

Citi Prime Finance



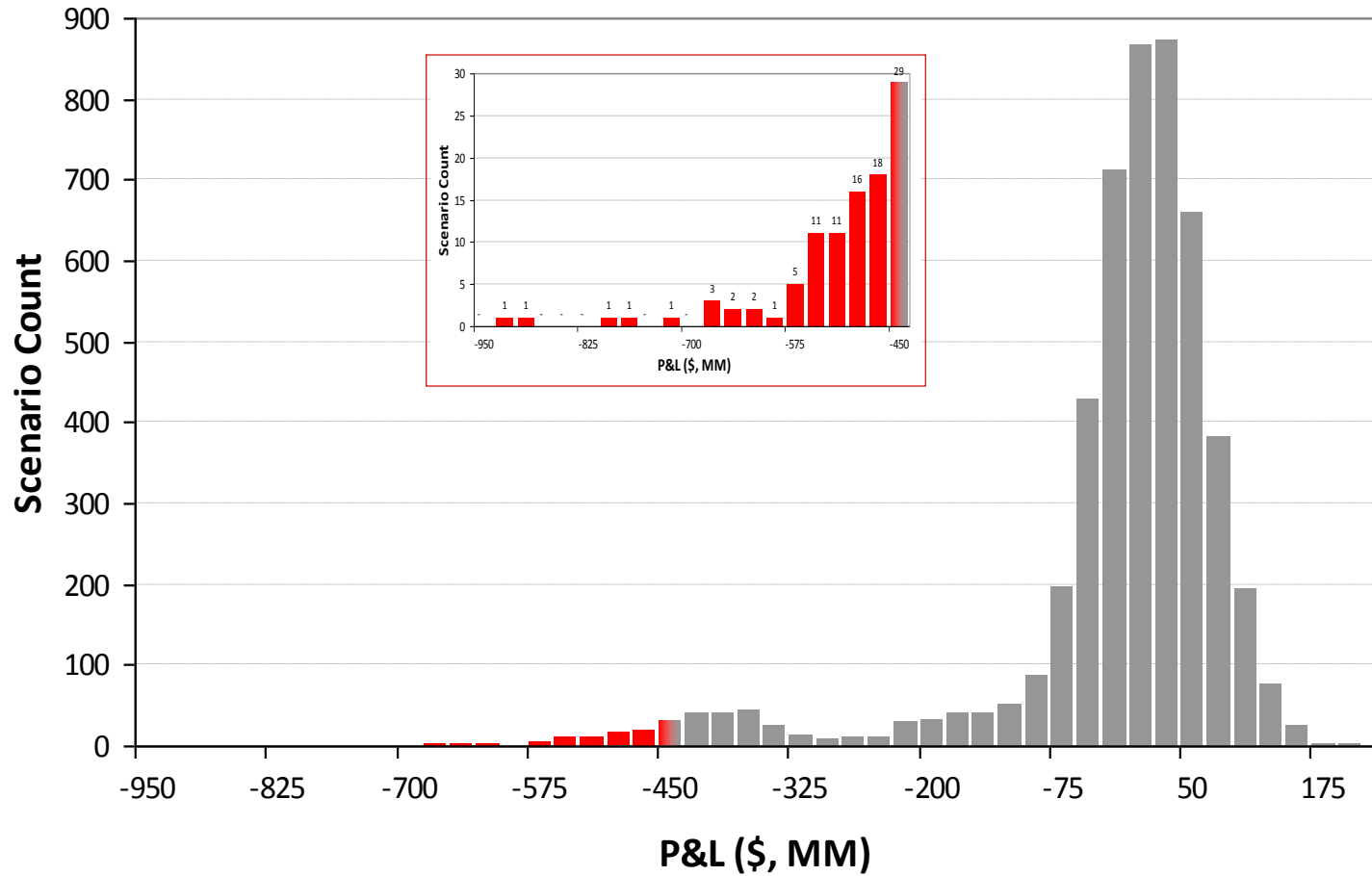
Managing Tail Risk in a Global Multi-Strategy Portfolio

Volatility and Tail Risk Hedging – Tony LaPorta, April 2012

Agenda

- P & L Distribution
- Objectives
- Definitions
- Example
- Observations

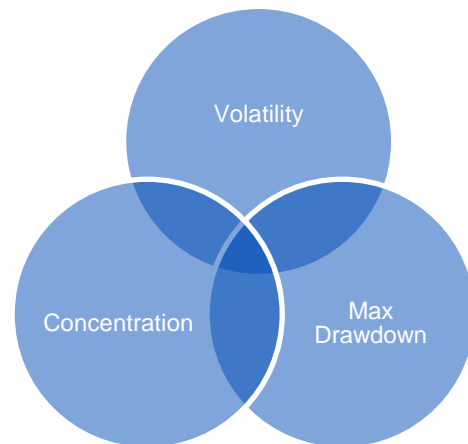
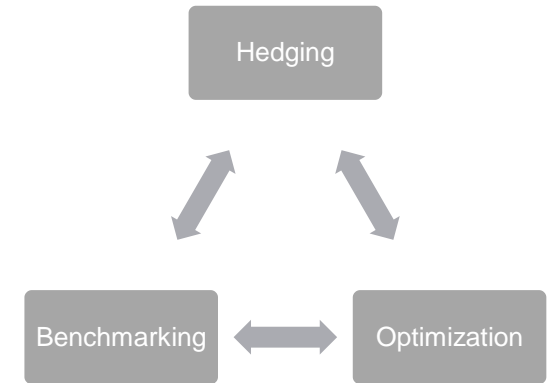
Histogram of Losses for a Generic Example

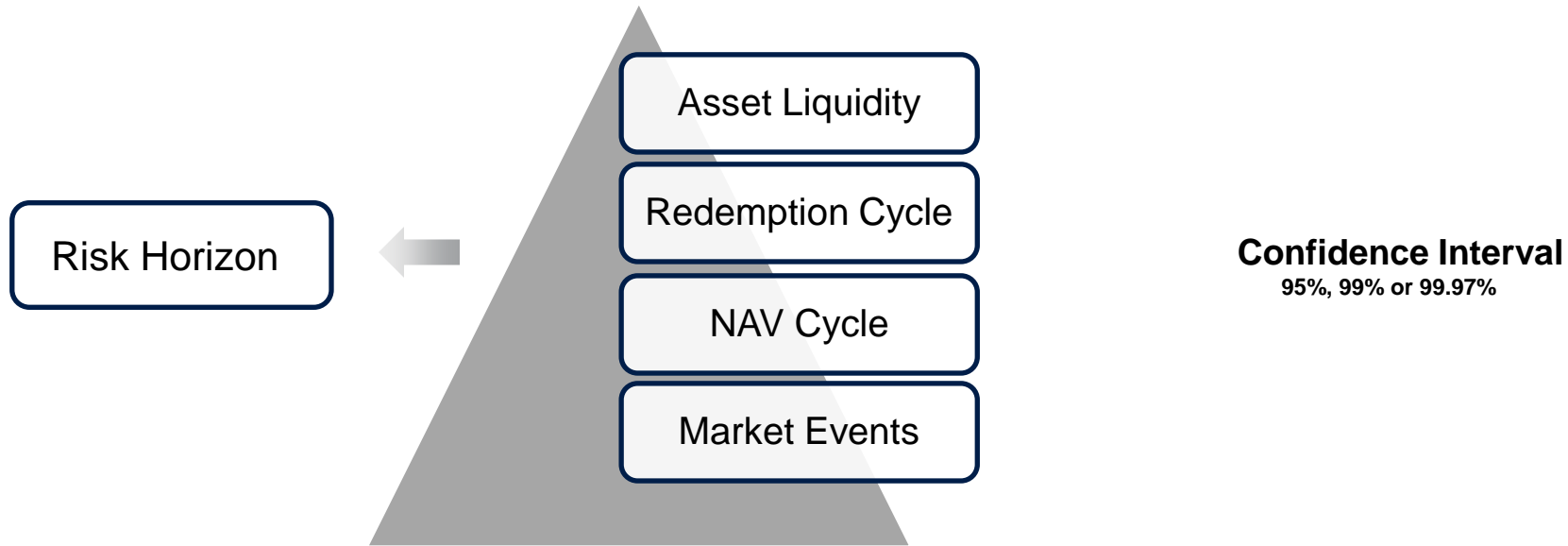


Prevent Forced Liquidation on Tail Event

Create a Risk Measurement Framework

Stay within the Risk Parameters Defined in Offering Memorandum





$$\text{Economic Capital} = \text{Term Margin} + 2^* (\text{Worst Loss})$$

- Term Margin -> Locked up for the Selected Risk Horizon
- Worst loss -> lesser of VaR, Unconditional Stress, Conditional Stress
 - Uniform Confidence Interval and Risk Horizon
 - VaR Serves as Baseline
- 2* -> Practical and Allows for Uncertainty

Example – Multi-Strategy Fund (\$2bn under Management)

- Daily 99% VaR of \$(25)mm
- Term Margin Requirement of \$1BN
- Primary Risk Factors Provided below
- Risk Horizon 1 Month, CI 99%

- Scaled VaR -> $\$25\text{mm} \times \sqrt{21} = \115mm
- Unconditional Stress Loss = \$(250) (aggregated using a correlation matrix based on historical data)
- Conditional Scenarios = \$(362), \$(118), \$(339)

Factor	Exposure		Shock 1-month 99%			Conditional Scenarios					
	Unit	Amt	Unit	Amt	Loss	Loss Severity			Loss Amt		
						Europe Fin. Crisis	China Slowdown	Inflation Crisis	Europe Fin. Crisis	China Slowdown	Inflation Crisis
DM IR 30yr	\$mm/bp	(1)	bp	100	(100)	-50%	-25%	200%	50	25	(200)
DM IR 2/10	\$mm/bp	1	bp	50	(50)	50%	25%	200%	(25)	(13)	(100)
IG Corporate Bond	\$mm/cr01	(1)	bp	100	(100)	200%	25%	25%	(200)	(25)	(25)
IG CDS	\$mm/cr01	1	bp	75	(75)	-150%	-25%	-25%	113	19	19
EM High Vol FX	\$mm	500	pct	15%	(75)	100%	50%	0%	(75)	(38)	-
Equity Net	\$mm	100	pct	25%	(25)	100%	50%	20%	(25)	(13)	(5)
Equity L/S Matched	\$mm	1,000	pct	10%	(100)	100%	50%	20%	(100)	(50)	(20)
CBond Arbitrage	\$mm	1,000	pct	5%	(50)	150%	35%	10%	(75)	(18)	(5)
SN Concentration	\$mm	50	pct	100%	(50)	50%	10%	5%	(25)	(5)	(3)
Totals					(625)				(362)	(118)	(339)

$$\text{Economic Capital} = \$1\text{bn} + 2 \times \min(-115, -250, -362, -118, -339) = \$1.724\text{bn}$$

Observations

- Fund is Adequately Capitalized to Absorb a Major Shock
 - Available Capital beyond margin and loss buffer at \$274mm
 - Current VaR Implies Annual Volatility of ~8.6%
 - Max Drawdown at ~18.1%
- Interest Rate Exposure is Dominant in an Inflationary Environment
 - Possible Hedge in Long Dated Swaptions
- Long Credit, Equity and Convertible Exposure Sensitive to Financial Risk
 - Possible Hedge in Equity Puts, Tranched Protection
- Hedging Could Increase VaR While Decreasing Scenario Risk
- Overconfidence in Scenarios is a Risk
- Counterparty Risk on Derivatives and Operational Risk not Included
- Model Could be Used at a Strategy Level

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