



Real World Portfolio Simulation

A portfolio simulation application with real world features and decision making capability

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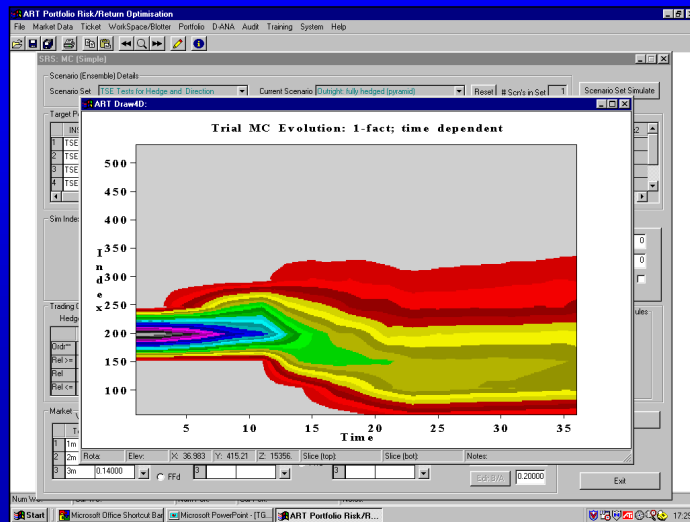
These slides are excerpts from a section on portfolio management. As with many of the slides in the position keeping case studies (such as those in the Samples in DerivsTradingSamples.pdf), here, portfolios are analysed via backward and forward testing and include rebalance strategies and many real world effects (transactions cost, funding, liquidity, etc). However, with more complex portfolios and trading issues the analysis requires somewhat greater sophistication.

This slide shows that a position with a long dated equity option and funding book will be assessed for its P&L performance over its holding period. The expected market conditions are also tested for the “usual” market assumption that the market simply drifts linearly, and also against the assumption that the market undergoes a large down turn and increase of volatility prior to return to a more normal condition.

As an interesting additional illustration of the usefulness of a full portfolio analysis, in this case the long dated equity option is hedged via several strategies including delta only, delta+gamma, and Pyramid involving futures, short dated equity options, and bonds. However, this example was from a market with an inverted yield curve, and it will be seen that though this appears to be an equity portfolio, it does end up losing money partially due to interest rate issues with certain rebalance strategies.



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One of the expected market conditions tested is one where first the market trends upwards with a typical volatility (18%), but then is set to have a “mini crash” with a large increase in volatility (40%) prior to returning to another upward trending environment with typical volatility.



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SR: Simple OutPut
Portfolio History Viewer

Port Number: [] Port Date: [] Port Time: [] Port Offset: 0.167

Filter: [] Custom

ID	Curr...	Status	Trnsfrd	Tms To	Index	Notional	Instr...	Deriv	Strike	Type	Ex...
1	100	CAD	Live		TSE	10.000	Spot	Option	200.00	Call	Eu
2	1	CAD	Live		FUNDIN	984.88	Depo	Spot	0.0000	Spot	No
3	104	CAD	Closed	Expired	EICash	TSE	-1.6500	Spot	Future	225.85	Fr
4	105	CAD	Closed	Expired	EICash	TSE	1.1085	Spot	Option	215.00	Put
5	106	CAD	Closed	Expired	EICash	Gov.	5.4200	Bond	Future	11.500	Frwd
6											
7											
8											
9											
10											

Port Properties
Total Deals: 5 Total Deals Shown: []

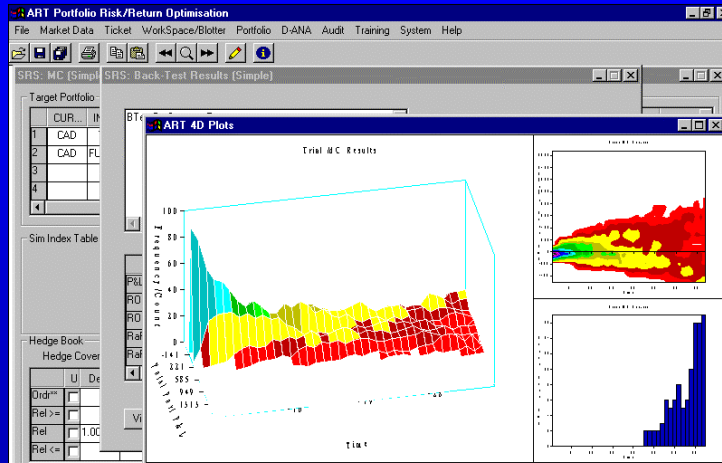
At any point in "time" the composition of the portfolio is a result of market conditions and the rebalancing strategy

A portfolio simulation for 1 path for a "Pyramid Flat" hedging strategy

This slide shows one step through the life of the position, and illustrates that even a single option position with a Pyramid hedge will often have at least 5 "contracts" in the books.



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The net P&L performance of the portfolio for the forecast conditions and the given rebalancing strategy can be reviewed for a large number of paths.

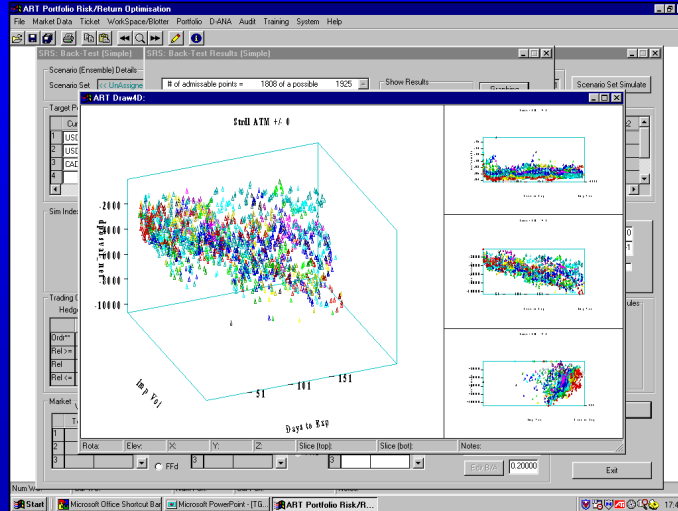
A portfolio simulation for 1000 paths for a "DELTA Flat" hedging strategy

This slide shows the P&L distributions for the portfolio from above during its entire life. It is noteworthy that the long dated equity position held during an effectively rallying market has performed less well than might have been expected on a total return basis, partially due to the volatility in the market, but also due to the shape of yield and volatility curves first used to value the long dated equity option.

Other important observations include that the variability of P&L is quite large. The plot to the top right shows that width of P&L distribution is quite wide and there is a small chance of producing "adequate" returns, though the trader or management may wish to decide if another strategy is more consistent with the firm's risk-adjusted requirements for the returns generated by the trading desk.



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This slide illustrates that visualisation methods with forward and backward testing of portfolios are quite important, since though the 2-D plots on the right seem to be just “blobs of points”, the 4-D plot clearly shows important patterns in the P&L as parameterised by market conditions. This type of analysis can then be used to not only assess position keeping strategies, but also to determine buy/sell conditions.