

Mindless Fitting?

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ABSTRACT

We are required to mark-to-market non-plain (exotic) products in a way that is consistent with the observed market prices of liquid vanilla products. This means that for each exotic we must have a one-to-one mapping between vanilla prices and the exotic's price. Such mapping is called the mark-to-market model as it produces mark-to-market price and risk exposure for each exotic. Risk management policies (risk limits, desire to minimise volatility of the mark-to-market P&L) typically compel traders to hedge exotics with vanillas such that the combined risk exposure, measured by the mark-to-market model, is close to zero.

In the traditional approach we set the exotics price equal to its' value given by a valuation model that assumes a certain stochastic evolution of the relevant risk factors. In order to fit vanilla prices practitioners use, are forced to use, over-parameterised models (models with local volatility surfaces is one example) whose resulting risk factor dynamics could be counter-intuitive. Does this make a good model, i.e., does hedging to such model's risk exposure result in realised replication cost (derivative's actual "manufacturing cost") that is close to the initial exotic's price the model produces? We cannot be sure of that!!!

What are the alternatives? Can we start with a price of an exotic produced by a standard derivatives valuation model, with risk factors dynamics that makes sense (who is to judge?), and somehow, externally, adjust this price to reflect the difference between market and model prices of relevant vanilla options? Would the resulting mapping produce a hedging model that is better than the one based on the above traditional approach?

In this presentation we provide an example of such an alternative mapping based on "external price adjustors". We show how external price adjustors modify the risk exposure produced by the underlying derivatives pricing model.