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I have been explaining specific cases of this a lot lately so figured I should address it more generally in a quick thread. The underlying of every fixed-maturity derivative is the forward price of the underlying to that maturity date, NOT the spot price.

To a commodities or interest rates trader this is trivially obvious. Its equities people who struggle to think about term structures (there was a reason for the Equities In Dallas thing)...

But to be fair to equities folk, it is because they don't really think about term structures in their day to day lives. The term structure of equity forwards is given by no-arbitrage relationships between spot, interest rates (financing), and dividends.

Simplifying a bit, the forward price to date T of an equity at time t is given by $F(T, t) = S(t) * \exp((r(t, T) - q(t, T)) * (T-t))$ where $S(t)$ is the spot price at time t $r(t, T)$ is the interest rate between t and T $q(t, T)$ is the dividend yield between t and T

(and yes, other financing angles can come into the above relationship as well, e.g. hard-to-borrow stocks have an extra component from borrow cost / lending return)

If a trader needs to deliver a stock at date T, they can either borrow money to buy the stock now (at time t), and hold it until time T, collecting dividends over that period; or they can buy the T-forward contract at time t. No-arbitrage principles enforce the relationship.

So if we know rates, dividends and borrow costs then we know the term structure of equity forwards, and we can transform the cost of delivering a stock at time T1 into the cost of delivery at T2 with some trivial math.

As a result, we get the Black-Scholes simplification, where the forward does not appear directly in the pricing formula, but rather it appears implicitly through the inclusion of interest rates and dividends in the formula.

This is completely different than other product markets. Take crude oil, for example. Crude delivered in January is a very different product than crude delivered in May. If you need to fuel a power plant in January, you can't use crude promised for delivery in May to do it!

And if you need to process oil into gasoline in May, but you have oil in January, you need to store it, which might get very expensive if everyone else needs storage space as well.

The price of each month is determined by supply and demand for oil for delivery in that month and by the storage economics. So the term structure can swing back and forth between contango and backwardation; some months can go up in price and other months down on the dame day; etc

An option contract gives the owner the right to buy or sell on a defined maturity date in the future. To hedge that option, the seller would trade futures or forwards to that same maturity date. In the case of crude, the typical option contract is an option on a future.

An equity option buyer or seller might not explicitly think about it, but by trading the underlying stock as their delta hedge, they are taking basis risk to the difference between spot and forward (e.g., to rates and dividends).

Anyone who owned a long dated call option on a company that announced a significant increase in their forward dividend growth guidance found that out the hard way.

This issue comes up all the time in the VIX, where many people reference moves in spot VIX and wonder why their options positions don't move in line with it.

The VIX future (or the forward, calculated from put call parity on the options) is the underlying of each month's VIX options. If a market maker buys a November VIX call, they sell the November futures against it.

The Nov VIX call and the Nov VIX future settle at the exact same moment, into the exact same VIX spot calculation based on the SOQ. So if the long November call has gone deep in the money, a short futures position against that call will be a riskless position into settlement.

That's the essence of what it means for a security to be the underlying of a derivatives contract.