1995 General
Insurance Convention

CAPITAL, PROFIT AND RISK

- a case study in the practical application of Risk-Based Capital
- setting profit margins
- analysing underwriting contribution

by

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CAPITAL, PROFIT AND RISK

Aim of talk

- using a risk-based capital approach,
- set profit margins,
- assess underwriting performance,
- stochastic modelling

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Framework of financial control

- **UCB = underwriting capital base**
  - **varies by line of business,**

- **ROI = return on investment**
  - **target level of return,**

- **FPF = financial plus factor**
  - **credit for investment income,**

- **TOR = target operating ratio**
  - **what we can afford by line**

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Underwriting capital base

- varies by line of business,
- reflects riskiness,
- local statutory minimum requirements,
- RBC formulae:
  - underwriting risk
  - reserve risk
  - investment risk
  - premium growth,
- covariance factor
  - at Group level

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Return required from underwriting

- shareholders' capital £ 60
- investment return 8.5% p.a. £ 5.1
- can write premium of £100
- profits from underwriting £ 9
- total return = £14.1/£60 = 23.5%
- return from underwriting =

£9/£60 = **ROI = 15%**

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Financial plus-factor

- credit for investment income,
- present value on underwriting year basis,
- average length of time to payment,
- interest rates in territory concerned,
- funds available for investment,
- reserving strain

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Target operating ratios

	Property risk %	Property cat %	Accident short %	Accident long %	Marine %	Aviation %
Capital base	35	100	45	80	60	70
ROI	15	15	15	15	15	15
Profit margin	5.3	15	6.8	12	9	10.5
FPF	6	12	14	40	10	14
TOR	100.7	97	107.2	128	101	103.5

All figures are percentage of premiums.

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Underwriting targets for underwriters

	Property risk %	Property cat %	Accident short %	Accident long %	Marine %	Aviation %
Target Operating Ratio	100.7	97	107.2	128	101	103.5
Retro Cost	3	12.5	1	1	5	8
Expenses	8.5	8.5	7	8	7.5	7.5
Target u/w ratio	91.2	76	99.2	119	88.5	88

Underwriters accountable for achieving target u/w ratio

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Financial control

- **financial control is NOT:**
  - **for accountants,**

- **financial control MUST BE:**
  - **relevant to front-line managers,**

- **financial control is an integral part of the business,**

- **financial targets must be translated into UNDERWRITING TARGETS**

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Setting profit margins

	Treaty A	Treaty B
Loss cost	2.30%	
Target u/w ratio	92.3%	
Commission	10%	
Quotable rate	2.79%	
Quoted rate	3.15%	
EPI	£63,000	£420,000
Target profit	£ 2,957	£ 22,260
Extra/(less)	£ 7,200	(£12,600)
Achieved profit	£10,157	£ 9,660

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Quarterly reserving/results reporting

Example team: u/w 1993 at Q1 1995

	Premium	Reserved u/w ratio	Target u/w ratio
	£'000	%	%
Property - risk	2,900	89	92.3
Property - cat	300	10	74.5
Accident - short	1,900	102	100.3
Accident - long	700	115	115.0
Marine	1,800	100	88.5
TOTAL	7,600		

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Profits performance compared to target

Example team: u/w 1993 at Q1 1995

	Premium	Target profit	Extra/ (less)	Achieve profit
	£'000	£'000	£'000	£'000
Property - risk	2,900	152	94	247
Property - cat	300	45	194	239
Accident - short	1,900	128	(33)	95
Accident - long	700	84	0	84
Marine	1,800	162	(207)	(45)
TOTAL	7,600	572	48	619

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Underwriting contribution

Example team u/w 1993 at Q1 1995

	Capital £'000	Contribution £'000	Expenses £'000	Profit £'000
Property - risk	1,015	405	160	247
Property - cat	300	269	30	239
Accident - short	855	209	114	95
Accident - long	560	168	84	84
Marine	1,080	90	135	(45)
TOTAL	3,810	1,142	523	619

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Next steps in setting capital requirements

Current process	Next steps
• deterministic	• stochastic
• backward looking	• forward looking
• covariance factor only approximate	• balance from portfolio
• worst case scenario	• "risk willingness"

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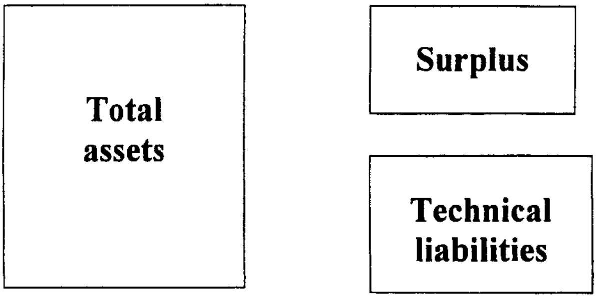
STRATEGIC ASSET ALLOCATION

Classical approach - simple matched position



- technical liabilities = matched assets
    - currencies of liabilities
    - conventional bonds of suitable duration
    - index-linked bonds
    - invest/disinvest underwriting cashflow

- capital base = surplus
    - capital base = surplus
    - on call to cover fluctuations
    - invest/disinvest underwriting cashflow

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Interactions of assets and liabilities

- different asset choices

  = different variability of returns

- assets and liabilities

  - sometimes independent
  - sometimes correlated

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Stochastic approach to asset-liability modelling

- **stochastic model to generate**
  - **economic variables**
  - **underwriting cashflow**
  - **asset returns**

- **2 measures of reward**
  - **amount of surplus**
  - **return on surplus**

- **2 measures of risk**
  - **variability of surplus**
  - **Prob (surplus falls below certain value)**

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Indivisible pool of capital

- combined riskiness
    - underwriting
    - assets,
- cannot allocate by line

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Summary of talk

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