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I wanted to mention something that is important in derivatives portfolio/risk management but that doesn't come out in the interview questions, that is often the source of DM questions. Often my interview questions are "how would you hedge this rainbow variance option" ... (1/n)

... which is intended to help people understand the particular nature of the risk of that instrument, and more generally, the way derivatives traders think about synthetizing more complex risks out of simpler building blocks. (2/n)

However, that does not mean that the sell side trader literally goes out and executes that replicating portfolio hedge every time his bid gets hit or offer gets lifted, or manages each position he has on via that dynamic replication strategy. (3/n)

That would be prohibitively time-consuming, costly and inefficient, even on a big bank desk with a lot of infrastructure. (4/n)

Rather, the trader manages their overall portfolio exposures as a risk pool - and depending on the product and the bank, much of that risk may roll up into a larger portfolio that pools risk sourced on various different desks (flow, exotics, etc.) (5/n)

To simplify, the job of a sell side trader is to make markets on customer requests; collect some spread when customers hit the bid or lift the offer (hopefully...!); and then hold onto as much of that spread as possible over time. (6/n)

Holding onto spread means optimizing the tradeoff between risk reduction and cost efficiency. The most risk-reducing hedge is to go out into the inter-dealer broker (IDB) market and immediately transfer the exact risk away, but that's rarely cost-efficient. (7/n)

Rather, a sell-side trader will model all the various risk factors of the positions in their portfolio, understand how much risk is contributed from each source, and seek to contain the overall risk and the size of the various basis risks they have. (8/n)

For example, a US index vol trader might slice the volatility surface into buckets by delta and forward time to maturity, and monitor their overall net vega positions and their spread basis risk between SPX, NDX and RTY within each bucket. (9/n)

They might also apply a range of covariance matrices to that risk bucketization to measure a range of overall portfolio volatility expectations under different correlation regimes. (10/n)

When a customer lifts the trader's offer on $250k vega of 6-month SPX variance, that will decrease the portfolio's gamma, and decrease its net vega in each of the forward tenor buckets inside of 6 months at a rate which is increasing as scenario volatility levels rise. (11/n)

The traders' happiest outcome is to offset the risk of the trade with another client trade. If she currently has a 3-month variance market out to another client who she believes is a seller, she'll probably show a tighter bid, maybe 0.1 below mid. (12/n)

If she wins the trade, and the size matches, now she has a 3m-6m variance switch position on, and collected spread on both sides. Later that day, when she sees a client quoting a 3-month into 3-month forward-starting option, she shows a good bid to buy 3m3m forward vol. (13/n)

More generally, she's going to have "axes" in her portfolio all the time, risk factors where she's longer or shorter than she'd like to be. She'll be looking for flow to reduce those exposures, bidding or offering more aggressively on trades that will be net risk reducing. (14/n)

If a very large customer trade came in, $5 million vega, she would probably have made a wider market and collected more spread, but also been more aggressive in the initial hedge, working in multiple markets (VIX, SPX, etc) to flatten out the first-order risk. (15/n)

She might also have retail structured note issuance flowing into her book, creating particular exotic forward vega and skew risks that are not statically hedgeable. She'll hedge first order exposures more quickly, and manage the residual exposures more gradually. (16/n)

You get the idea.

Point is, these specific questions about how you would hedge or dynamically replicate some particular instrument or strategy are designed to help you understand the basic concepts - they're not literally what happens on every individual trade on a standalone basis!

Also note that, while having been involved in running this type of book teachers a trader a tremendous amount about how to measure and manage derivatives risk, the actual *moneymaking* part is quite different from the equivalent process on the buyside ....

here the pnl is dropped into the book steadily by customers, and the trader's job is to manage down the risk over time while holding onto as much of the pnl as possible, all the while dodging grenades (toxic trades) and satisfying her risk managers