

10 Options Risk – Part 2: Measurement vs. Hedging vs. P&L

The previous Chapter focused on the first of the three core components of position management, stated as:

- Definition of core methods and measures.
- Single period hedging and position management.
- Holistic/holding period position management, with attention to both reliable valuation, and “optimal” risk-adjusted holding period P&L (returns).

This Chapter focuses on the second of these core elements. Here, the key issues addressed are:

- How does the use of a specific risk measure impact hedging decisions, and the ensuing position P&L.?
- How to incorporate the real-world multi-dimensional aspects of options risk in the process, and especially the simultaneous or correlated impacts on P&L.
- The extension to using scenario analysis/reporting, which is shown to be the “minimum” level of risk measure/reporting, since the basic risk measures from the previous Chapter don’t even begin to capture the totality of risk and the P&L implications, especially in a dynamic environment.
- The position P&L is impacted by factors evolving over time, and as such as sensible risk management mechanism must assess the P&L impact due to the dynamics at hand. However, this Chapter focuses on the first step of assessing dynamic issues, and as represented by single period dynamics. The comprehensive or holistic matters correctly belong in the third core element as introduced in Chapter 22. Indeed, those holistic analyses will also be required for the “prove it” rule, to assess the credibility of the entire risk management, position keeping, and even pricing formula veracity questions.
- That position management issues cannot be couched in the “comfy” highly idealised setting of pure theoretical (academic) finance. Notably, each decision (or lack thereof) implies some asymmetry or imperfection, and will necessarily lead to “slippage” on many occasions. As such, real world position management is to a large extent the management of “slippage”, and how that is factored into the operational and business models.

Once again, these points are just one element of three core elements, and it is emphasised that all three components are required in the position management process.

This Chapter focuses primarily on market risk, and primarily on sensitivity related measures. However, it will be shown that certain types of sensitivity approaches can be used for a kind of Profile Matching and which permits moving to static replication, rather

than dynamic replication. Similarly, it will be seen that using scenario analysis with probability weighting is in a sense tantamount to a kind of VaR-like result.

This Chapter presents risk measurement and management mostly from a “hedging” perspective. This is purely a matter of convenience. The general notion of “rebalancing” a position may be in the context of hedging (as in risk reduction), or it may as part of a directional or arbitrage strategy. The calculations in this Chapter remain the same regardless of the actual purpose of the rebalance.

Ultimately, it is important not to get bogged down in semantics. The definitions are important, but your ability to “see” what the measures and strategies are “doing” or “telling you” is what counts.

10.1 Risk Measurement vs. Hedging vs. Position Keeping (P&L is everything)

In a sense, expressions like “risk measurement/reporting” are virtually meaningless in the real world if they are processes taken in isolation. It does not matter how many Nobel laureates stand by the theories if they do not provide a sensible linkage to P&L (unless of course your only objective is to publish in academic journals).

Ideally, a position management process/strategy should tie contract valuation and rebalances to the holding period (risk-adjusted) returns. The BSM framework sort of tries to do this for option pricing. It is with that linkage lingering in the background that options risk measures (e.g. the Greeks) are/can be considered to tie together the risk measures (at any one instant in time) to the holding period returns.

Unfortunately, the BSM framework is developed in a highly idealised setting with many heroic assumptions that do not hold in the real world. Even worse, the practice of position management generally deviates considerably from the assumptions, even where it might be possible to preserve BSM requirements.

Be that as it may, for the moment it will be assumed that risk/rebalance issues at any one instant are in fact such that the “appropriate” sequence/strategy of these measures/actions collectively over the holding period are tied together in some sensible risk/return context. The degree to which this is untrue, and remedies for the divergences, is deferred to Chapter 22, and to [8.a].

For this Chapter, the discussion focuses on hedging or rebalancing that is implied or used at any one instant in time, based on the risk measures, and how those actions impact P&L over one (or a few) time periods.

The key lesson here is that risk measurements are almost incidental since the important outcome is the effect on P&L. Put differently, as traders we would rather “be wrong” by the theoretically measures of risk, if the outcome provides a better P&L.

Caveat: In reality, your mandate/regulators will require your risk measures/reporting to follow certain rules, even if they are sub-optimal from a trading perspective. However, and as is common practice, it is perfectly sensible (and sometimes desirable) to report your risks as required by the “higher powers”, but rebalance based on the “measures” that benefit your positions. That is, hedging may well, and reasonably, be performed based measures that differ from the official risk/reporting measures.

Clearly, this forms a demarcation between (official) risk measures and (sensible) hedging/trading. This way, the regulators are happy, and your P&L is happy.