Market Risk

In finance, we usually have to deal with a trade off between return and risk. While returns can be easily measured, more effort has to be put on measuring risk. It is obvious that there is a huge variety of risk, one of them is the market risk.

Market risk is defined as *"the risk of changes in the market value of an instrument or portfolio, connected with unexpected changes in market condition".*

The market condition that affect the market value of an instrument are:

- Exchange rate risk
- Interest rate risk
- Equity risk
- Commodity risk
- Volatility risk

The most used way to estimate market risk is by using Value-at-Risk (VAR).

Value-at-Risk is defined as *"the maximum potential loss with a confidence level over a predetermined period".*

$$Prob(L>Var)=1-c$$

This definition highlight all the aspect that needs to be estimated when we are computing Value-at-Risk:

- Maximum potential loss
- Confidence level
- Time horizon

In general, there are three ways of computing Value-at-Risk:

- Parametric approach (Variance-Covariance Approach): it estimates VAR value based on normality assumption distribution
- Historical Simulation: it estimates VAR value by looking at historical returns that we have experienced in the market
- Montecarlo Simulation: it estimates VAR value by creating n simulation knowing the moments of the distribution