

The Role of the Actuary in a Life Insurance Company

Yangon, Myanmar 14 July 2014

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What we'll cover

- A key difference between (individual) life and non-life business
- Some traditional actuarial roles in life insurers
- Some non-traditional actuarial roles in life insurers
- *And why these roles are important*

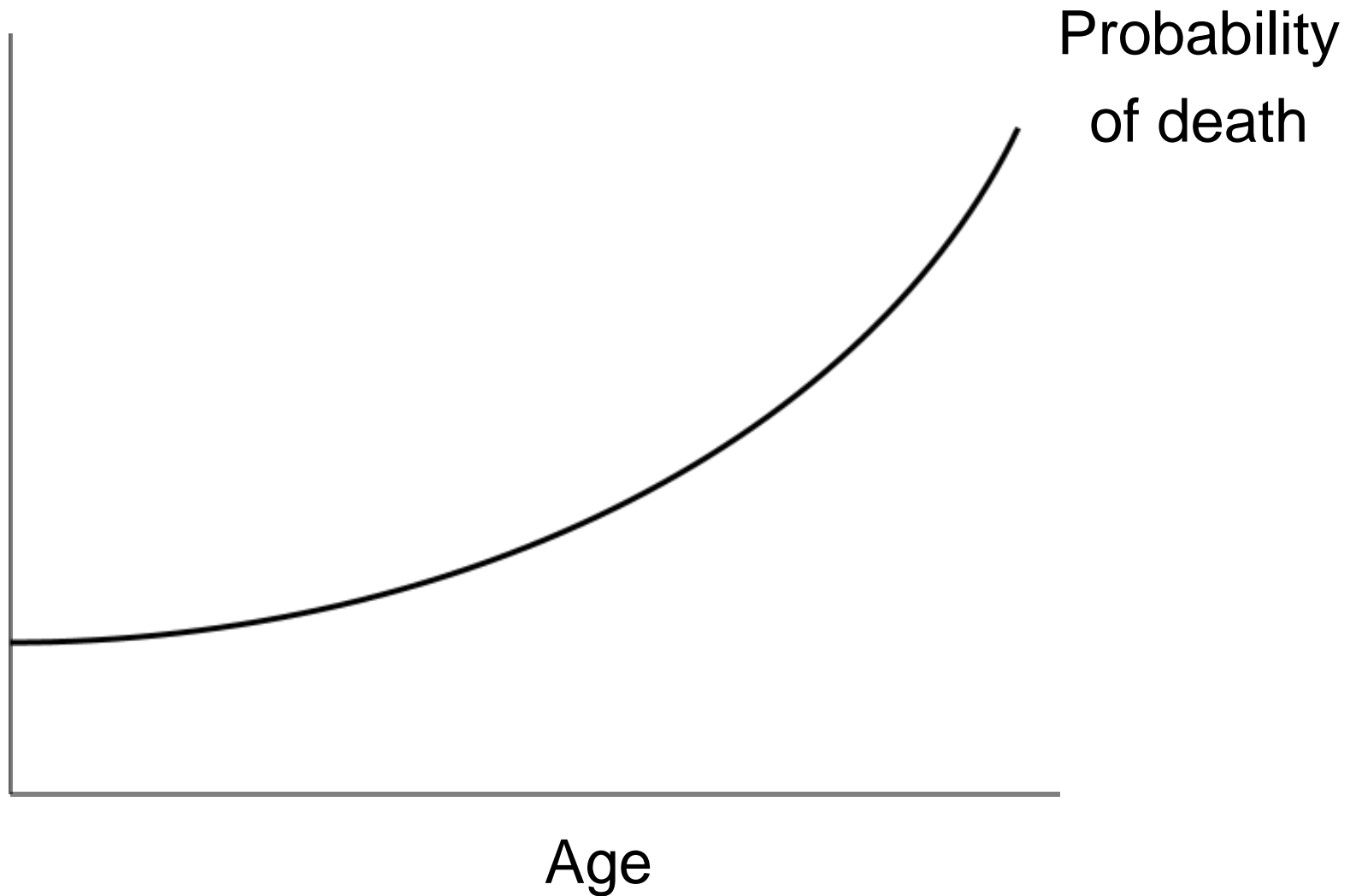


Individual life vs non-life

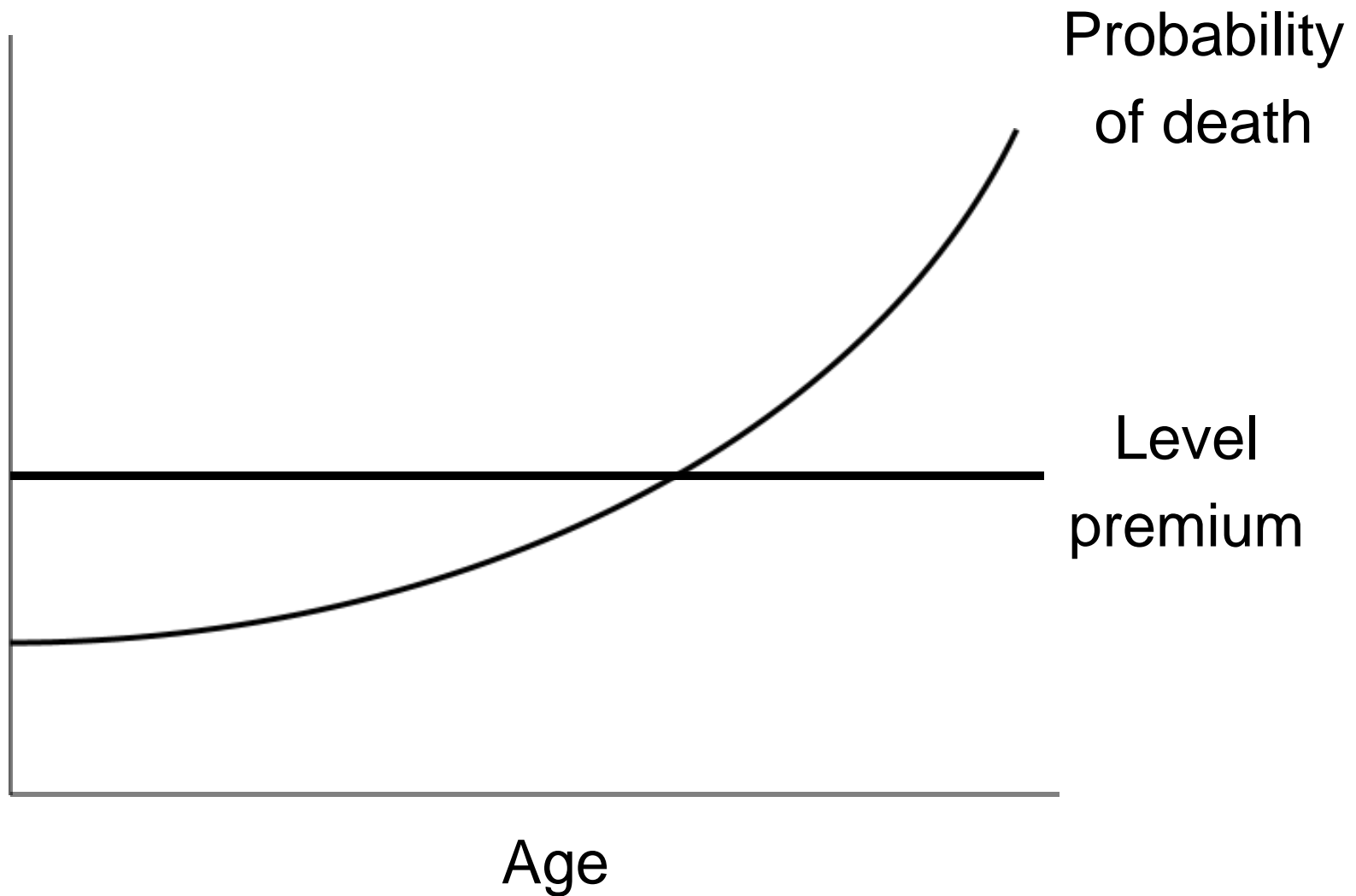
- ❑ Most non-life policies (and group life policies) are written for one year at a time
- ❑ Individual life policies last for many (10, 20, ..., 50+) years, with policy terms determined largely at issue, often with guaranteed level premiums



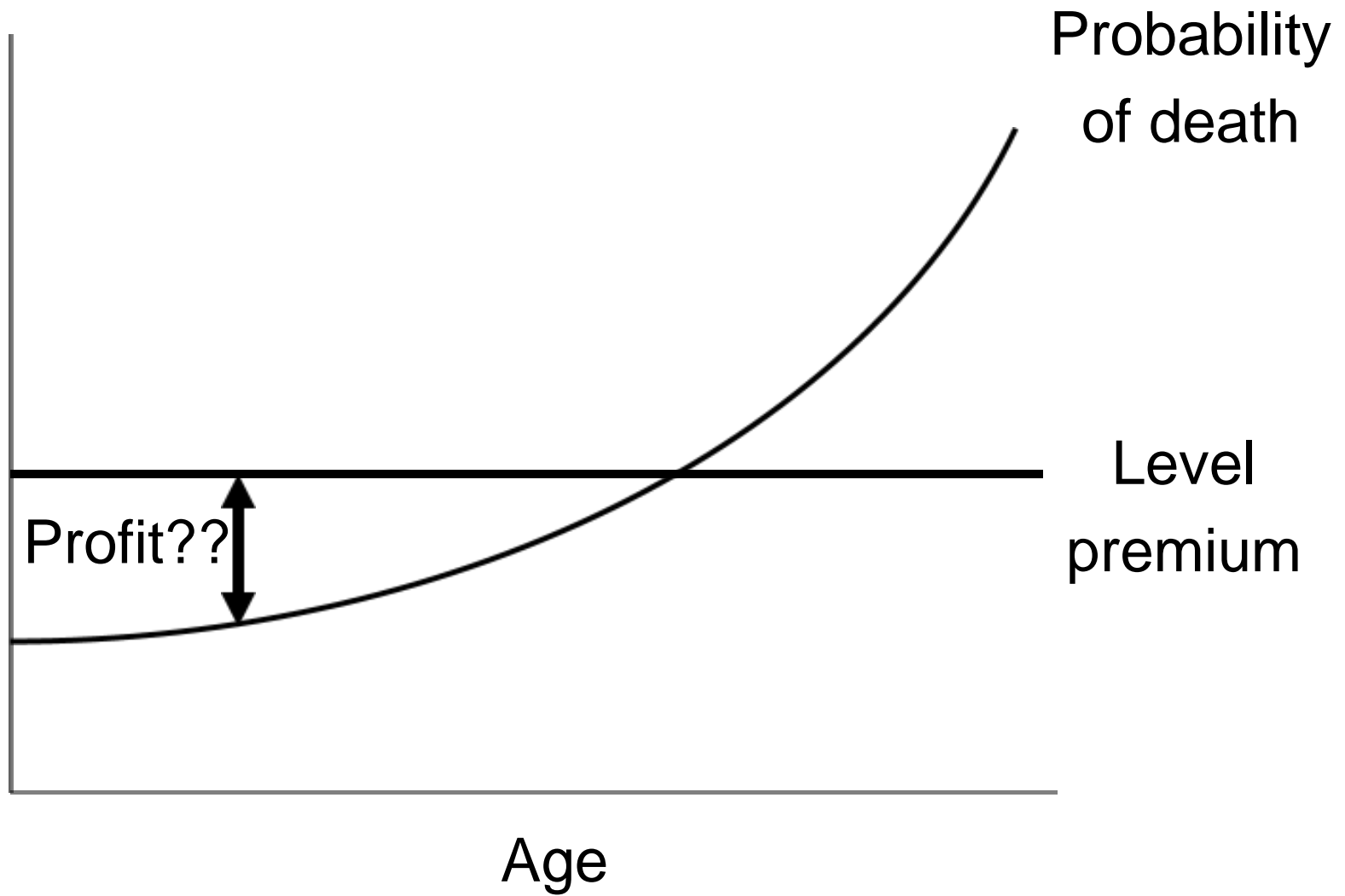
Individual life policies



Individual life policies



Individual life policies



Some questions that arise

- ❑ How much should the insurer be setting aside as a liability now to ensure it will have enough later to pay the claim, if/when it ever happens?
- ❑ Which mortality table is to be used? and what kinds of adjustments are necessary/appropriate?
- ❑ How will the premium be invested? How will future premiums be invested? What rates will they earn?
- ❑ How many policyholders will lapse/surrender their policies before death? and when?
- ❑ What expenses will be incurred in administering the policy? What impact of inflation?



Some actuarial roles that arise

Traditional

- ❑ Product design and pricing
- ❑ Valuation / financial reporting
- ❑ Profitability analysis
- ❑ Setting policy dividends / bonuses
- ❑ Dynamic solvency testing
- ❑ Experience analysis
- ❑ Underwriting
- ❑ Marketing

Non-traditional

- ❑ Risk management
- ❑ Asset liability management
- ❑ Investment strategy
- ❑ Transformation
- ❑ Predictive analytics



Assumption-setting underlies many of these roles

- ❏ Ideally “best-estimate” the same for both pricing and valuation, but
- ❏ In valuation, a need for explicit risk margins, varying with degree of risk and with degree of uncertainty around the best estimate
- ❏ In pricing, a margin for risk and profit important, varying ideally again with degree of risk and degree of uncertainty around the best estimate
- ❏ Combination of own experience (if any), industry experience (if any), industry experience elsewhere, non-insurance-specific experience, etc., **all adjusted appropriately for the product, the underwriting, the distribution channel, and the company**



Product design and pricing

- ❑ Committing the company now to obligations it will still have 30, 40, 50, and more years from now!
- ❑ Current experience and economic environment is important, but how about the future?
- ❑ Translating company profit targets into profitable and saleable products – a challenge!
- ❑ Clear communication to management important – sensitivities and ranges of outcomes
- ❑ Poor pricing can come back very quickly to haunt you, and is picked up soon in valuation ...



Valuation – policy liabilities

In the olden days

- ❑ “Net” premium reserves
- ❑ Assumptions locked-in at issue
- ❑ Assumptions considered conservative (but didn’t necessarily turn out to be!)
- ❑ Stable results (but masked emerging problems – Japan!)

Emerging

- ❑ Liability calculated using policy premiums
- ❑ Valuation assumptions updated as experience emerges and economic conditions change
- ❑ Explicit risk adjustment
- ❑ Volatile results (not necessarily a good thing!)



Liability (ignoring reinsurance):

- Sum of PV of:
 - Death benefits
 - Surrender benefits
 - Dividends / bonuses
 - Commissions and expenses
 - Any other disbursements
- Less sum of PV of:
 - Policy premiums
 - Any other policy-related income

Illustration of sensitivity

| | Before | After | Chg |
|-------------|--------|-------|-----|
| Assets | 1100 | | |
| Liabilities | 1000 | | |
| Surplus | 100 | | |
| Earnings | 20 | | |



Illustration of sensitivity

| | Dur | Before | After | Chg |
|---------------|-----|--------|-------|-----|
| Assets | 10 | 1100 | | |
| Liabilities | | | | |
| ❑ PV Benefits | 15 | 5000 | | |
| ❑ PV Premiums | 7 | 4000 | | |
| ❑ Difference | | 1000 | | |
| Surplus | | 100 | | |
| Earnings | | 20 | | |



Illustration of sensitivity

Impact of interest rate from of 1%

| | Dur | Before | After | Chg |
|---------------|-----|--------|-------|-----|
| Assets | 10 | 1100 | 1210 | 10% |
| Liabilities | | | | |
| ❑ PV Benefits | 15 | 5000 | 5750 | 15% |
| ❑ PV Premiums | 7 | 4000 | 4280 | 7% |
| ❑ Difference | | 1000 | 1470 | |
| Surplus | | 100 | | |
| Earnings | | 20 | | |



Illustration of sensitivity

Impact of interest rate from of 1%

| | Dur | Before | After | Chg |
|---------------|-----|--------|-------|-----|
| Assets | 10 | 1100 | 1210 | 10% |
| Liabilities | | | | |
| ❑ PV Benefits | 15 | 5000 | 5750 | 15% |
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| ❑ Difference | | 1000 | 1470 | 47% |
| Surplus | | 100 | | |
| Earnings | | 20 | | |



Illustration of sensitivity

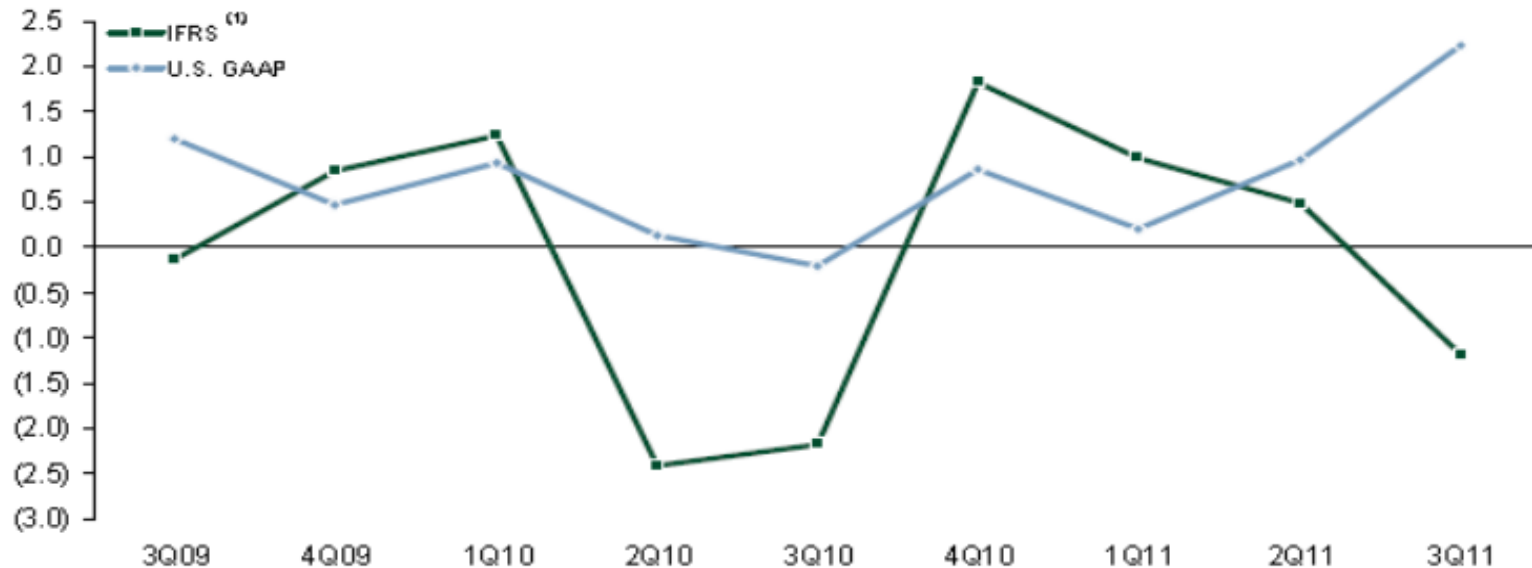
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| ❑ PV Benefits | 15 | 5000 | 5750 | 15% |
| ❑ PV Premiums | 7 | 4000 | 4280 | 7% |
| ❑ Difference | | 1000 | 1470 | 47% |
| Surplus | | 100 | -260 | -360% |
| Earnings | | 20 | -240 | -1300% |

This is not just theory ...

Net Income in accordance with IFRS and U.S. GAAP

Net income
(C\$ billions)



- IFRS¹ net income is typically more volatile compared to U.S. GAAP in periods of market dislocation due to more extensive use of mark-to-market accounting

¹ Effective January 1, 2010 Manulife adopted IFRS as a replacement of CGAAP. 3Q09 and 4Q09 are presented in accordance with CGAAP

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Profitability analysis

- ❏ With that kind of volatility, pretty important!
- ❏ Sources of earnings analysis, of interest to:
 - Management
 - Shareholders and market analysts
 - Regulators
- ❏ Understanding trends, in order to:
 - Update valuation assumptions
 - Update pricing assumptions for new products
 - In the case of “participating”, “with-profits”, “adjustable premium” products, make appropriate changes to dividends/bonuses/premiums



Dynamic solvency testing

- ❑ Emerging approaches to financial reporting give a much better picture of where the company stands today. But ...
- ❑ They don't necessarily provide a good understanding of how sensitive a company's solvency is to changes in market or economic conditions, its sales success (or failure), and other factors
- ❑ Dynamic solvency testing assesses future financial position under a variety of scenarios
- ❑ Now leading to an even broader Own Risk and Solvency Assessment approach (ORSA)



Other traditional roles

- ❑ Experience analysis
 - Mortality, lapse, expenses, ...
 - Increasingly complex as more product types emerge
- ❑ Underwriting
 - A bridge between the underwriting and actuarial disciplines
 - Assessing cost-effectiveness of underwriting requirements
 - Ensuring underwriters understand what's priced into the product, and actuaries understand how the underwriters are classifying the risks
- ❑ Marketing
 - Technical assistance to the sales force
 - Interpreting sales force needs to the pricing or corporate actuaries



Moving to non-traditional roles

❖ Areas:

- Enterprise risk management (ERM)
- Asset-liability management (ALM – really one component of ERM)
- Investment strategy
- Transformation of platforms, processes, and organization
- Predictive analytics, especially around new business

❖ In fact, these not really that non-traditional, but merely an evolution of these functions over time

❖ In life insurers, asset-liability management the most critical piece of ERM, given the long-term nature of the business



In summary, an actuary is

- ❑ With appropriate qualification, a provider of formal opinions to the regulator and public
- ❑ The producer of the key elements of the financial reports
- ❑ Instrumental in projecting future solvency
- ❑ The developer of the company's products
- ❑ Often the Chief Risk Officer
- ❑ A key advisor
- ❑ Often a key player in management, and sometimes the CEO!



Equipping the actuary for this

- ❑ Education, at the outset and continuing thereafter
- ❑ Professionalism, including
 - A meaningful code of conduct
 - A discipline process
- ❑ Guidance for actuarial practitioners
 - Standards of practice
 - Educational notes

Given the long-term nature of the obligations of an insurer, and the extreme sensitivity of the company's financial position to the actuary's work, these are critical!

