# Twitter Thread by Risk Manager(Banks,Asset Management,Insurance)



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**If the connotation of risk is an intertwined concept and is difficult to quantify, how does a Risk Officer look at it?**
**Is there any way other than using copula models to determine systemic risk with long tails or a black swan event?**
**@CQFInstitute @GARP_Risk @SOActuaries**

I guess we are worried about Market and Credit Risks or other interrelated financial risks which can create conjoint loss given events.

Any #Gaussian distribution model will enable you to model and predict potential Operational, Liquidity and Balance sheet AL - (Asset - liability) Mismatch, Market and Credit drove losses under normal market conditions.

But in the financial sector, the trend has been to emphasize more on #material and #quantifiable risks, which adhere to SPC #Statistical Process Control such as Credit and Market risks, at least in the context of financial instruments with a #linear pay -off.

Research has shown that even in the financial sector most of the #tail #risk event impacts are #Operational in nature=>
•75- 80% of the loss given events are classified as Operational #LGE - (LOSS GIVEN EVENTS),
•Only 15%- 20% of the LGEs are driven by Market or Credit or both

Stress testing is one tool which can be used to model risks to have correlated material impacts, for e.g. in the Hedge Fund Business.
#Risk managers can use #scenario #analysis based on an expert judgement, that can be more helpful, instead of applying #VaR models blindly.

Most preferred will be #Bayesian Methods applied to stress testing and scenario analytical models to assess #conjoint heavy-tailed risk impacts!

Using the #Gaussian #Copula Model to check Dependency / Co-Dependency can create further problems.
The Financial Markets outcomes are not Normal or i.i.d in any sense.

I assume you are referring to some other Copula Modeling Technique, such as the #Gumbel Copula?
Gaussian Copula model assumes that correlation (strength of association between x and y variables) is Linear and hence presents the symmetric perspective of market-driven loss events.

Operational Risk Modellers faced a lot of difficulty at banks when they were implementing the #AMA - Advance Measurement Approach Models.
@BIS_org

Most of the Operational Risks were strongly correlated and hence copulas were used to model dependency/codependency risks.
But that didn't work out well using symmetric event modelling assumptions!

The real #Conditional #Tail #Risk is emanating from #Asymmetric Co-dependent Events!

Ultimately, @BIS_org guidelines were re-issued to Commercial Banks, and now they don't need to apply the AMA - LDA (Loss Distribution Approach) Methodology to compute Operational risk capital required by the deposit-taking institution.

I am sure hedge funds face similar kind of asymmetric risks which also develop co-dependency over time.

Kindly note Operational risk modelling of hazardous and other non -hazardous risk incidents and events require two distributions aka a compound distribution, (which consists of both the Frequency and the Severity Probability Distribution Models).

Both are statistically different from one another!
A #Poisson Probability Distribution Model to measure frequency, whereas stochastic simulation can be used to measure severity for each single event loss.

The loss frequency distribution must be combined with the loss severity distribution for each risk type/business line combination in order to determine a compound loss distribution.
The most common assumption used is that loss severity is independent of loss frequency.

How to accurately simulate this distribution?
This Loss distribution model for e.g. in the context of a Hedge Fund?
Can we induce randomness into the experiment to better capture heavy loss incurring tailed events aka Black Swan Events (having high severity and low frequency)?

#Hull (2015) suggests the following steps be taken in building the #Monte #Carlo #Simulation leading to the modelling of the loss distribution:

1. Sample from the frequency distribution to determine the number of loss events (nnn)
2. Sample nnn times from the loss severity distribution to determine the loss experienced for each loss event (L1, L2,…,Ln)

3. Determine the total loss experienced (=L1+L2+…+Ln=L1+L2+…+Ln=L1+L2+…+Ln)

An MCS Experiment might not suffice in picking up rare unforeseen abnormal loss events. It can help you to only optimize your understanding of normal risk incidents (high frequency and low severity) for a given level of probability.

Probably you need to use #EVT Extreme Value Theory to assess very large and rare losses.

BIS Basel Accord earlier provided guidelines under Basel II Framework (now stands revised).
Kindly refer to the same BASEL II - ORM Taxonomy as laid down in Basel II literature to better understand the vertical dependencies between various risk types/ across various lines

They are Seven pillars of OPs Risk Taxonomy in altogether =>
The following lists the seven official Basel II event types with some examples for each category:
1.Internal Fraud – misappropriation of assets, tax evasion, intentional mismarking of positions, bribery

2.External Fraud – theft of information, hacking damage, third-party theft and forgery
3.Employment Practices and Workplace Safety – discrimination, workers compensation, employee health and safety

4.Clients, Products, and Business Practice – market manipulation, antitrust, improper trade, product defects, fiduciary breaches, account churning
5.Damage to Physical Assets – natural disasters, terrorism, vandalism

https://t.co/LzetwUdFiR Disruption and Systems Failures – utility disruptions, software failures, hardware failures
7.Execution, Delivery, and Process Management – data entry errors, accounting errors, failed mandatory reporting, negligent loss of client assets

A hedge fund might face similar operational and financial risks.
To better comprehend hedge fund business complexity you need to have a proper FMEA (Failure Modes and Effect Analysis) ....

OR #PDCA (plan -do check -act) / RCA (root cause and analysis) Methodology to properly map and drill down key risk factors and driver/s, which can enable the modeller to better qualitatively understand and visualize the risk incidents and loss given events that have big impacts!

Don't underestimate #ORM Operational Risk
Management that is a classic problem observed in the #FRM Profession, just because it is difficult to do quantitative modelling.

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