

HOW CAN WE MOVE TO STOCHASTIC ANALYSES?

Girinker Aggarwal *GI Actuary*

Building & Maintaining STOCH Models

- *Introduction*
- *Building the Model*
- *All you NEED...*

Stochastic Models

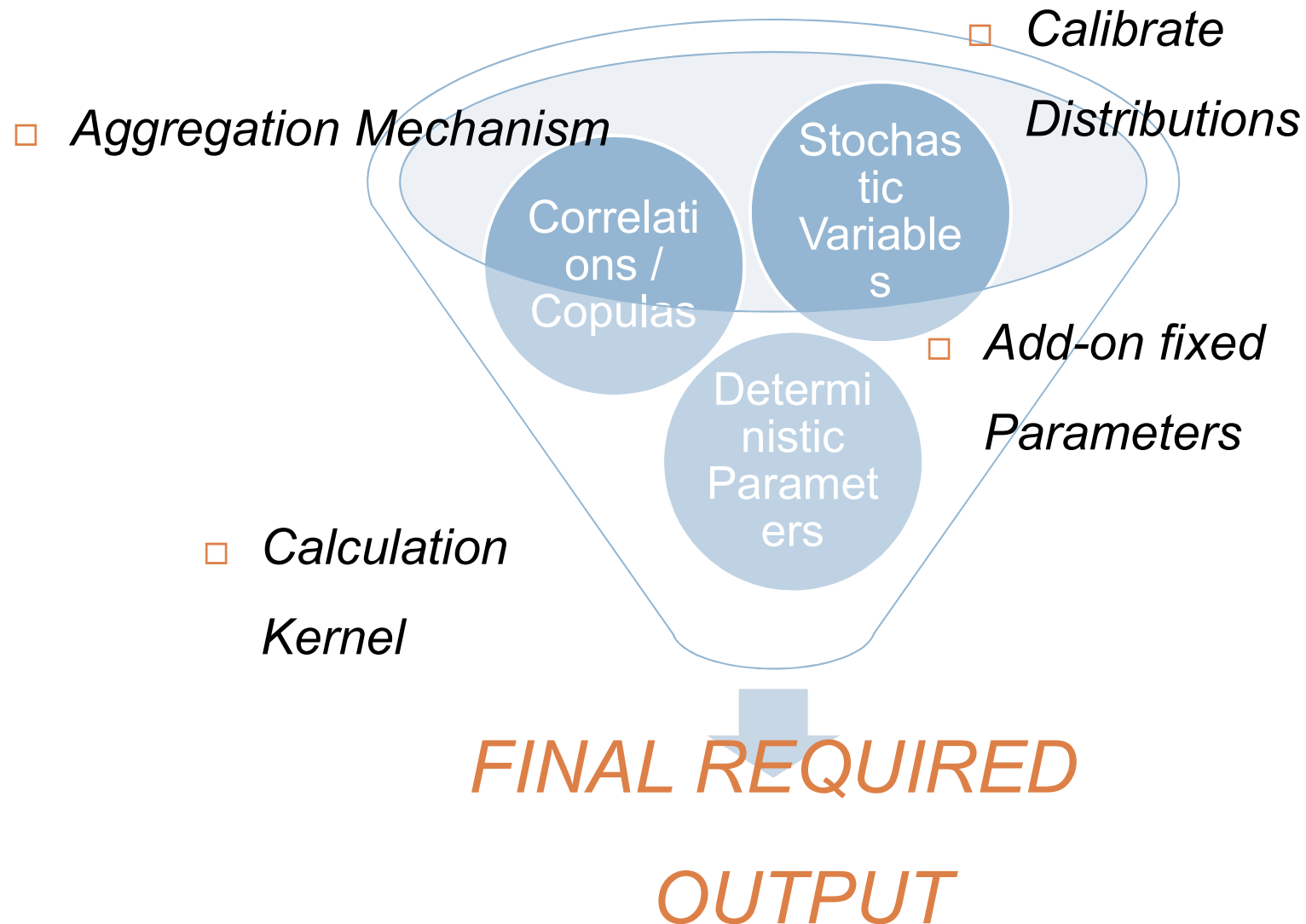
>> 10s of 1000s of simulations as
opposed to 10s of deterministic
scenarios...

>> More statistical analyses, more

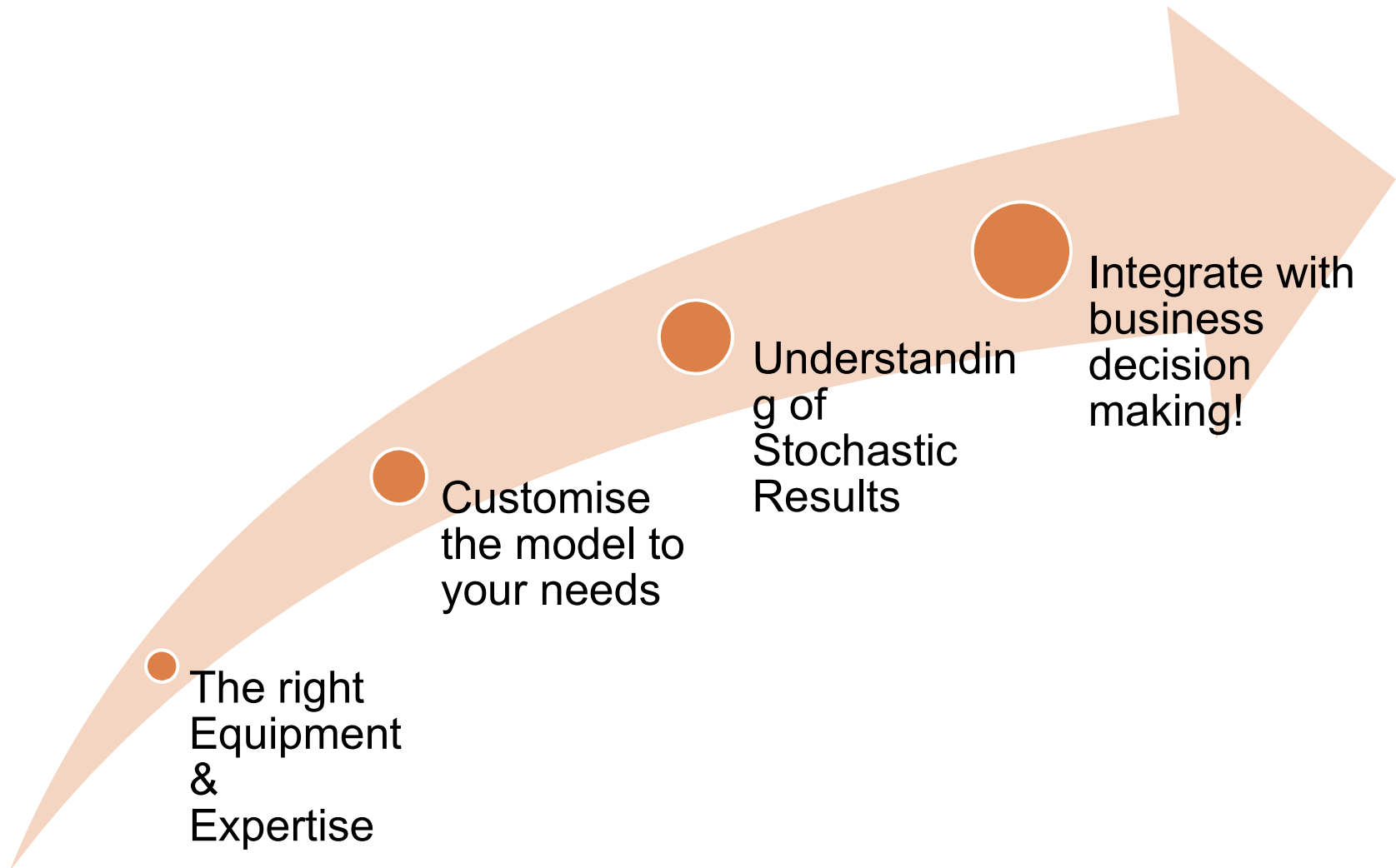
INSIGHTS!

SIMULATIONS	Premium	Losses	Expenses	Investments	Defaults	...	...	Δ Net Assets
1	1,091	588	291	150	7			355
2	1,035	605	214	245	5			455
3	1,065	685	247	103	6			230
4	1,061	767	208	(87)	1			(2)
5	1,037	478	223	225	9			552
6	1,056	1,122	253	(164)	10			(493)
7	1,082	674	219	61	3			248
8	1,030	889	276	(223)	3			(360)
9	1,060	681	290	225	7			306
10	1,036	542	255	186	7			417
11	1,045	970	292	212	10			(15)
12	1,058	1,138	267	(69)	7			(424)
13	1,091	938	233	206	5			121
14	1,065	672	235	135	5			287
15	1,008	630	210	(13)	8			148
16	1,060	886	237	1	6			(68)
17	1,007	840	217	157	2			106
18	1,072	654	297	110	6			225
19	1,092	470	276	222	6			561
20	1,074	916	293	(71)	6			(212)
21	1,068	533	222	241	1			553
22	1,042	558	254	84	5			309
23	1,091	458	259	(88)	1			285
24	1,069	708	243	248	3			362
25	1,014	501	221	197	5			484
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.	.	.	.	.	.			.
.	.	.	.	.	.			.
10000	1,034	1,122	286	99	1			(276)
Mean	1,055	732	251	92	5			160
St Dev	25	209	30	139	3			308
CoV	2.4%	28.6%	11.8%	150.8%	53.1%			193.0%

Building the Model



All you NEED...



The Business Application...

- *Economic Capital Required*
 - *Enterprise Risk Management*
 - *Return on Shareholder Capital*
 - *Business Planning / Budgeting*
 - *Reinsurance Optimisation*
- and many more...*

What we do now...



DETERMINISTIC ANALYSES

- ▣ *Best Estimate Reserves*
- ▣ *Single Point Risk Premiums*

GENERAL INSURER

- ▣ *Motor*
- ▣ *Property*
- ▣ *Liability*



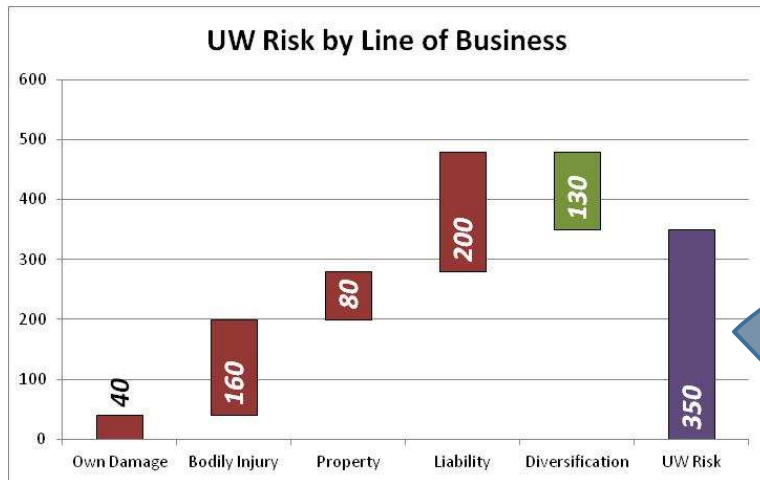
STOCHASTIC ANALYSES...

What more can we do?



Economic Capital Calculation

*INSIGHTS into extreme
unforeseen events!*



What Constitutes Your Capital?



*How capital intensive is your
business??*

NET ASSETS

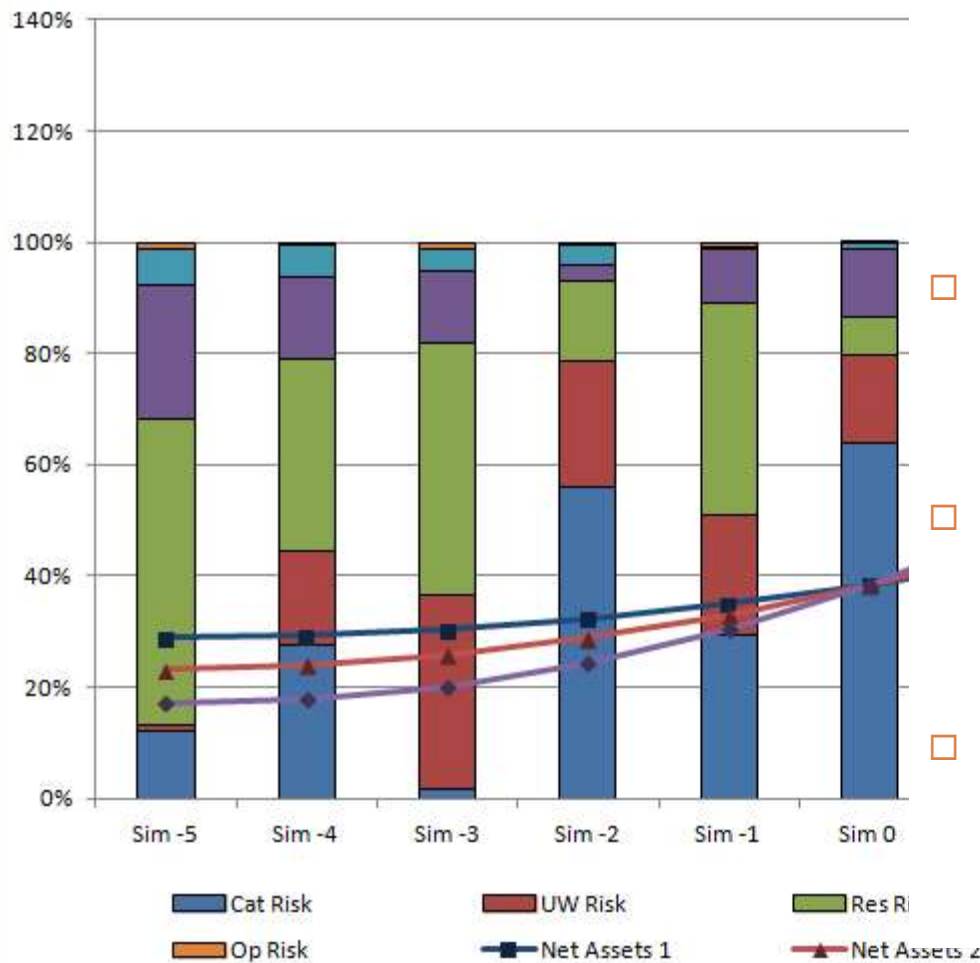
Enterprise Risk Management

What are your RISK SCENARIOS??

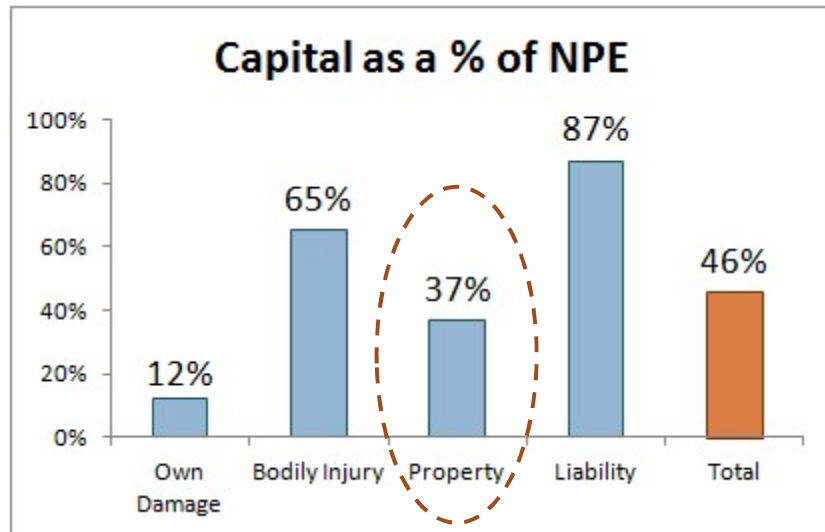
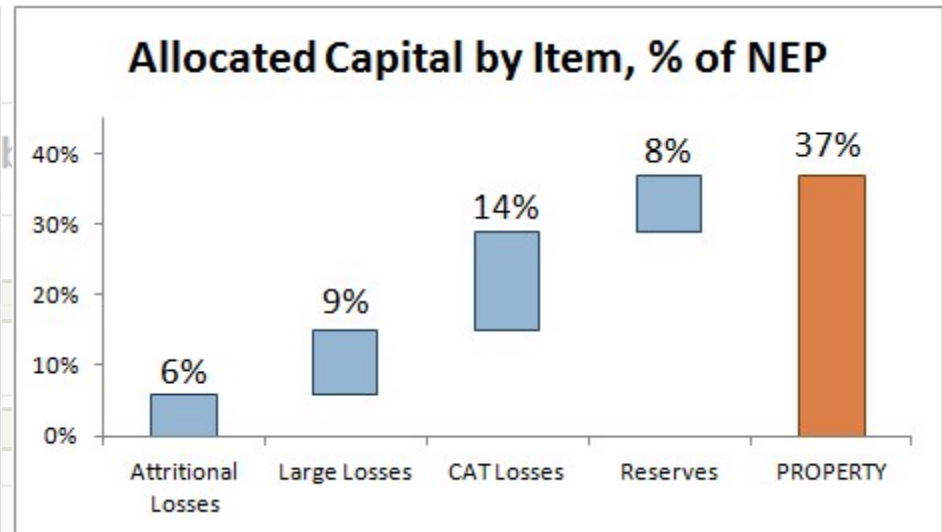
KEY

CONSIDERATIONS

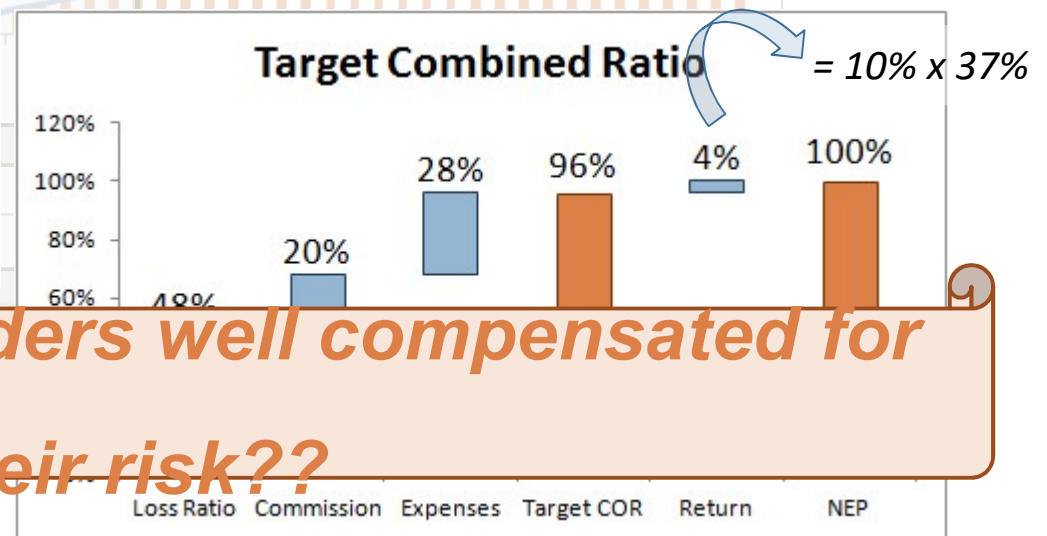
- *Develop and maintain a risk register*
- *Effectiveness of the risk mitigation strategy*
- *Impact of writing a new line of business*



Return on Shareholder Capital



***TVaR approach to
Allocate Shareholder
Capital***



***Are your Shareholders well compensated for
their risk??***

Business Planning / Budgeting

SIMULATIONS	No. of Losses	Event 1	Event 2	Event 3	Event 4	Total
1	3	1,030				
2	2	826				
3	2	980				
4	3	820				
5	4	1,082				
6	2	900				
7	2	765	1,			
8	4	797				
9	2	1,099				
10	1	1,062				
11	2	373	1,			
12	5	631	1,000	700		2,331
13	2	298				
14	3	940				
15	3	457				
16	4	1,092				
17	2	1,008				
18	2	396	1,			
19	1	554				
20	2	410				
21	-					
22	3	410				
23	3	582	1,			
24	1	667	1,			
25	5	560				

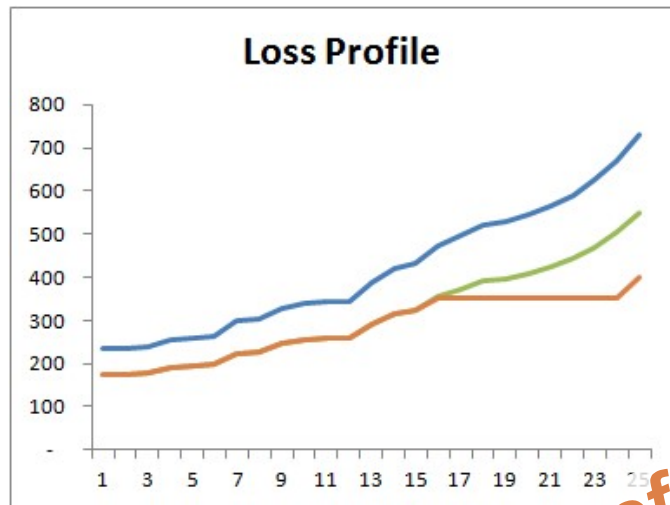
No. of Expected Losses by Band				
	\$100k - \$500k	\$500k-\$1m	\$1m-\$5m	>\$5m
Own Damage	5.4	2.8	0.6	0.1
Bodily Injury	8.3	6.1	3.6	1.4
Property	6.7	3.9	2.2	1.5
Liability	3.3	2.7	1.2	0.3
Total	23.7	15.5	7.6	3.3

Expected Cost per Claim by Band				
	\$100k - \$500k	\$500k-\$1m	\$1m-\$5m	>\$5m
Own Damage	180	645	2,165	5,140
Bodily Injury	350	834	3,165	6,189
Property	275	774	4,387	8,190
Liability	248	610	2,870	7,345
Total	276	746	3,393	7,172

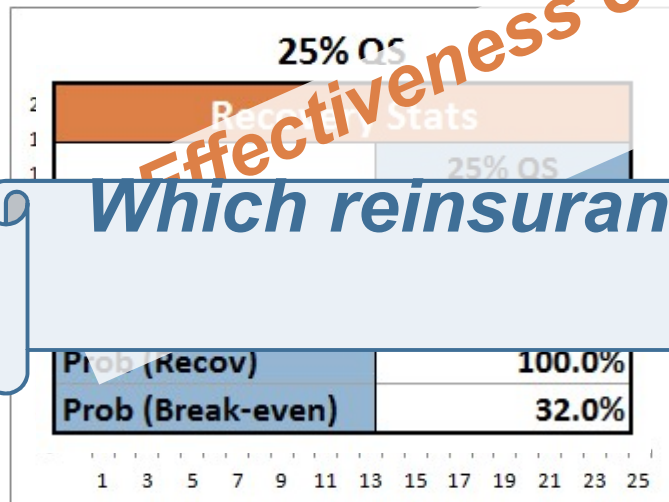
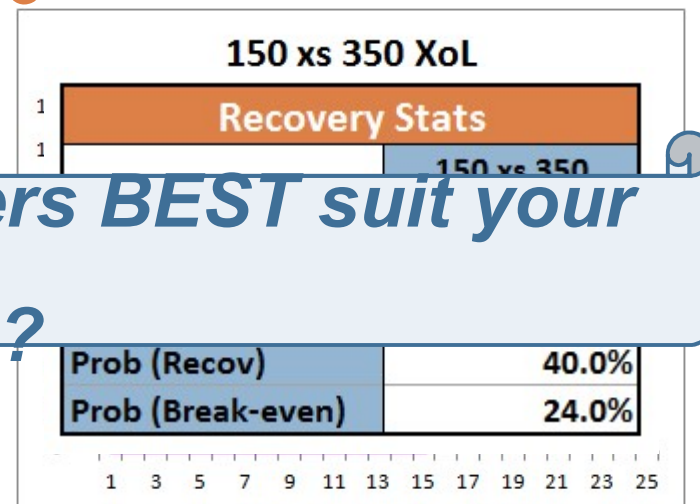
CoV	45.1%		41.7%
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*Application in Large/CAT Losses, LRs,
prudence loadings*

Reinsurance Optimisation



Loss Profile - Impact of Reinsurance			
	Gross Loss	Net of 25% QS	Net of 150 xs 350 XoL
Average	358	313	283
St Dev	149	112	72
CoV	35.8%	35.8%	25.5%



*Which reinsurance covers **BEST** suit your needs??*



A Word of CAUTION!

The model is part of the decision process; it is NOT the decision....!

BEWARE!



Calibrating Distributions &
Correlations

Events NOT in Data

Parameter Error

Model Error

Spurious Accuracy

Process Error

Multiple
Conclusions

Interpretation of
Results

Model
Limitations

Informing the Answer, Not Providing it

BUT, and it's a BIG but, we never will get to a point where we can say with absolute certainty that this is "the" correct result. Therefore models only advise, models must never decide. Intelligent humans, who understand the models and the business context they operate in, should use them to help make a business call, be it "should I write this risk?", "should I buy this reinsurance cover?" or "should I invest in this stock?"

The model is a part of the decision process; it is not the decision.

Summary

Venturing into stochastic modelling may seem like a big leap,

however, the overall business application is manifold!

Insights into unforeseen business scenarios ...

help you be better prepared for the future and adopt ...

appropriate and optimum risk management measures.

Use the results as a guide to informed decision making!



Thank You

Please feel free to reach out for any queries:

girinker21@gmail.com

+91 9999804593