Convergence and Discontinuity: impacts on our financial security.

Asia-Pacific Risk and Insurance Association
12th Annual Conference

Anthony Asher
6 July 2008
Agenda

• The business elements of life insurance
  – The extent of the market
  – The standard issues
  – Providing policyholder security

• Convergence and correlations create expected risks
  – International economy
  – Intellectual traditions

• Discontinuity creates surprise risks
  – Critical points
  – Dynamic hedging
The extent of the market: developed economies
The extent of the market: developing economies
The source of cash flows, revenues and profits: Australian example

<table>
<thead>
<tr>
<th>$ million</th>
<th>Cash flows</th>
<th>Revenue</th>
<th>Profit after tax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment business</td>
<td>51,000</td>
<td>250,000 assets 2,500 fees</td>
<td>1,000</td>
</tr>
<tr>
<td>Insurance risk</td>
<td>6,400</td>
<td>2,500</td>
<td>1,000</td>
</tr>
<tr>
<td>Advice</td>
<td>2,500</td>
<td>2,500</td>
<td>250</td>
</tr>
</tbody>
</table>

These numbers are illustrative

In Australian 75% of superannuation assets are outside life insurance companies.
The standard agenda of current issues

- Financial Reporting
  - Speed to year-end
  - International Accounting Standards

- Valuation issues
  - Solvency II

- Capital Management
  - Optimal capital allocation
  - Securitisation

- Pricing

- Risk Management
  - Compliance
  - ALM
  - Reinsurance
  - Unit pricing

- Product Rationalisation
  - Cost vs benefits
  - Which products and systems?

- Risk Point of View
  - Middle Australia is under-insured
  - Product innovation quickly copied
  - Sustainable advantage
Providing policyholder security: income streams and disability

Income streams

- Financial security means an income when you cannot work
- Require sharing of investment and longevity risks
- CPF (Singapore developments)

Disability insurance

Rehabilitation…

is better, but hard and humiliating

Heterogeneity

- Physical disabilities – need financial support for rehabilitation
- Backache and depression – need strong pressure to return to work
  “the diagnosis rather than the condition is the cause of most claims”
- Intellectual and mental conditions – payment to 3rd parties
  “there are people who will not be able to participate in workplace without ongoing … assistance, sometimes … in an institutional setting.”
- Other conditions – income support

Long term care

- “For the very old over 85, “70% have difficulties with cognition, executive tasks and/or with balance, gait, mobility and activities of daily living.” … in Sydney
- “almost one in three Australians has given help to an aged or disabled person in the previous year.”

Age segmentation of accounts in Australia

<table>
<thead>
<tr>
<th></th>
<th>Members</th>
<th>Balances</th>
<th>Pensions / benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>➔ 65</td>
<td>➔ 65</td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>3%</td>
<td>14%</td>
<td>30%</td>
</tr>
<tr>
<td>Corporate</td>
<td>2%</td>
<td>11%</td>
<td>26%</td>
</tr>
<tr>
<td>Public</td>
<td>7%</td>
<td>5%</td>
<td>68%</td>
</tr>
</tbody>
</table>

Source: APRA Annual Superannuation Bulletin June 2007
Agenda

• The business elements of life insurance
  – The extent of the market
  – The standard issues
  – Providing policyholder security
• Convergence and correlations create expected risks
  – International economy
  – Intellectual traditions
• Discontinuity creates surprise risks
  – Critical points
  – Dynamic hedging
Ongoing growth in international trade …

IMF World Economic Outlook, April 2008
... accompanied by increases in capital flows ...

IMF World Economic Outlook, April 2008
...and reducing PPP deviations as barriers are removed

![Bar chart showing contributions to global growth, 2007](chart.png)

- **Contributions to Global Growth, 2007**
  (percent of global growth rate)

  - Based on old PPP weights
  - Based on new PPP weights
  - Based on market exchange rate weights

Source: IMF staff calculations.

IMF World Economic Outlook, April 2008

Based on October 2007 World Economic Outlook estimates except where noted.

© 2008 Deloitte Touche Tohmatsu
Over the longer run, investment markets look diverse ...
... but in the short run seem to show strong short term convergence
Credit spreads also appear to converge …

IMF World Economic Outlook, April 2008
... perhaps because capital innovations are also spreading.
Agenda

• The business elements of life insurance
  – The extent of the market
  – The standard issues
  – Providing policyholder security

• Convergence and correlations create expected risks
  – International economy
  – Intellectual traditions

• Discontinuity creates surprise risks
  – Critical points
  – Dynamic hedging
Intellectual traditions – Convergence means greater understanding … and less debate

Accounting using “fair values” – Understanding volatility
- Financial Accounting Standards Board (USA)
- International Accounting Standards Board (Elsewhere)

Capital regulations using risk based capital - VaR
- BASLE II - Banking Capital
- Solvency II – Insurance Capital

Legal Environment
- Cross border mergers and acquisitions
- Supervisory bodies (APRA, FAS etc)
- Bancassurance

Finance and Martingales - Markets as physical systems
- University finance courses
- International Actuarial Association syllabus
- International Risk Management Institute
- … but market tails and inefficiencies (Fama and French, Nassim Taleb)

Metaphysics
- Epistemology: How do know anything? …only what is measurable?
- Value: Virtue or utilitarianism … and the pursuit of happiness
Intellectual traditions – Convergence means greater understanding … and less debate

The Emperor has no Clothes: Limits to risk modelling (Jon Danielsson)

“It is argued that since market data is endogenous to market behavior, statistical analysis made in times of stability does not provide much guidance in times of crisis. …the empirical properties of current risk forecasting models are found to be lacking in robustness while being excessively volatile. For regulatory use, the VaR measure is lacking in the ability to fulfil its intended task, it gives misleading information about risk, and in some cases may actually increase both idiosyncratic and systemic risk.”

There are limits to how much risk capital can be reduced
Agenda

• The business elements of life insurance
  – The extent of the market
  – The standard issues
  – Providing policyholder security

• Convergence and correlations create expected risks
  – International economy
  – Intellectual traditions

• Discontinuity creates surprise risks
  – Critical points
  – Dynamic hedging
Discontinuity: Ising model critical points

Possible critical points:

- Impact of increasing CO₂ and global warming
- Breakdown of family structures
- Obstacles to disease (plague, AIDS and Bird ‘flu spread by travel)
Discontinuity: converging trends

Pennant pattern

- A pennant or a symmetrical triangle occurs when price action range is slowly narrowing down. Consistent lower highs and higher lows eventually brings price to an apex of a triangle. After being squeezed at the top of a triangle, the price most of the time will breakout from a pennant in the direction of the most recent dominant trend.

Possible breakouts:

- Peak oil production meets rising consumption
- Job losses through automation meet declining workforces
- Retiree selling of assets meets sovereign fund investors
Investment issues: is there sufficient capital to sustain guarantees?

Dynamic hedging

- Equivalent to “Constant Proportion Portfolio Insurance”
- “The October 1987 crash showed that portfolio insurance strategies are subject to failure when the market swings wildly in short periods of time”

Size of market for investment guarantees in retirement

- Who would absorb reduction in share prices of 30%?
- Already $200bn in post retirement income, rising rapidly
  - Should add close to retirement money
  - More annuities would create even more growth
- Losses of between $60bn and $200bn if everything guaranteed
- Annual profits of all Australian companies is approximately $100bn

Conclusion is that annuitants must take most of the risks