Week 3 - Summary

Hi. Are you ready for the summary of this week?

This week, we really have special effects. Enjoy.

During this week we have introduced the Value-at-Risk, or VaR.

The VaR is an omnipresent measure of risk in risk management.

In the field of credit risk, it is often called C-VaR, or credit risk VaR.

From a purely statistical point of view, we have said that the VaR is nothing more than a quantile.

A VaR at confidence level alpha is therefore the alpha quantile of the loss distribution.

So, here we are, to define the VaR we need a loss distribution.

Let's create one....

Now, let us sketch a curve to represent this distribution.

For a loss distribution, the Value-at-Risk is always defined on the right tail, that is the part of the distribution representing the probability of observing the larger losses.

The VaR alpha is simply the threshold loss above which the probability of observing a larger loss is 1-alpha.

For what concerns the actual computation of the Value-at-Risk, we have considered some exercises. I strongly suggest you to spend time on these and on the extra exercises you can find on the platform of the course.

It is very important that you understand how to compute the VaR.

And now, let us come back to the other topics of the week.

We have then considered derivations of the VaR, such as the mean-VaR, that is to say, the VaR centered around the mean. Or specific VaRs, for distributions like the Gaussian and the student-t.

We have also introduced the expected shortfall, a measure of risk that quantifies the average loss over the VaR. Here it is.

Moreover we have given the definition of coherent measures of risk.

A coherent measure of risk is a measure, which is monotone, sub-additive, positive homogeneous and translation invariant.

We have discussed the financial implications of these properties.

It can be shown that, while the expected shortfall is always coherent, the VaR is not.

This is due to the fact that the Value-at-Risk is not sub-additive, in general, even if there are special cases for which this is true. For example, when the loss distribution is a Gaussian distribution.

Finally, we have introduced the basic procedure for back-testing.

Back-testing is the set of statistical tests we can use to verify whether our Value-at-Risk, our VaR, is reliable or not, on the basis of historical data.

So, for this week we are done.

Goodbye.