Scottish Re

## Mortality Reinsurance Pricing and Treaty Negotiation

2005 Fall Southeastern Actuarial Club
Meeting
Charlotte, NC
November 18, 2005

## Key Discussion Points

1. Historical Changes in the Reinsurance Market
2. Pricing
3. Economic factors affecting life reinsurance market
4. Observable trends in mortality and underwriting
5. Hot Treaty Issues
6. Conclusions



## Historical Factors

**Demand for Life Reinsurance Grows Significantly in US**

- Business model of life companies shifts from underwriter to asset gatherer
- Use reinsurers to fund growth of new business (shift from excess to quota share)
- Companies demutualize and become more focused on capital and earnings management
- Regulatory changes increase the amount of capital needed to support mortality business (Regulation XXX)

**Supply of Capacity Plentiful and Cheap**

- During 1990s, European composites acquire life re specialists to diversify business
- Low cost capital (LOCs) funds growth
- Reinsurers able to provide mortality assessment expertise and outsourcing of mortality risk to primary companies
- Aggressive pricing to fuel market share objectives
- Lower return expectations on life re business subsidized by higher returns on P&C lines



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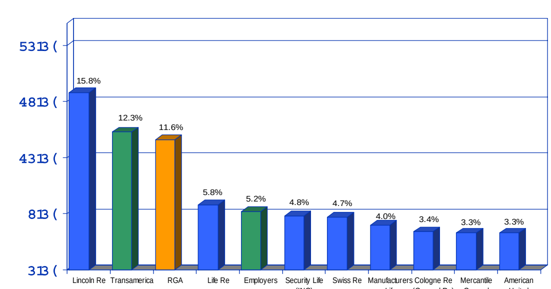


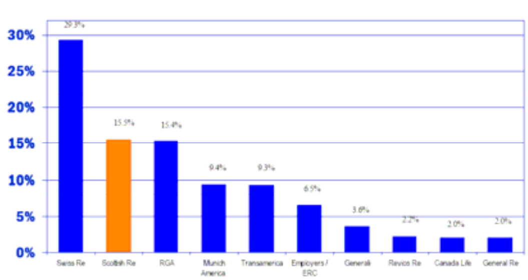

Source: 1995 Society of Actuaries Life Reinsurance survey

## Changes?

- Lincoln Re – Acquired by Swiss
- Transamerica Re – Acquired by Aegon
- RGA Re – Partially acquired by Met Life
- Life Re – Acquired by Swiss Re
- ERC – Partially acquired by Scottish Re no longer writing new business
- Security Life – Acquired by ING and subsequently by Scottish Re
- Manufacturers –Merged with John Hancock
- Cologne Re – Acquired by General Re
- M&G - Acquired by Swiss Re
- AUL – Acquired by ERC



## 2004 U.S. Market Shares




Source: 2004 Society of Actuaries Life Reinsurance survey



## Life Reinsurance Market Environment

- A great deal of talk of 'hardening' life reinsurance market
- Definite evidence of:
  - Reduction in capacity
  - Increased pricing
- Underlying cause of pricing trends:
  - Supply/demand dynamics
  - Underlying economics



## Factors Putting Positive Pressure on Reinsurance Prices

**Non-mortality Factors**

- Cost of capital
- XXX Reserve collateralization costs
- Sustained low interest rate environment

**Mortality Assumption Correction**

- Some reinsurers dropped assumptions inappropriately low in late 1990's to early 2000's
  - A correction needed

**Upward Trend in Mortality By Issue Year**

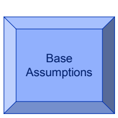
- Relaxing of underwriting in direct marketplace
- Separate issue from secular mortality improvement
  - Underlying mortality continues to improve
  - Insured mortality will continue to improve assuming underwriting is held constant

## Underwriting and Claims Audits

- Essential to monitor client use of underwriting and claims authority
- Framework to:
  - Set clear expectations to ceding company
  - Reflect company practices in setting pricing assumptions
  - Audit to verify underwriting philosophy assumed in pricing is consistent with actual practices
- Scottish Re conducted 19 underwriting reviews in 2004
- Scottish Re will conduct > 30 audits during 2005
- Allows Scottish Re to better understand how the underwriting practices relate to those communicated at the time of pricing
- Good time to share feedback and communicate our expectations and philosophy



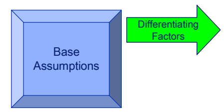
## Mortality Management Loop




- Success starts with solid base mortality assumptions



## Mortality Management Loop




- Important to be able to differentiate among situations
  - Target market and distribution differences
  - Underwriting guidelines and criteria
  - Underwriting philosophy and quality
- Risks in applying ‘average’ assumption across the board
  - Win when you’re low, Lose when you’re high
  - Result will fail to meet expectations



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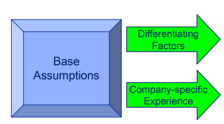


- Important to use all available information
- Firsthand mortality experience relating to situation is ideal

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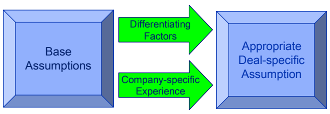
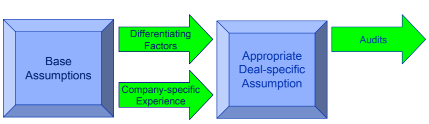



- End goal is an appropriate assumption tailored to the situation to allow efficient selection of risks.
  - Win where you want to win
  - Lose where you want to lose
- Losing is an acceptable result when it's the right economic answer



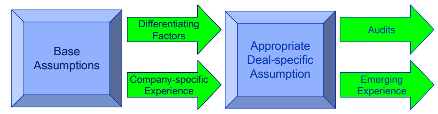
## Mortality Management Loop




- Auditing key to ensure proper controls
  - Guidelines being followed
  - Exceptions within tolerance for pricing



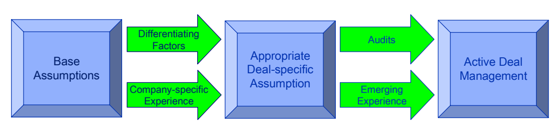
## Mortality Management Loop




- Critical to be able to evaluate emerging experience in varying timeliness and detail
- Quarterly reviews of all significant treaties
  - Timely review at high level ensures "Early Warning System" of emerging material surprises
- Comprehensive mortality studies and analysis
  - Operate at slightly longer lag
  - Provide detailed understanding of performance of business relative to expectations
  - Requires experience and context to ensure complete value and interpretation

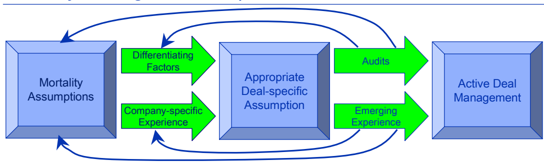


## Mortality Management Loop




- Important to be proactive in dealing with emerging issues
  - Quick feedback and action on adverse audit findings
  - When necessary, re-price or terminate underperforming treaties
  - Adjust assumptions & pricing relative to changes in underwriting practices
  - Reset expectations around inforce performance relative to available information

## Mortality Management Loop




- Feedback not only used at 'micro' level for client level management
- "Plow back" information to continuously improve and enhance overall process
  - Mortality data leads to adjustments in base assumptions
  - Audits change views/benchmarking of client companies
  - Emerging data allows validation of fit of differentiation mechanisms
- Keep eye on macro-level trends to ensure no 'systemic drift' from reality



## Macro Trends in Mortality

- Underlying mortality continues to improve, but at a slowing rate
  - Improvement comes in bursts (e.g. CAD treatment in the 1970's)
  - Medical advances continue to improve mortality in underlying population
  - Rate of improvement has been at a declining pace
  - Improvement has not been level by age or gender
  - Where will next breakthrough come?



## Macro Trends in Mortality

- Male vs. female mortality differential is narrowing
  - Male mortality has improved more than females
  - Medical advancements have focused more on male causes of death
  - Lifestyle convergence
  - Relevant to life re pricing for situations with unusually skewed distributions of male or female business



## Macro Trends in Mortality

- Overall large amount mortality not dramatically favorable to 'core' policy sizes
  - In theory, large amount mortality should be quite favorable
    - Positive socio-economic factors
    - "Kitchen sink" underwriting
  - In reality, emerging experience on large policies is comparable to experience at core amounts ($500,000-$1,000,000)
  - Likely driven by a number of factors
    - Significant pressure to place large cases (stresses needs for audits)
    - Experience on young issue ages at high amounts very unfavorable
    - Some evidence of efficient replacement of early-mid 1990's large amount policies with lower priced products or more preferred classes
      - Increased incentive to both policyholder and producer for large policies
  - Some companies have very favorable large face mortality while some have very poor large face mortality
    - Correlated with underwriting
    - Also seems to be strongly affected by "typical" target market

## Macro Trends in Mortality

- Upward trend in mortality by issue year due to relaxed underwriting requirements
  - Life industry has long focused on ‘better’ underwriting practices
    - For most of history, ‘better’ = lower mortality
    - Recent history → ‘Better’ = faster & cheaper with similar mortality
  - Current industry status on underwriting requirements vs. mid-1990’s
    - Fewer attending physician statements
    - Fewer treadmill EKG’s
    - Higher paramedical limits
    - Oral fluid has replaced blood testing in places
  - Some of these changes are cost justified and are good business decisions
    - Yet, have upward implications to mortality
    - Benefits often disproportionately affect the ceding company
  - Separate from ‘mortality improvement’
    - Mortality is improving…assuming underwriting paradigm held constant



## Relaxing of Underwriting Guidelines

- Key to success in this paradigm is differentiating subtle differences in underwriting
- Two historical life reinsurer pitfalls:
  - “Case of 1,000 nicks”
    - Suffer from sequence of several minor underwriting changes
      - Move med limits– 1%
      - Move EKG limit for ages <50 from $500,000 to $2MM – 1.5%
      - Replace blood with oral fluid for ages <40 and amounts <$250,000 – 2%
      - Change preferred criteria on driving from 0 MV in 2 years to 2 in 3 years – 1%
      - CUMULATIVE IMPACT = 1.01 x 1.015 x 1.02 x 1.01 = 105.6%
  - Definition of acceptable change in underwriting is ‘in line with market’
    - Being in line with market is important → lack of alignment can equal anti-selection
    - If however market drifts upward and assumptions not adjusted, will fail to meet expectations



## Retrocession Issues

- Large unknown accumulations have caused reduction in available per life capacity
- Change in “Jumbo” limits
  - In the past, “No Jumbo” pools were available
  - $65 million is now the limit for most retro
  - Definition has also changed
    - Applied for and intended to replace (excluded replacements)
    - In force and applied for (including replacements)
  - Violation of treaty limits will likely not be known until claim time
- Similar downward pressure on automatic binding limits
- Restrict time for recovery from reported administration errors?
- No longer accepting table shaving programs
- Have proposed language which removes the retro from any risk where rules were not followed



## Conclusions

- Pricing will continue to reflect observed trends in mortality
- Pricing and underwriting must be consistent in order to achieve margins
  - OK to evolve underwriting standards
- Treaties becoming more of a contract than agreement
  - Rules versus guidelines
  - Tighter treaty language
  - Unreasonable for either party to expect the more favorable of the letter and the spirit
  - Not going to go back to hand shake agreements
- Increased scrutiny of claims
  - Direct companies – audit underwriters, log exceptions, contest where appropriate, police agents
  - Reinsurance companies – audit compliance and practices of ceding companies
  - Retrocession companies – large face amount policies, limits
- Relationship could become more adversarial?

## Nature of Relationship Creates Misalignment of Risks

- Most reinsurers and direct writers view relationship as a partnership
  - Share in similar risks
  - Interests tend to be directionally aligned
- Nature of relationship causes varying sensitivity to various risks
  - Creates misalignment with balancing multiple issues
    - Mortality expectations
    - Expense management
    - Field management
    - Sales Targets
- Treaty terms and Embedded Options Can Enhance any Misalignment
  - Recapture
  - Rate guarantees
  - Underwriting Requirements
  - Financial Triggers



## Other Issues Contribute to Lack of Alignment

- Clearly the reinsurer is more sensitive to mortality results than the direct writer
  - Especially true in a quota share reinsurance situation
- Reinsurer also has minimal financial interest in other key issues
  - Underwriting expenses
    - Reinsurer does not participate in costs savings
    - May be a logical 'cost/benefit' trade off if fully retained or based on retention logic
    - But any increase in mortality is significant to the reinsurer and has no offset
  - Placing "more" business with an agent
    - Expenses also affected by placement rates
    - Again, no impact to reinsurer if he reinsures the extra risk at similar or superior margins
- End result
  - A situation may make sense for the direct writer to take a small mortality hit to place business and protect expense ratios
  - Result to reinsurer is material hit to profitability with no tangible benefit
  - Interests are misaligned and the reinsurer has limited recourse



## Putting It All Together

- Consider a typical situation
  - Direct company contemplating underwriting changes to speed process
  - Result will be 10% higher mortality
  - Partially offset by expense savings
- To direct writer, result is a move from 9% to 8% of pretax margin if 50/50 reinsurance

| Allocation of each $1 of revenue | Original | | With Changes | |
|---|---|---|---|---|
| | Rx Company | Direct Co. 50% Rx'd | Rx Company | Direct Co. 50% Rx'd |
| Claims | 85% | 31% | 94% | 34% |
| Reinsurance | 0% | 31% | 0% | 31% |
| Expenses | 6% | 30% | 6% | 27% |
| Profit & Taxes | 9% | 9% | 0% | 8% |

- Reinsurers side of the coin
  - Do not participate in the expense savings that partially offset higher mortality
  - More sensitive to mortality deviations to begin with
  - Result is all profitability gone
- Makes sense to direct writer, not to reinsurer



## Older Issue Ages are Getting More Attention

| Issue Age | PV/ 1000 | Face Dist. | % of Mortality |
|---|---|---|---|
| 25 | $ 2.99 | 8% | 0.4% |
| 35 | $ 5.23 | 15% | 1.4% |
| 45 | $ 13.32 | 20% | 4.7% |
| 55 | $ 36.95 | 25% | 16.2% |
| 65 | $ 91.48 | 20% | 32.0% |
| 75 | $ 189.96 | 10% | 33.2% |
| 85 | $ 347.77 | 2% | 12.2% |
| Total | $ 57.17 | 100% | 100.0% |

1/3 of Face = over ¾ of Mortality

Being off 6-7% at the older issue ages can result in an overall 5% shortfall across portfolio

- More focus on older issue ages
  - *Growing population there*
  - *Large premium dollars at stake*
- Core age paradigms have been applied here
  - *Underwriting approach similar to core ages*
  - *Priced at same % of industry tables*
- It is critical to get the underwriting and pricing of these issue ages correct
  - *Moderate error on small amounts of business can erode profitability*

## OIA - Ultimate Mortality

- Mortality beyond the point of underwriting selection
- Very important due to magnitude and PV dynamics
- In theory, should not vary much situation to situation

| *Males* | 1000qx Att. Age 90 | *% of VBT Ultimate* | 1000qx Att. Age 100 | *% of VBT Ultimate* |
|---|---|---|---|---|
| **VBT Composite Ultimate** | **172.250** | ***100.0%*** | **324.530** | ***100.0%*** |
| **1990-95 Basic Ultimate** | **163.710** | ***95.0%*** | **312.840** | ***96.4%*** |
| **2000 U.S. Population** | **169.600** | ***98.5%*** | **298.000** | ***91.8%*** |
| **86-92 Canada CIA Basic Ultimate** | **176.780** | ***102.6%*** | **390.000** | ***120.2%*** |
| **Survivors Federal Ees 1990-2000** | **181.880** | ***105.6%*** | **341.360** | ***105.2%*** |
| **RP2000 Healthy Annuitants** | **183.408** | ***106.5%*** | **344.556** | ***106.2%*** |
| **Ret. Fed. Employees 1990-2000** | **181.490** | ***105.4%*** | **366.740** | ***113.0%*** |
| **'94 US MGDB** | **180.886** | ***105.0%*** | **375.228** | ***115.6%*** |
| **40% of 1975-80 Basic Ultimate** | **73.044** | ***42.4%*** | **129.168** | ***39.8%*** |



## Hot Treaty Issues

- Recapture
  - Historically, provided the ceding company the right to take back risks when a company increases its risk tolerance and changed its retention limit
    - Assumes motivation of reinsurance is risk spreading
    - Retention typically meant corporate retention and did not vary by treaty or product
    - Only provided recapture of a small percentage of the risks in most cases since cases were excess of retention
  - In the 1990's, reinsurance market went from excess of retention to 80% and 90% quota share arrangements
    - Motivation for quota share reinsurance was primarily capital optimization and assumption arbitrage not concern about risk concentrations on a given life
    - Recapture language stayed the same change in retention limits
    - Recapture for increases meant changes is corporate retention
    - Changing the quota share percentage does not provide recapture under the "increase in retention" provision unless specifically provided
    - Changes in language changes lagged changes in the market and many treaties are less clear than desired
    - Difficult to determine intent in some instance particularly when the players are different



## Hot Treaty Issues

- YRT Rate Guarantees
  - Rates in typical YRT agreements inforce today are not guaranteed
    - Motivations were related to reserve requirements and pricing methods (i.e. information provided to the reinsurer on older agreements was pretty vague)
    - Reinsurers generally priced to not have to raise rates if business materialized as expected
    - Treaty language provides the explicit option to increase rates
      - Often provides the ceding company the remedy of recapturing with or without penalty
    - Some ceding companies have negotiated stronger language with reinsurers and pay the extra cost of this limitation
    - Very few rate increases in the past and those increases were generally applied in special situations
  - Current Issue
    - Significant profit pressure on ceding companies and reinsurers
    - Rate guarantee has a material cost
    - Guaranteeing rates may limit a companies ability to address problems that arise in a measured manner
    - Complicated by recapture issues that may arise



## Hot Treaty Issues

- Claim certainty
  - History
    - Historically reinsurers have seldom invoked the contractual right to deny claims on risks that did not meet the definition of those eligible to be automatically bound under the agreement
    - Expectations are that reinsurers will pay claims and ceding companies will underwrite in accordance with the guidelines communicated to the reinsurer
    - Reinsurer often only have "the nuclear option" of not paying claims where the underwriting guidelines were not followed

## Hot Treaty Issues

- Claim certainty
  - Current Situation
    - All ceding companies want to have
      - Low, guaranteed reinsurance rates
      - Flexibility to underwrite as the feel appropriate
      - Certainty that claims will be paid
    - Reinsurers want
      - To earn acceptable returns and margins
      - To be able to rely on companies written underwriting guidelines and good judgement
      - To pay claims
    - Errors
      - Historically, reinsurers elected to pay many gross underwriting errors
      - Difficult to determine an error from a deviation in many instances
      - Errors by an agent are generally not reinsured but covered by E&O or self-insured
      - Treaty should clearly communicate which party is responsible for errors and price should reflect this difference



## Hot Treaty Issues

- Claim certainty

  Difficult to address this issue unilaterally for all companies

  1. Some companies underwrote prudently in accordance with the guidelines communicated to the reinsurers
  2. Some companies generally followed their guidelines but made exceptions due to offsetting risk characteristics and prudent underwriting judgement
  3. Some companies generally followed their guidelines but made exceptions for business reasons without offsetting risk factors
  4. Some companies clearly underwrote poorly on a regular basis and bound reinsurers to risks with significant extra mortality for reasons

  - All companies have made mistakes although some companies much more frequently than others
  - Reinsurers do not want to deny claims but are generally not willing to state equivocally that they will pay all claims regardless of a ceding companies actions
  - Is there middle ground that provides claim certainty while not impairing a reinsurers ability to address unacceptable practices



## Hot Treaty Issues

- All Hot Issues
  - New business Negotiations
    - Discuss Treaty terms before pricing rather than as an afterthought
    - Easier to find an acceptable solution before business is written then when resolving an issue costs one party millions of dollars
    - Decide what is important and what is critical
      - Most treaty terms are negotiable
      - Neither party can have everything it would like
      - Make sure that what you get is what you want most
      - If you drive a hard bargain, recognize that there is little room for post deal accommodations
      - Know what is worth walking away over to your organization
    - If you get “better” terms and embedded options, the cost of reinsurance should be higher
    - If an issue enhances the misalignment of interests, …
    - Difficult to determine an error from a deviation in many instances so document the case well
    - Treaty should clearly communicate which party is responsible for errors and price should reflect this difference



# Q & A