The Actuarial Profession
making financial sense of the future

Credit Risk and Reinsurers

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Quiz

- How many of these reinsurers were rated AA or above just before 9/11?
- How many of these Reinsurers are now rated AA- or above?

Why is it of interest?

- Downgrades
- Reinsurance Recoverables increasing
- Regulators and Rating Agencies
- Price of Security

Moody's on reinsurance recoverables

"In the face of these emerging concerns over reinsurance exposure, Moody's is increasing analytic attention on reinsurance risk in our evaluation of ceding insurance firms, most notably in the context of assessing capital adequacy."

Source: Moody's Special Comment, Growing Reinsurance Risk Weighs on P&C Insurance Market Recovering, August 2003

Warren Buffet Quote

"Cheap" reinsurance is a fool's bargain: When an insurer lays out money today in exchange for a reinsurer's promise to pay a decade or two later, it's dangerous – and possibly life-threatening – for the insurer to deal with any but the strongest reinsurer around.

What we'll talk about

- Nature of Reinsurance Credit Risk
- Position in the UK
- Tools of the Trade
- Placing a value on security
- Strategies for mitigation

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Credit risk

FSA Definition:

Credit risk is incurred whenever a *firm* is exposed to loss if a *counterparty* fails to perform its contractual obligations **including** failure to perform them in a timely manner.

Reinsurance collectability

Moody's definition:

the reinsurer's ability and willingness to pay what the ceding insurer claims is owed under the terms of the contract.

Reinsurance credit risk

Investment Credit Risk	Reinsurance Credit Risk
▪ Lots of data	▪ Not much data
▪ Diversification possible	▪ Correlation
▪ No business relationship	▪ Business partner
▪ Traded	▪ Non-traded
▪ Exposure known	▪ Exposure unknown
▪ Regulated	▪ Regulated?

How does it arise?

- Reserves
- Guarantees
- Catastrophes

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Reinsurance recoverables increasing

£'m	Reserves for Reinsurance Ceded	
	2001	2003
Abbey National	423	935
Aegon	106	372
Aviva	985	2,356
Axa Sun Life	59	128
Canada Life	76	230
HBOS	108	147
HSBC	252	323
Legal & General	736	2,948
Prudential	183	187
Royal Bank of Scotland	75	240
Standard Life	114	207

Non profit business in the L&GA and PHI funds

Source: Thesys

A large proportion of resources

£'m	Reserves for Reinsurance Ceded			
	2001	2003	% of LTBA	% of Capital
Abbey National	423	935	5.3%	53%
Aegon	106	372	2.2%	19%
Aviva	985	2,356	3.7%	25%
Axa Sun Life	59	128	0.6%	4%
Canada Life	76	230	5.5%	57%
HBOS	108	147	0.7%	6%
HSBC	252	323	78.4%	192%
Legal & General	736	2,948	9.9%	56%
Prudential	183	187	0.2%	2%
Royal Bank of Scotland	75	240	98.3%	67%
Standard Life	114	207	0.4%	4%

Regulation

- PS04/16
  - The *rules* and *guidance.....* seek to protect against credit risk by requiring a *firm* to limit and diversify its exposure and to hold sufficient financial resources to withstand credit loss insofar as such loss is reasonably possible.
- Dear Chief Executive letter August 2004
  - "it is perhaps surprising that life insurers do not give reinsurance credit risk a higher profile".
  - Identifying good practice with regard to credit risk.

PS04/16

- Exposure limits
  - 100% capital resources
  - 20% of gross earned premium
- Capital requirement
  - Margin for credit default
  - Stress capital

    Spread factor * √ Bond spread * Exposure

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Tools of the Trade

- Agency ratings
- Individual research
- Capital markets and default statistics

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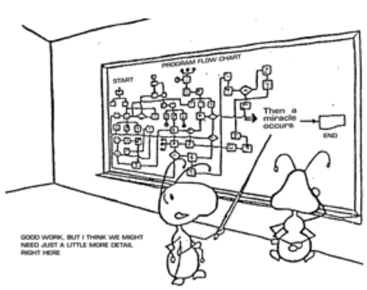
S&P Financial Strength Rating

A Standard & Poor's Insurer Financial Strength Rating is a current opinion of the financial security characteristics of an insurance organisation with respect to its ability to pay under its insurance policies and contracts in accordance with their terms.

Insurer Financial Strength Ratings are based on information furnished by rated organisations or obtained by Standard & Poor's from other sources it considers reliable.

Insurer Financial Strength Ratings do not refer to an organisation's ability to meet non-policy (ie debt) obligations.

The Rating Process????



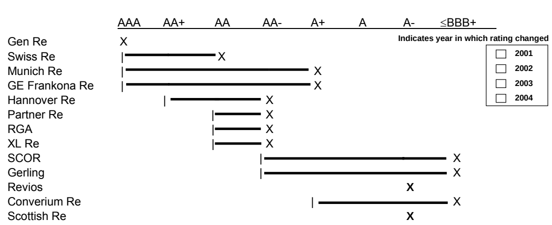
Financial Strength Ratings

- AAA
  An insurer rated “AAA” has EXTREMELY STRONG financial security characteristics. “AAA” is the highest Insurer Financial Strength Rating assigned by Standard & Poor’s.
- BBB
  An insurer rated “BBB” has GOOD financial security characteristics, but is more likely to be affected by adverse business conditions than the higher rated insurers.

The different ratings

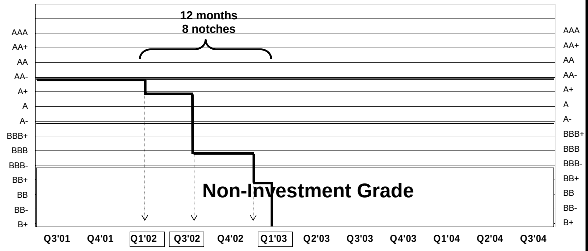
S&P / Fitch	**Moody’s**	**AM Best**	
AAA	Aaa	A++	Extremely Strong
AA+	Aa1	A+	Very Strong
AA	Aa2		
AA-	Aa3	A	
A+	A1		Strong
A	A2	A-	
A-	A3	B++	
BBB+	Baa1		Good

S&P Rating Changes

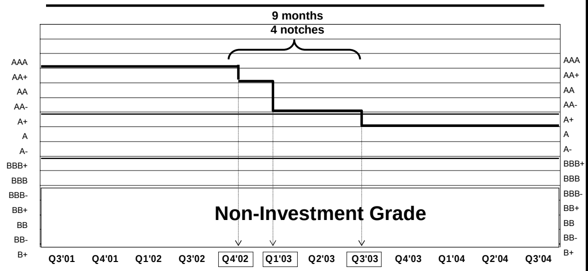


Ratings as of November 4, 2004. Changes since September 11, 2001.

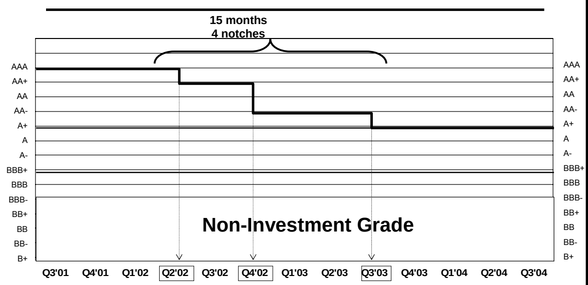
Gerling Global Re



Munich Re



GE Frankona



Reasons for the downgrades

- 9/11
- Mistakes
- Reserve strengthening
- Weak pricing
- Catastrophes
- Weak investment markets

Moody’s current view


Industry Outlook

September 2004

Global Reinsurance Industry Outlook

Rating Outlook Shifts to Stable
Following Period of Ratings Repositioning

Pace of Rating Downgrades and Negative Outlooks Tapers
Reserves Weakness Lessens with Favorable Pricing Environment
But Business Volatility and Low Entry Barriers Pressure Long-term Returns

Summary Opinion

Moody's Investors Service

“After numerous rating downgrades over the past few years, Moody’s considers the rating outlook for the reinsurance industry to be stable, reflecting a view that, over the next 12-18 months, the number of rating actions is likely to be moderate and driven more by specific characteristics of individual firms than industry-wide conditions.”

S&P and Moody’s ratings

	S&P		Moody’s	
	Rating	Outlook	Rating	Outlook
Gen Re	**AAA**	**Stable**	**Aaa**	**Negative**
Swiss Re	**AA**	**Negative**	**Aa2**	**Stable**
GE Frankona	**A+**	**Negative**	**Aa2**	**Stable**
Munich Re	**A+**	**Stable**	**Aa3**	**Negative**
Hannover Re	**AA-**	**Stable**	**Baa1**	**Positive**
XL Re	**AA-**	**Stable**	**Aa3**	**Stable**
Partner Re	**AA-**	**Stable**	**Aa3**	**Stable**
RGA Re	**AA-**	**Stable**	**A1**	**Stable**
Scor Re	**BBB**	**Stable**	**Baa3**	**Developing**
Revios	**A-**	**Stable**	**No rating**	
Converium Re	**BBB**	**Watch**	**Baa1**	**Stable**
Scottish Re	**A-**	**Stable**	**A3**	**Negative**

Tools of the Trade

- Agency ratings
- Individual research
- Capital markets & default statistics

Individual research

- Larger exposure
- Sources of data:
  - Report and accounts
  - Rating agency reports
  - Reinsurer questionnaire
  - Search the web

Some questions to ask

- What are the key risks to your financial strength?
- Do you stress certain scenarios?
- What is your exposure to Mortality, CI, IP, Longevity, financial reinsurance, GI risks….?
- How often are exposures measured and updated?

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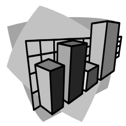
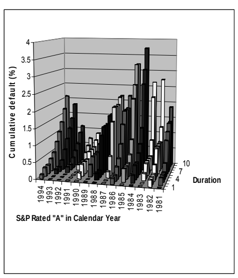
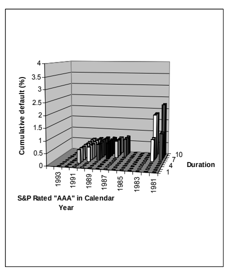
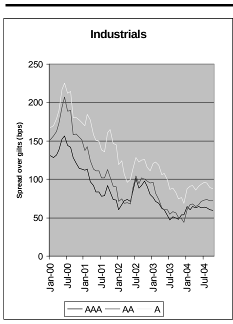


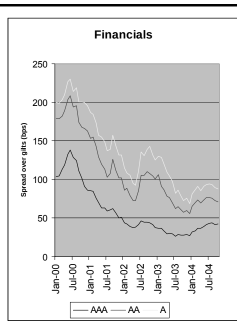
Default Statistics





Market spreads





Source: JP Morgan FI Research, 10 yr+ Sterling

The Credit Spread Puzzle

Rating	Spreads over Gilts bps (10yr+ Financials as at 29 Oct 2004)	Historic defaults per 10000 (S&P 10th Root of 10 year default rate 1981-2003)
AAA	42.4	5
AA	71.3	10
A	88.1	20

Some pieces of the puzzle

- Spreads over gilts built up from:
  - Real-world expectations of Default X Recoveries
  - Liquidity
  - Risk premium
    - Correlation with market risk
    - Non-diversifiable credit risk including contagion
    - Downgrade risk

➢ Market spreads can't be ignored

Reinsurance spread might be higher…

- Default/recovery could be higher or lower
- Liquidity low => Downgrade risk higher
- Credit Risk Correlations
  - Insurance risk
  - Insurance business
  - Equity risk, other investment risk
  - Leverage/reinsurance
- Greater interaction with operational risk

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Pretend that there's a perfect reinsurer…

- Will pay claims
- The regulator won't require capital to be held against default
- Has unlimited capacity

➢This reinsurer sets the arbitrage free price of risk transfer

How do other reinsurers compare?

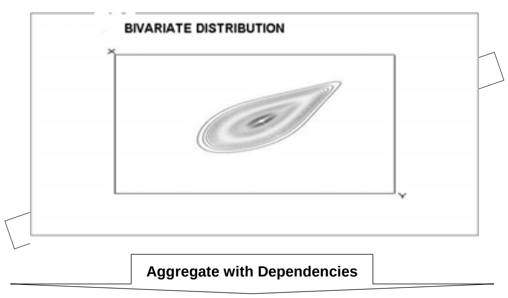
- Modelled how much the credit risk costs
- Used spreads based on previous slides
- And credit risk capital requirements in PS04/16
  - Under both realistic and statutory regimes
- Essentially arbitrage-free adjusted for capital requirements

Price of security

- 20-year term, level premium reinsurance
- No correlations, not very risky lines

Rating	AAA	AA	A
Price	100	98.4	96.9

Difficult to model correlations



Sensitivity

Rating	AAA	AA	A
Price	100	98.4	96.9
Increasing spread by 20%	100	98.2	96.5

Risky lines of business

Rating	AAA	AA	A
Risky line with more correlation and more insurance risk	100	97.9	96.1

- More insurance risk results in relatively higher reserves
- More risk increases the dependency between credit and insurance risk

What about the things you can't put numbers on?

- ➢ Reinsurer are intimate business partners
- Impact on customers
- Attention of the regulator
- Management time and effort wasted
- Interaction with operational risk

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Management of the risk

Diversify reinsurers
Deposit backs
Credit triggers
Third party support
Securitisation
Structuring

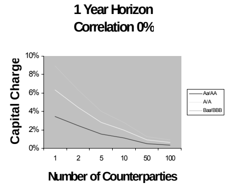
Diversification - The Mantra of Finance

- Reduces extreme outcomes from localised or idiosyncratic events
- Does not reduce macro risks or risks in extremis
  - Risks affecting the whole reinsurance sector
- Measurement is difficult
- Model/parameter errors are large

Regulation
Investments
Other reinsurers
Population trends
Economic environment
Social environment
Non-life business
Savings business
FOS

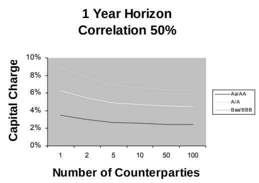
A Simple Example

- Generalised Model
  - $\sigma\sqrt{(N+(N^2-N)\rho)}$
  - σ = St Dev of Individual Credit Loss
  - N = Number of Credits
  - ρ = Correlation of Counterparties
- Observed Defaults from Moodys 1980 to 2003
- Binomial Model
- Capital = 2 X St Deviations/Exposure
- **Observations from Nil Correlation Scenario**
  - **Diversification brings benefits**
  - **Diversification can reduce capital**
  - **The weaker the credit quality, the more value diversification seems to have**



Impact of correlation

- Impact of partial correlation
  - Reduces the value of diversification
- Ranking of Relative Importance
  - Individual Counterparty Risk
  - Correlation of counterparties
  - Number of counterparties



Credit triggers

Reinsurer's view:
- Exacerbates any decline
- Rating agencies don't like them

Insurer's view:
- Good protection
  - but what if queue is not valid
  - scope for disagreement in deciding on amount of recapture or commutation
- If he's got it I want it!

Deposit backs, Third Party, Securitisation

- Deposit backs
  - Good for managing credit risk
  - Regulatory arbitrage diminished
- Letters of credit, guarantees
  - Usually short term only
- Securitisation
  - Size of deals
  - Could grow in importance

Structuring

- Risk premiums
  - Credit risk builds up if insurance risk deteriorates
  - Also can lose valuable risk mitigation
  - Capital efficiency
- Reviewable rates
- Financing with the same reinsurer
- Reduced Premium Periods
- Buy less, buy smarter

Conclusion

- Reinsurance credit risk more complicated
- Reinsurance credit risk is increasing
- Regulators are driving changes
- Quality of reinsurance credit risk has deteriorated
- Thorough research is needed
- A price for security is emerging
- Diversification may not help
- Other mitigants may not help

Conclusion

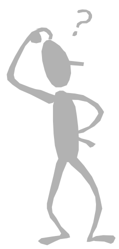
- "A reinsurance company is like a tea bag .... you don't know how strong it is until you put in the hot water." – James Bryce, CEO, IPC Holdings as quoted in Reactions

- The most expensive reinsurance is uncollectable reinsurance. – Moody's Industry Outlook September 2003.

Don't slip up

Questions ...

on what we have discussed today?



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