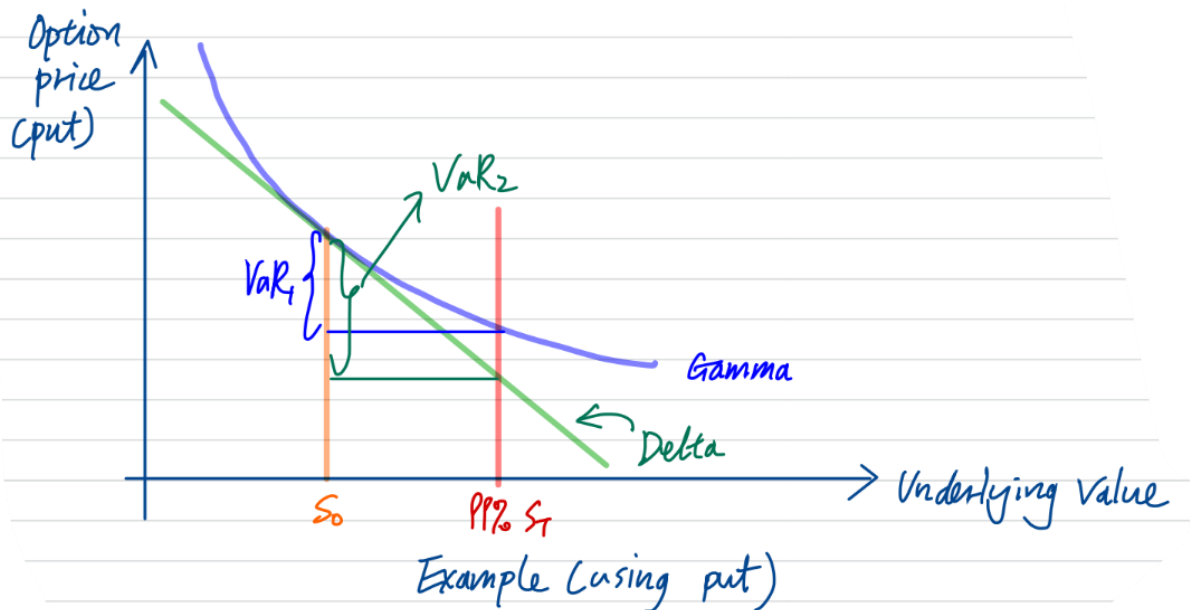


1. "If you use the Delta approach for a positive Gamma option, you will overestimate the VaR". Is it true or false? Explain.

True. As shown in the graph.



$$VaR_1 < VaR_2$$

2. Assume you are the CEO of a bank and feel that the risk regulations are too constraining. What are ways you could use to take more risk while still respecting the regulation:

(a) Under Basel I

One main weakness of Basel I is that for the on-balance sheet exposure, its differentiation of the four brackets is not very detailed nor through. For example, all claims in OECD governments, banks or public sector entities receive a very low risk weight of 0% or 20%. However, out of 38 OECD countries, many are still developing countries, which imply that they may have higher risks. Even if we ignore the developed or developing country distinction, each country has its own sovereign risk and idiosyncratic risks. Therefore, I could potentially load up government bonds from Mexico, Greece, which has a much higher yield and risk profile than US treasury bonds, but my risk-adjusted asset would remain very low.

Moreover, for the on-balance sheet, the risk weight does not differ with maturity, so I could load up on long-maturity investments, which have higher interest rate risk.

(b) Under Basel II

Basel II allows banks to provide its own estimates for assessing credit risks and to use its own internal models. Therefore, I could intentionally be overly optimistic and use models that led to lower risk assessment.

Basel II credit risk assessment relies on rating from rating agency. However, most rating agency reacts slowly to the market and the rating are done ex-post so I could find investment with more risks than the rating implies.

3. Why is Basel II blamed for precipitating the financial crisis?

First, Basel II allows banks to use their own internal models to assess risks, which would be used to determine the minimum capital requirement. This created incentives for banks to underestimate their credit risks and being over-optimistic.

Second, banks' internal models are not necessarily superior in measuring risks and they could perform poorly.

Third, in the Basel II framework, the credit risk weight depends on rating agencies, which may have conflicts of interests. And as we know, prior to the financial crisis, the rating agencies did a terrible job rating the subprime CDOs, which greatly affects the credit risk assessment of the banks.

Fourth, the capital requirement could be pro-cyclical, which in turn amplify the market volatility.

Lastly, the average level of capital required is not adequate to capture