credit exposure less any amount recovered (as defined by the recovery rate). In all other instances the credit loss is set to zero.

Economic capital is statistically measured for 1-year time period at 99.95% confidence level that is consistent with the probability of default (0.05%) targeted by most institutions.

Economic capital (RWCA) is allocated based on the underlying economic risk of inventory positions.

There is no easy way to either scale up or scale down the time dimension to compare the two capital calculations. There is no easy way to extend GRM-T&I's one day (or ten day) historical simulation to a one-year time horizon without making some long time horizon probability distribution assumptions on the risk factors involved.

One approach popularly used in market and also discussed in literature is based on Extreme Value Theory.

Assuming the loss distribution follows t-distribution, the scaling factor for confidence level change is given by

$$K = \left(\frac{1 - 99\%}{1 - 99.95\%} \right)^r$$

where r needs to be calibrated based on 1-year loss distributions

You can find more details at

<https://finpricing.com/lib/EqLookback.html>