Selected Chapters from Capital Modelling
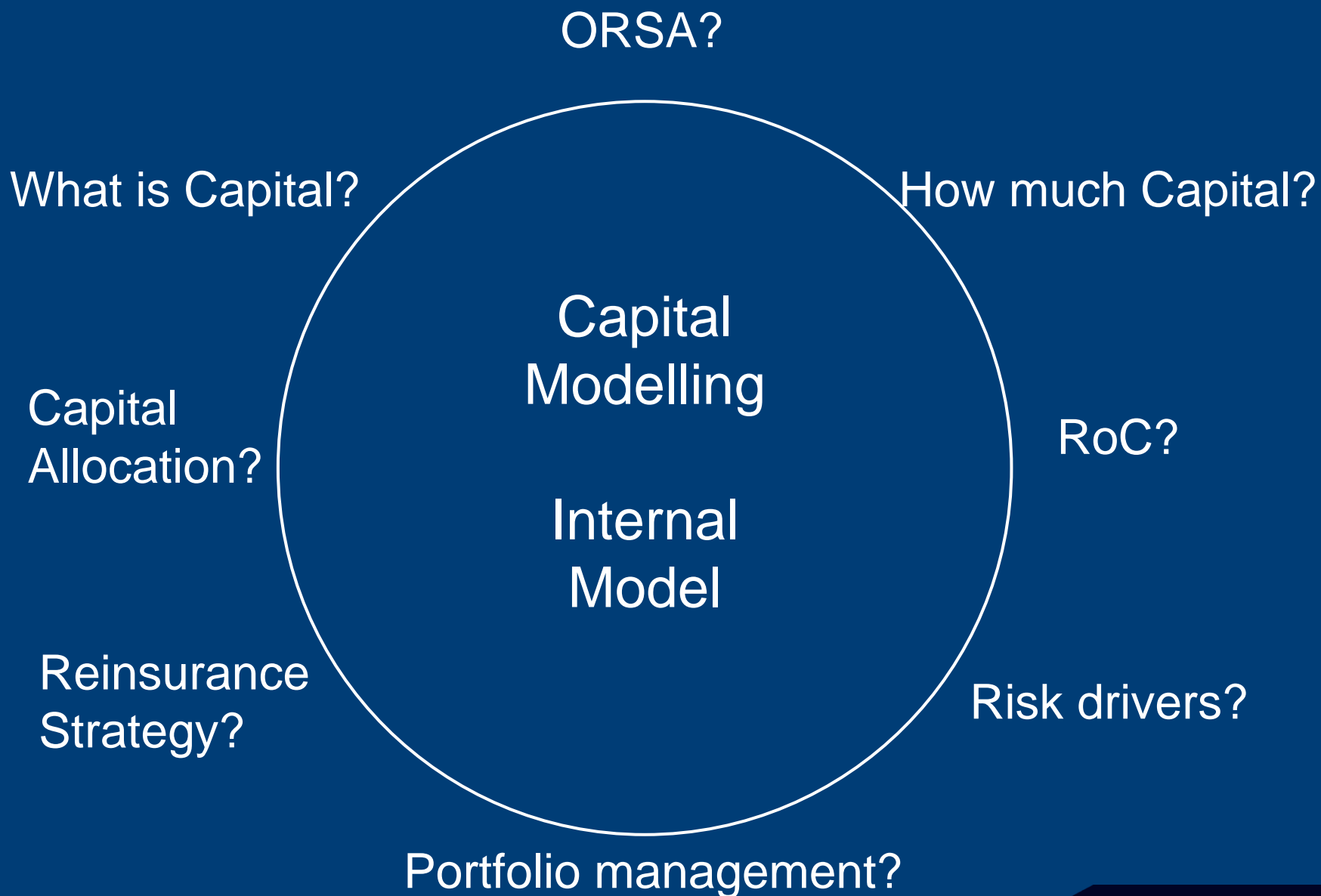
Jan Martinek
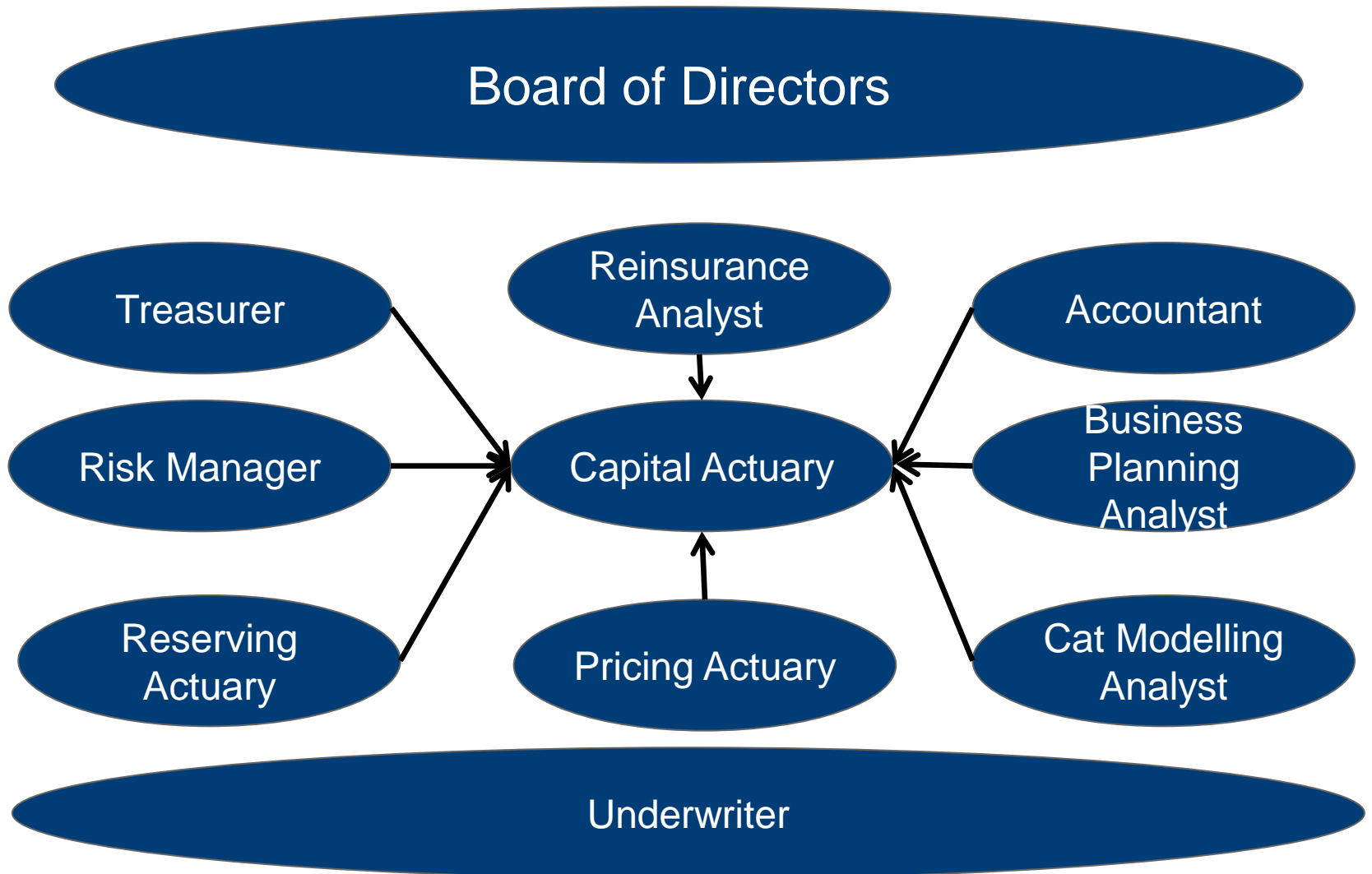
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May 29, 2013

ORSA?

What is Capital?

How much Capital?

Capital
Modelling

Capital
Allocation?

RoC?

Internal
Model

Reinsurance
Strategy?

Risk drivers?

Portfolio management?

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Who is Who?

Internal Model vs. Standard Formula

+ Capital requirement

- Internal Model SCR 2-3 times lower than Standard Formula SCR

+ Use of the model

- Possibility to get higher rating with lower capital
- Reinsurance optimisation - possibility of reducing reinsurance costs
- Portfolio management - better view on business mix, manage the underwriting process, change in risk appetite
- Allow for capital allocation in pricing

+ Understanding of the business - Internal

- Parameterisation and analysis consistency between departments
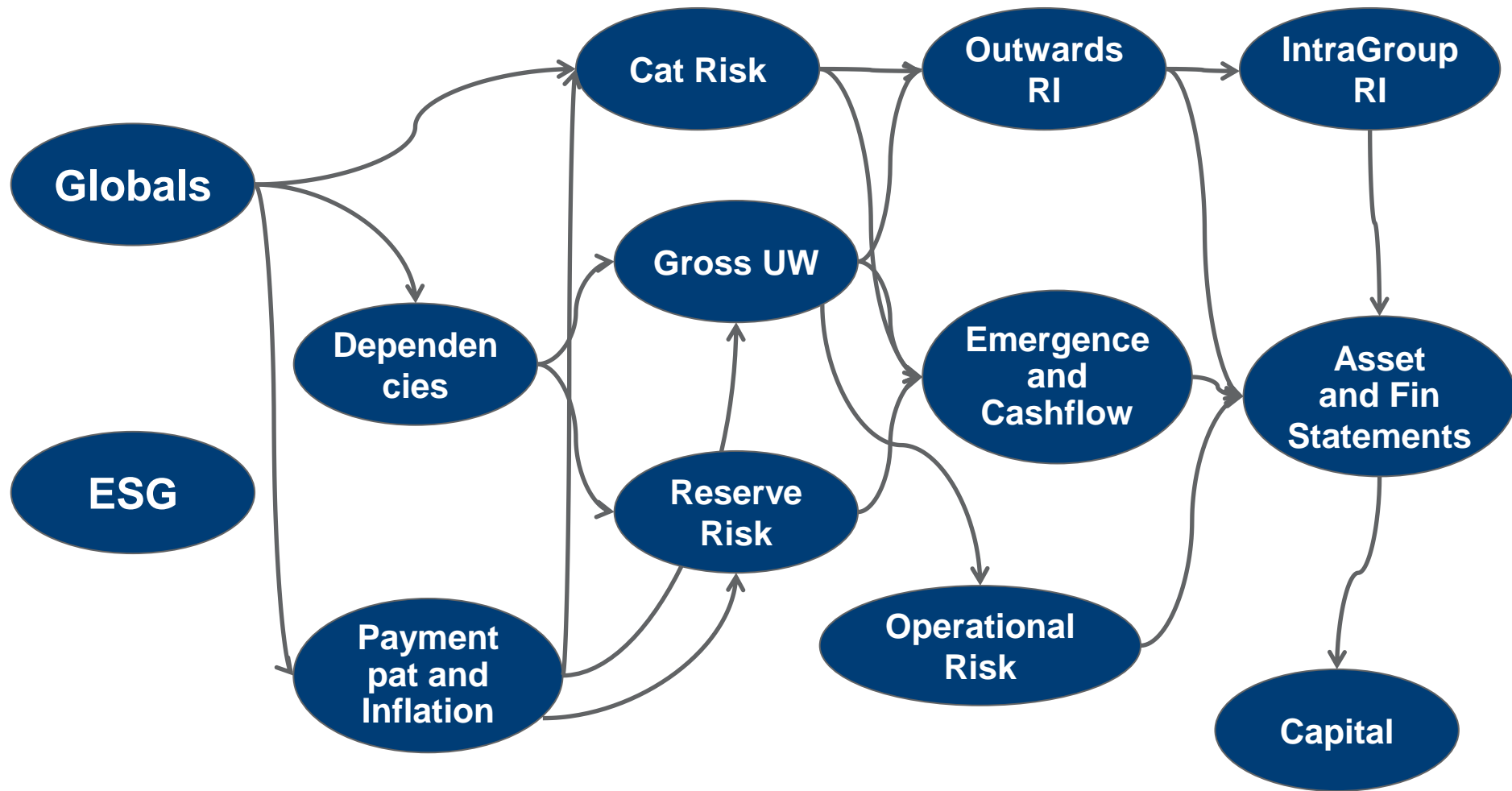
- Costs, Resources & Time

- Software & Hardware costs, Consultancy
- Dedicated team of 2-4 people (Actuaries) + 2 people (Risk Management)
- Model build + documentation min of 12 months

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How should my Internal Model be?

Runtime

Risk Completeness

Complexity

Cutting Edge

Regulatory Compliant

Useful

Management Level

What would be your priority if you were a CEO?

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Model Structure

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Top Down vs Bottom Up
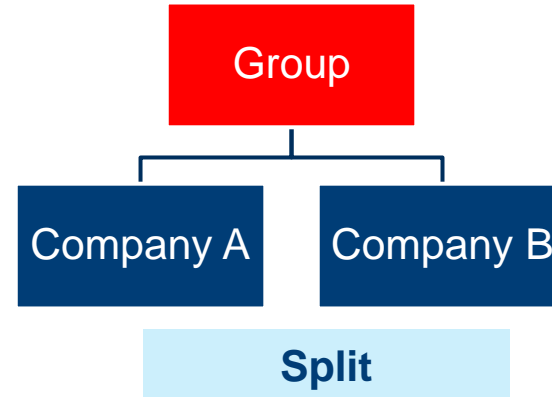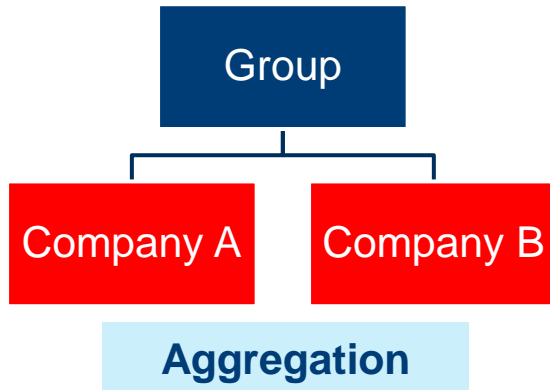
Bottom Up	Company A	Company B	Total
Mean	1 000	500	1 500
50th percentile	995	490	1 489
90th percentile	1 130	631	1 688
95th percentile	1 171	678	1 761
99.5th percentil.	1 278	806	1 899
Diversification at 99.5th			8,9%

Top Down	Company A	Company B	Total
Mean	1 000	500	1 500
50th percentile	1 000	500	1 500
90th percentile	1 125	562	1 687
95th percentile	1 172	586	1 758
99.5th percentil.	1 265	632	1 897
Diversification at 99.5th			0,0%

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Time Horizon

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One Year vs Ultimate

- ICA in United Kingdom
  - To Ultimate in line with UK GAAP
- SII vs SII to Ultimate (LCR)

- What view is better for
  - Insurance company?
  - Regulator?
  - Customer?
- What view would you use for decision making?
  - Is one year view appropriate for
    - Liability? Property?
- 3 year view

Class of business	20% CoV
Premium	1000
Loss Ratio	90%
Emergence Factor	30%
Capital To ultimate	504
Risk Free Rate	2%
Cost of Capital	6%
Capital To 1YR	81
Increase in Risk Margin	30
Total Capital on 1YR basis	111

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Capital Allocation

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Capital Allocation

- What is an ideal capital allocation method?

  - How would you allocate capital without Internal model?

- What is Fair Capital Allocation Method?

  - No undercut

  - Symmetric

  - Consistent

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Capital Allocation - Example

	Mean	CoV	Standalone	First-In	Last-In	Shapley	Co-TVaR	Co-VaR	Covariance	Wang
Class A	1000	10%	1 287	16%	17%	16%	16%	17%	15%	16%
Class B	2000	10%	2 573	32%	31%	31%	29%	29%	20%	30%
Class C	3000	13%	4 186	52%	52%	52%	55%	54%	65%	54%
Aggregate	6000	9%	7 504	100%	100%	100%	100%	100%	100%	100%

- ## No ideal capital allocation method
  - Some methods can even allocate negative capital to some classes!!!
  - Used as initial estimate

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Reinsurance Analysis

Reinsurance Analysis

- Is my RI programme priced adequately?

  - Internal vs Broker view

  - Example XoL RI (15xs10, LOD, 2x100%Rei. Premium)

					Recoveries at:
Total RI Premium Mean	1 250 000	Total RI Premium at 99.5th	1 664 200	90th	-
Base RI Premium	1 229 199	Base RI Premium	1 229 199	91th	-
Reinstatement Premium	20 801	Reinstatement Premium at 99.5th	435 001	93th	-
Adjustment Premium	0	Adjustment Premium	-	94th	582 929
Total Commission	-	Total Commission	-	95th	1 680 065
Recoveries Mean	185 000	Recoveries 99,5th	3 866 730	96th	2 932 773
SD Recoveries	775 001	SD Recoveries	775 001	99th	3 760 808
Recovery Rate Mean	15%	Recovery Rate at 99.5th	232%	99,5th	3 866 730
Net Benefit of Reinsurance Mean	(1 065 000)	Net Benefit of Reinsurance at 99.5th	2 202 530	99,9th	5 957 747

- Risk mitigation

  - Capital saving

  - Group vs Class of Business decisions

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Regulator & Rating Agencies

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Regulator & Rating Agencies

- Documentation & Risk function Review

  - Market Consistency

- Benchmarking & Validation

  - 1 Year view vs Ultimate view vs Business plan

  - Volatility assumptions

  - Dependency structure (Tail vs Rank Dependency)

  - Capital level within peers groups

- Key is to maintain good relationship

- Use Test

  - Capital allocation -> Pricing

  - RI optimization

  - Capital planning (3 year view)

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Thank you

Contact:

Jan Martinek

email: jan.martinek@argo-int.com

tel: +44 (0) 20 7712 7537

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