IASB/FASB Meeting
Week commencing 21 March 2011

IASB Agenda reference	**12A**
FASB Agenda reference	**61A**

Project	**Insurance contracts**
Topic	**Education session on explicit risk adjustment (*revised version: 16 March*)**

Accounting for Insurance in Australia –

What can we learn about expected liability values & risk margins ?

Presentation to IASB & FASB

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March 2011

Australian Insurance – Using Discounting & Quantified and Explicit Risk Margins

- Background to Australian Insurance Market
- Insurance Basics – Why use Risk Margins ?
- Consistency & Reliability
- Use of Accounting Results by Management
- Practical Issues
- The Vital Role of Disclosure
- Summary

A Bird's Eye View of Australian Non-life Insurance

- **A medium sized, but sophisticated market**
  - 10th largest insurance market in the world
  - Gross private sector premiums A$33 Bn (US$33 Bn) (APRA regulated)
  - Gross public sector premiums A$10 Bn (US$10 Bn) (mostly compulsory workers' compensation and motor bodily injury insurance covers)
  - Insurance industry has been profitable in recent years
  - General inflation around 3% p.a.
  - Risk free interest rates around 5% p.a.

Australian Non-life Insurance

- **Both large & small insurers operating in Australia**

  132 private insurers operate in Australia, but 4 major groups underwrite 61% of total private sector premiums (IAG, Suncorp, QBE, Allianz)
- **QBE operates internationally (in 47 countries) using Australian Accounting Standards throughout the world** (including specific AASB 1023 for non-life insurance)

QBE Region	Premium	
Europe	$5.1 Bn	
America (North & South)	$5.1 Bn	
Other	$6.7 Bn	($3.5 Bn in Australia)

- **A wide range of products**
  - Personal Lines/Commercial Lines – almost 50/50
  - Short tail/Long tail – around 60/40 by premium (including public sector)

A Bird's Eye View ..... Recent History

- **HIH Collapse in 2001**
  - HIH was Australia's 2nd largest non-life insurer in 2001
  - the first significant non-life insurance failure for over 20 years
  - lack of discipline in reserving (and hence pricing) practices was seen to be a significant contributory factor
  - subsequent Royal Commission investigation made 61 reform recommendations

- **In 2002/03, insurance regulations (administered by APRA) were tightened in response to HIH, requiring risk margins for prudential reporting from 1 July 2003**

- **New Australian Insurance Accounting Standard (AASB 1023) also introduced as from 1 January 2005**

AASB 1023 since 1 Jan 2005

- Use of unearned premium for pre-claim liabilities
- Discount insurance liabilities at risk–free interest rates

- Risk margins mandatory for outstanding claim liabilities
- Liability Adequacy Test applied with risk margins

- Mandatory disclosure of both central estimates of insurance liabilities and risk margins
- Mandatory disclosure of Probability of Adequacy (PoA) of insurance liabilities with risk margins

- Mandatory disclosure of sensitivity of insurance liabilities to key assumptions e.g. inflation, claims severity, claim frequency
- Mandatory disclosure of claims development table

- All assets valued at market value, through Profit & Loss A/c

What is in common with the IASB ED ?

Insurance liability is based on

- Unbiased probability weighted expected cost of settling claims incurred
- Need to add an explicit risk margin
- Discounting for time value of money (at risk free rate in AASB 1023) to obtain present value
- Disclosure of estimated probability of sufficiency (adequacy) of liabilities
- No residual (or composite) margin required after insurance coverage ends, risk margin recognises the risk in the outstanding claims liability estimate
- No future premiums embedded in outstanding claims liability (because these are 1 year contracts)

Two Australian Insurance Accounting Standards – Non-Life vs Life

AASB 1038 used for Life Insurance

- Unbiased probability weighted expected cost of settling claims incurred
- Discounting for time value of money (at risk free rate with an allowance for illiquidity) to obtain present value
- Does not require explicit risk margins
- Uses residual margins with unlocked assumptions
- Difference between previously expected and current actuals in year (including discount rate changes) flow through to P&L with residual margin adjusted for changes in non-financial market estimates/assumptions (like B5 in IASB/FASB Paper 3M / 58M)
- Residual margin can never be negative
- All assets valued at market value, through Profit & Loss A/c
- Main differences are that AASB 1038 caters for contracts with multi-year insurance coverage and very low outstanding claims risk

Some Insurance Basics

- Outcomes of risks from individual policies are unknown when underwritten
- However, when many similar risks are underwritten, expected results of total portfolio become more predictable
- Claims are driven by:
  - *Frequency (or probability) of a claim event occurring; and*
  - *Severity (or size) of a claim if it occurs*
- Risks inherent in different classes of insurance vary over a spectrum :
  - *High frequency / low severity (eg motor) – outcomes relatively easy to predict reliably*
  - *Low frequency / high severity (eg earthquake) – outcomes are harder to predict reliably*
  - *Low outstanding claims risk (life) vs high outstanding claims risk (asbestos)*
- *These risk differences can be measured and quantified*

Calibration of liabilities
Australian Non-Life Insurance

Broad steps

1. Assess central estimates of the liability reserves for each class of business
2. Assess coefficients of variation (“CoV”) of the reserves
3. Select distribution for the present value of claims
4. Select probability of sufficiency (“PoS”)
5. Assess risk margin by class of business before diversification
6. Assess correlations for each pair of classes of business and assess diversification benefit
7. Assess the overall diversified risk margin for the whole portfolio
8. Apportion diversification benefit by class of business

Simple illustration of insurance risk

Assume a dice roll 100 times represents the results of underwriting 100 insurance policies in one year.

If 1 is result, insurer pays a claim of $1
If 2 is result, insurer pays a claim of $2
If 3 is result, insurer pays a claim of $3
If 4 is result, insurer pays a claim of $4
If 5 is result, insurer pays a claim of $5, BUT
If 6 is result, there is no claim at all.

All claims will be paid 1 year after policies are underwritten
Dice can be rolled at any time during that year

Probability of a claim is 5/6th and claim amount can be $1 to $5

Insurance liability

What is the liability of the insurer after all policies are written but before any dice have been rolled ?

Expected value = 100 x [1+2+3+4+5+0] / 6 = 250

Variance = 100 x [2x0.5x0.5 + 2x1.5x1.5 + 2x2.5x2.5] / 6

= 291.67

Standard Deviation = Square Root of 291.67 = 17.08

CoV = 17.08 / 250 = 6.8% (A key measure of extent of risk)

Insurance liability (before any dice are thrown)

From the well known nature of this statistical distribution we can confidently predict that results will be :

Probability of Adequacy (PoA)	$
50%	250
75%	262
90%	272

Hence, if insurer requires a 90% PoA, risk margin is $22 (= $272 - $250), before allowing for time value of money.

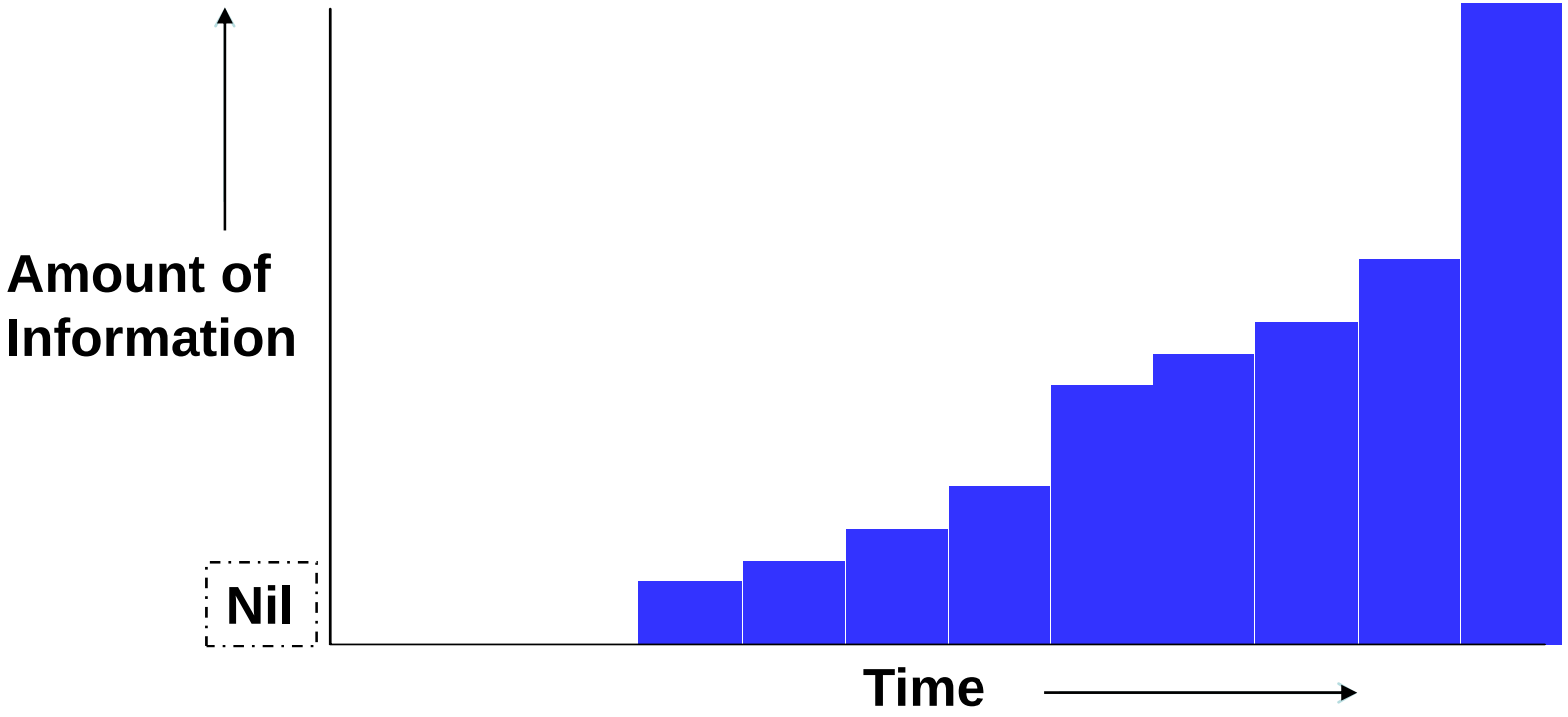
Insurance liability (before any dice are thrown)

If we assume a discount rate of 5% p.a., once we allow for timing of the claim payment one year after underwriting, the resulting insurance liability at the outset will be :

	$
Expected Value	$250 / 1.05 = $238
75% PoA	$262 / 1.05 = $250
90% PoA	$272 / 1.05 = $259

Insurance Claims Process – a key source of risks when estimating outstanding claims

Occurrence → Notification → Quantification → Settlement



Why does this matter ?

- Normal liability levels vary a lot by type of business:
  - long tail - 3 times annual premiums or more
  - short tail – as low as ¼ of annual premiums

- Typically, annual profit before tax might be 5%-15% of annual premium

- Hence, small changes in liabilities can have a major impact on reported profit

- Example - If anticipated annual premium is 100 and expected profit is 10, then a mere 1% change in a long tail liability of 300 will reduce reported profit by 30%

QBE Example – 31 Dec 2010

		(US$ Bn)
• Premium		13.4
• Profit before tax		1.3
• Unearned Premium Liability		6.8
Central Estimate (Net of R/I)	13.7	
Risk Margin	1.3	
• Total Claims Liability		15.0
• Total Insurance Liabilities		21.8

Here, a 1% change in Insurance Liabilities = 17% of Profit

What kinds of risk are in the risk margin (1) ?

- "**Internal systemic**"

  Risks internal to the liability valuation - the extent too which the adopted actuarial model is an imperfect representation of the real life process

  - Includes model structure error, model parameterisation error and data inaccuracy (sometimes referred to collectively as "model specification risk")

  - e.g. some customers may not have disclosed risk sensitive information in their proposals so the underwritten risks do not behave as expected

- "**External systemic**"

  Even if the model we have used is a good representation of reality today, future trends in claim outcomes external to the model may result in actual experience differing from that expected either gradually over time or suddenly e.g.

  - judicial interpretation or awards / legislative / political risks

  - economic risks (including normal inflation)

(Continued over)

What kinds of risks are in the risk margin (2) ?

- Event risk (man made or natural peril)
- Latent claim risk or claims from a source that was not expected (e.g. asbestos)
- Recovery risk (uncertainty in either non-reinsurance or reinsurance recoveries)
- Claims management process risk (if claim reporting, estimation, payment or finalisation processes change)
- Expense risk (the cost of managing claims changes)

- "**Independent Risk**"

  Risks inherent in the insurance process due to random statistical fluctuation (which generally reduce to relatively low levels as portfolio size increases)

  - generally estimated using well known statistical/stochastic techniques

  (e.g. Mack, Boot-strapping, Stochastic chain ladder, GLM, etc)

All of these risks are independent of financial market risk

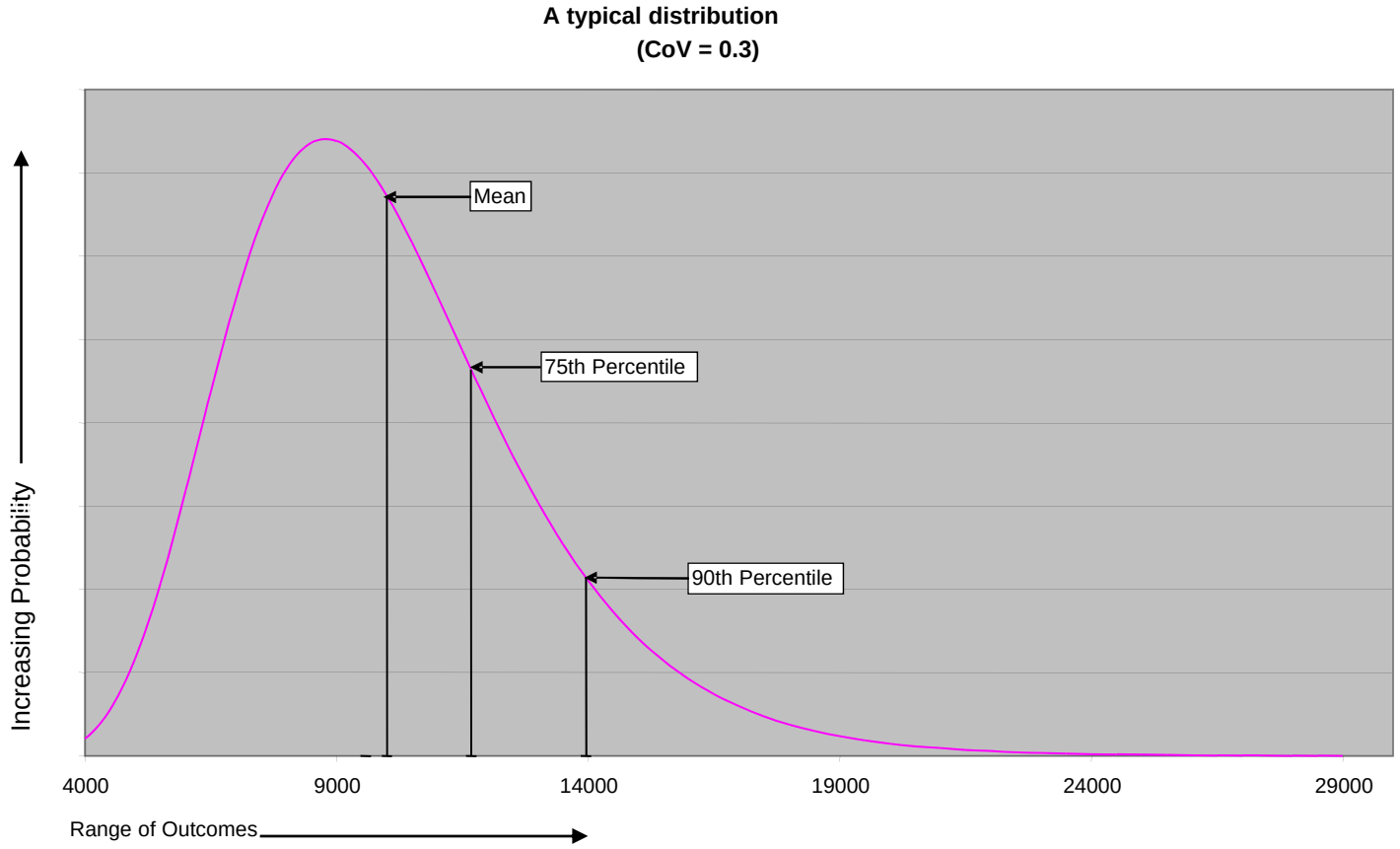
Key Measures of Risk

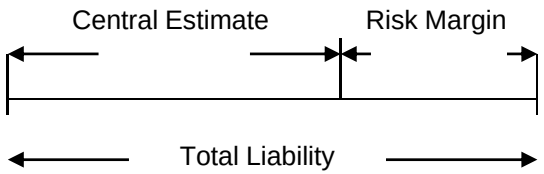
- Estimation from experience of claims frequency & severity and duration before claim payments will be made

- Use of suitable probability distributions based on experience (e.g. normal, lognormal etc)

- Measures of Uncertainty:
  - Co-efficient of Variation (CoV) (=Standard Deviation / Mean) (e.g. 15%, 30%) – a measure of the inherent variability of a distribution
  - Probability of Sufficiency (or Adequacy) (PoS/A) (e.g. 50%, 75%, 90%) – a measure of how likely a liability estimate is to be sufficient (given an assumed distribution and CoV of that distribution)

Central Estimate & Risk Margin – Outstanding claims

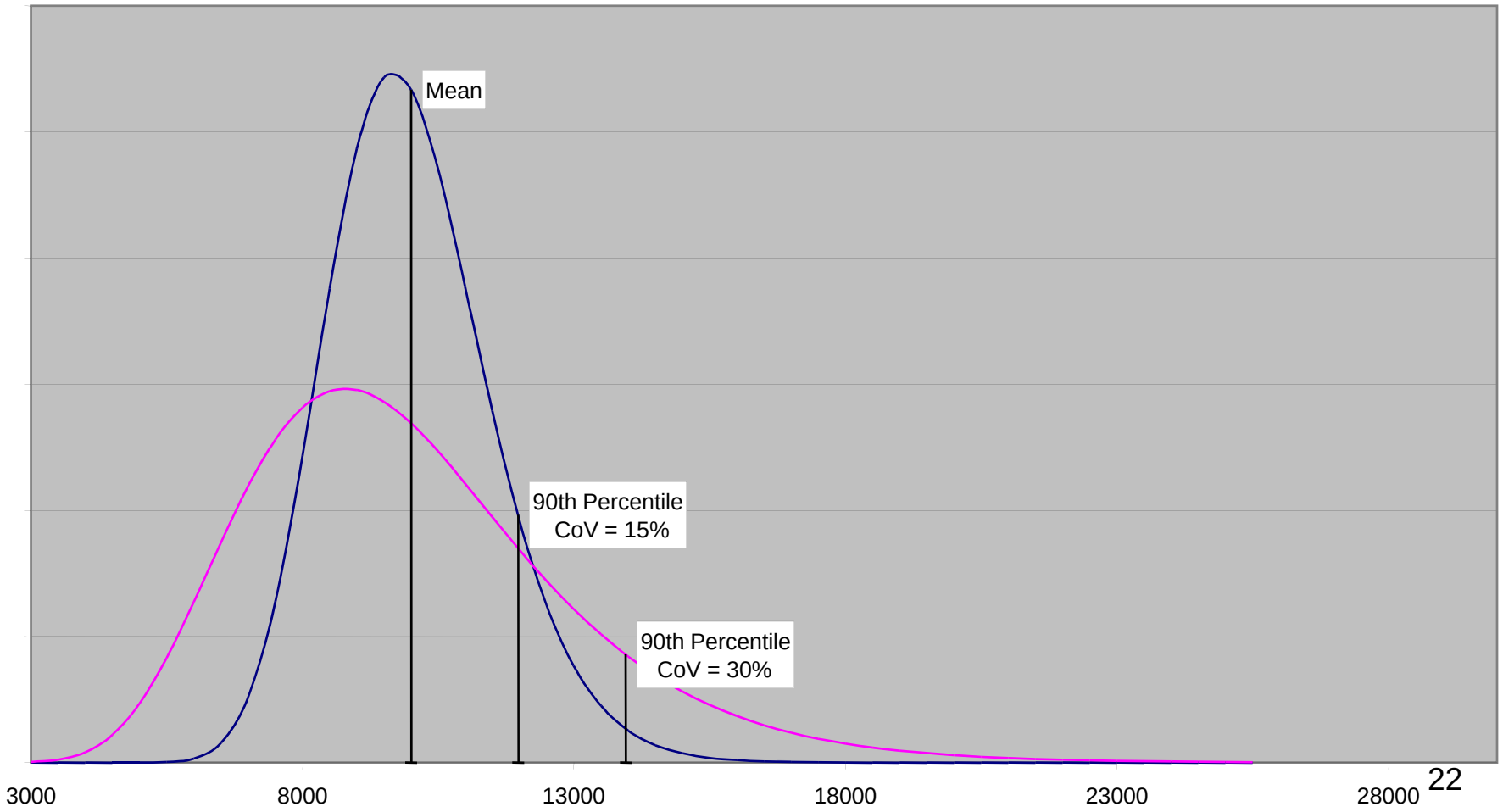




Probability of Adequacy (PoA) = the area under the curve to the left of the liability outcome selected.

Central Estimate & Risk Margin – outstanding claims

Typical outstanding claim distributions



Typical risk margins as a % of liability

Outstanding Claims Liability Risk Margins (R M)		Number	Liability	Liability	Simple	Simple
as at 30 June 2007 as a % of liability without R M		of	Weighted	Weighted	Average	Average
		Insurers	R M	R M	R M	R M
75% PoS Level	"Tail"		Mean	Std Dev	Mean	Std Dev
Houseowners/ Householders	Short	38	5.6%	2.0%	12.1%	15.8%
Domestic motor vehicle	Short	35	5.6%	2.1%	9.2%	6.2%
Commercial motor vehicle	Short	30	7.1%	3.1%	15.0%	19.2%
Travel	Short	14	7.7%	1.9%	17.0%	24.4%
Fire & Industrial Special Risks	Medium	38	8.5%	3.7%	13.1%	9.3%
Marine	Medium	38	9.5%	9.5%	16.7%	16.8%
Aviation	Medium	9	5.8%	4.4%	13.6%	9.4%
Mortgage	Medium	10	9.5%	6.2%	30.9%	26.6%
Consumer Credit	Medium	16	8.2%	5.9%	15.4%	15.2%
Other Accident	Medium	33	8.2%	3.6%	14.9%	16.9%
Compulsory Third Party motor vehicle	Long	12	9.3%	2.0%	10.4%	3.0%
Public & Product liability	Long	41	11.2%	6.9%	17.6%	18.8%
Professional Indemnity	Long	30	13.7%	7.1%	16.6%	20.3%
Employers liability (Workers compensation)	Long	20	12.5%	4.6%	14.3%	7.6%
Notes 1. Table excludes run-off insurers and all reinsurance business				Source: APRA Nov 2008		

Consistency & disclosure have improved

- Central estimates and risk margins are able to be tested in hindsight (more on this later)
- Initially (2003 and 2004) there was a wide range of CoVs, PoAs & risk margins used. But disclosure lead to market benchmarks and “norms” emerging
- Companies converged around 90% PoA of liability for outstanding claims as a “market standard” for AASB 1023 reporting
- Market analysts (users) very interested in liability disclosures and claim development tables
- Diversification allowances are still an area of some divergence, but increased disclosure does allow comparisons between insurers

Practical Experience – Risk Margins

Initially, the Challenges were material & fundamental

- Estimating and quantifying all the risk components to achieve, say, 75% or 90% PoA was a challenge
- There was (alarmingly) little global literature upon which to base an approach. This is not the case now !
- The Institute of Actuaries of Australia and APRA contributed to key research on risk margins
- Adequate Actuarial Standards (APRA GPS210/310 and IAAust PS 300) were vital
- The role of disclosure is crucial in developing consistency
- IAA Risk Margin Working Group paper (2009) sets current “state of the art”.

Practical Experience – The Benefits

- Extended rigour into business and increased actuarial influence in all insurance liabilities
- Improved transparency, internal management discipline and reporting
- Better quality and quantity of data
- Stronger communication links with Boards, senior management and investors
- Much better comparability between insurers and over time
- More focus on true drivers of the business, its risk profile & quality of risk management

Transparency - Using the Accounting Figures to Manage the Business

- **Results Tend to be Volatile**
  - But, so is the business!
  - Discount rates will change with market movements, but active asset/liability management materially mitigates this effect
  - A prospective approach to unexpired risk speeds up recognition of both profits & losses, leading to more active management of the business

- **Disclosure and Discipline (Actuarial Standards) are Vital**
  - Transparency of reporting means that trends in business outcomes are recognised at an earlier stage (and therefore tend to have a lesser “once-off’ effect on results)
  - Risk margins will not vary much over time as a % of the central estimate

- **Result Smoothing does not occur**
  - All disclosures are auditable and audited !
  - Internal and external reporting are consistent

IAG's Claims Development Table – 30 June 2010 (undiscounted net provision)

	2001 and prior $m	2002 $m	2003 $m	2004 $m	2005 $m	2006 $m	2007 $m	2008 $m	2009 $m	2010 $m	Total $m
NET ULTIMATE CLAIMS PAYMENTS											
Development											
At end of accident year		3,217	3,355	3,496	3,608	4,000	4,695	4,596	4,617	4,603	
One year later		3,145	3,178	3,331	3,561	3,927	4,660	4,554	4,656		
Two years later		3,084	3,103	3,358	3,529	3,858	4,619	4,549			
Three years later		3,050	3,073	3,342	3,485	3,860	4,632				
Four years later		3,028	3,018	3,326	3,450	3,847					
Five years later		3,000	3,026	3,315	3,399						
Six years later		3,000	3,020	3,286							
Seven years later		2,980	3,008								
Eight years later		2,981									
Current estimate of net ultimate claims payments		2,981	3,008	3,286	3,399	3,847	4,632	4,549	4,656	4,603	
Cumulative payments made to date		(2,901)	(2,929)	(3,153)	(3,213)	(3,494)	(4,046)	(3,845)	(3,558)	(2,387)	
Net undiscounted outstanding claims payments	690	80	79	133	186	353	586	704	1,098	2,216	6,125
Discount to present value	(207)	(15)	(14)	(22)	(28)	(47)	(62)	(79)	(126)	(184)	(784)
Net discounted outstanding claims payments	483	65	65	111	158	306	524	625	972	2,032	5,341
Reconciliation											
Claims handling costs											325
Risk margin											1,099
Net outstanding claims liability											6,765

Linking PoA With Value

- ***Compare for typical portfolios*:**
  - **Net Present Value (at Cost of Capital in excess of risk free rate) of requirement to hold funds in excess of the central estimate up to the 99.5th percentile of outstanding claims (assumed solvency level)**
  - **This will be equal to the initial capital needed less the NPV of expected capital releases as claims are settled after allowing for a risk free return for matching assets**
- ***Assuming*:**
  - **Claims log-normally distributed (i.e. skewed outcomes)**
  - **Realistic returns on capital (4% for AA & 6% p.a. for BBB over risk free)**
  - **Using Short, Medium and Long Tailed classes with suitable CoVs**

Comparisons for Non-Life Risk Margin PoA Equivalent to Cost of Capital

Term	Typical AA Rated	Typical BBB Rated
Short	62%	63%
Medium	77%	77%
Long	84%	83%

Conclusion : Not very sensitive to credit rating !

Comparisons for Non-Life Risk Margin PoA Equivalent to Cost of Capital

Term	Typical AA Rated	Riskier AA Rated
Short	62%	67%
Medium	77%	82%
Long	84%	88%

Conclusions :

- **Results are sensitive to true underlying risk levels**
- **Using "Cost of Capital" is likely to lead to lower risk margins compared to current Australian market practice**

Linking PoA With Value – Conclusions

PoA equivalent to Cost of Capital varies significantly by duration of business (and CoV)

- Around 60% - 70% for short tail
- Around 70% - 80% for medium tail
- Around 80% - 90% for long tail

Average over a 'balanced' portfolio will be around 75% PoA. In case of IAG in 2006, difference between 75% PoA and current 90% PoA (diversified) was :

= Some $710m, or

= Some 8% of all Insurance Liabilities, or

= Some 80% of one years Pre-Tax Insurance Profit

Impact of diversification on risk margins

A typical example of liabilities would have changed as follows:

PoA	Undiversified (A$m)	Diversified (A$m)	Change (A$m)	Change (%)
Mean	7,277	7,277	Nil	Nil
75%	8,408	8,004	404	5%
90%	9,752	8,714	1,038	11%

Examples of Required Disclosure

- Change in value of insurance liabilities if:
  - inflation rate assumed increases/(decreases) by 10%
  - interest rate used increases/(decreases) by 1.0% p.a.
  - average claims severity increases by 10%
  - average claims frequency increases/(decreases) by 10%
  - average term to maturity of outstanding claims increases / (decreases) by 10%

- All this information is subject to audit sign-off in the accounts as it is part of the accounts

- In Australia, an Independent Peer Review Actuary must also report to prudential regulator on all insurance liabilities valued by the insurer's Approved Actuary

Conclusions from Australian experience

- Insurance Isn't a "Black and White" business
  - Outcomes are nearly always uncertain
- Introducing appropriate accounting and actuarial standards, allows us to account for the "Grey" (or "Gray")
  - By using the concept of a distribution of potential outcomes and requiring clear disclosure
- Risk Margins provide a clear framework to achieve this
- Meaningful disclosure is key to reliability, consistency and comparability
- Management of the insurance business is improved by the added transparency and discipline introduced
- Users and investors have much better quality information

References for further reading

1.A Framework for Assessing Risk Margins – IAAust Risk Margins Taskforce (Marshall, Collings, Hodson & O'Dowd), November 2008 (www.actuaries.asn.au)

2.General Insurance Risk Margins Industry Report – Australian Prudential Regulation Authority (APRA), November 2008 (www.apra.gov.au)

3. Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margins - International Actuarial Association (IAA), 15 April 2009 (www.actuaries.org)

Appendix

A simple example

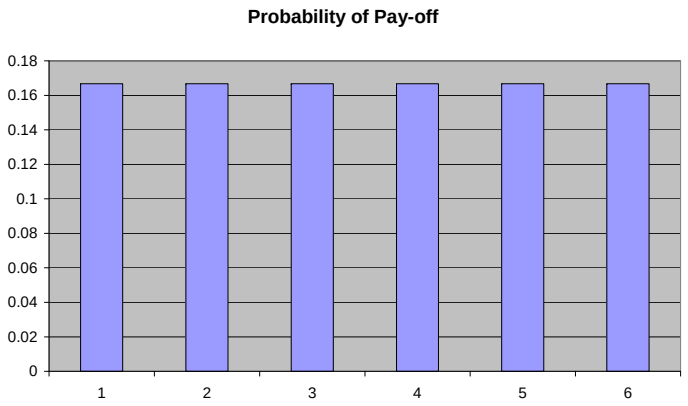
A Risk Primer - One Die

- Consider following game
  - One die
  - Payout is the number shown on the die

Mean = (1+2+3+4+5+6) / 6 = 3.5

Variance = 2 x (2.5x2.5 + 1.5x1.5 + 0.5x0.5) / 6 = 2.917

Payoff	Chance
1	1 / 6
2	1 / 6
3	1 / 6
4	1 / 6
5	1 / 6
6	1 / 6
Average	3.500
Variance	2.917
St Deviation	1.708

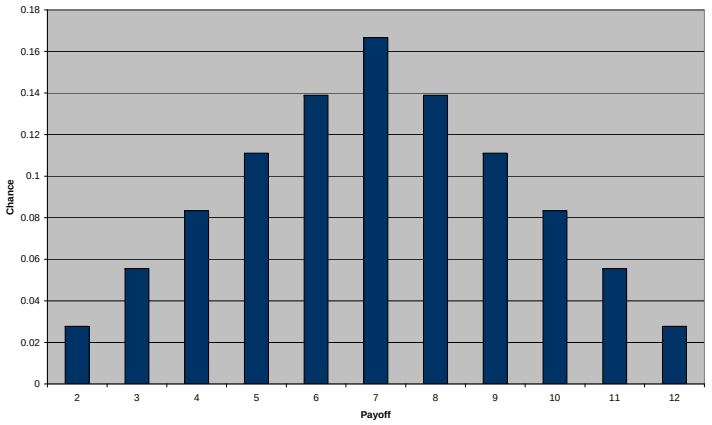


Risk Primer – Two Dice

Payoff	Chance
2	1 / 36
3	2 / 36
4	3 / 36
5	4 / 36
6	5 / 36
7	6 / 36
8	5 / 36
9	4 / 36
10	3 / 36
11	2 / 36
12	1 / 36
Average	7
Variance	5.83333
St Deviation	2.41523

Pay-off with Two Dice

Die 2 \ Die 1	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12



- Average and variance are twice the previous example, std deviation 1.41 times previous
- Distribution starts to look ‘bell shaped’

Different Risk Profiles – a Customer vs an Insurer

1 As the number of *independent* bets increases

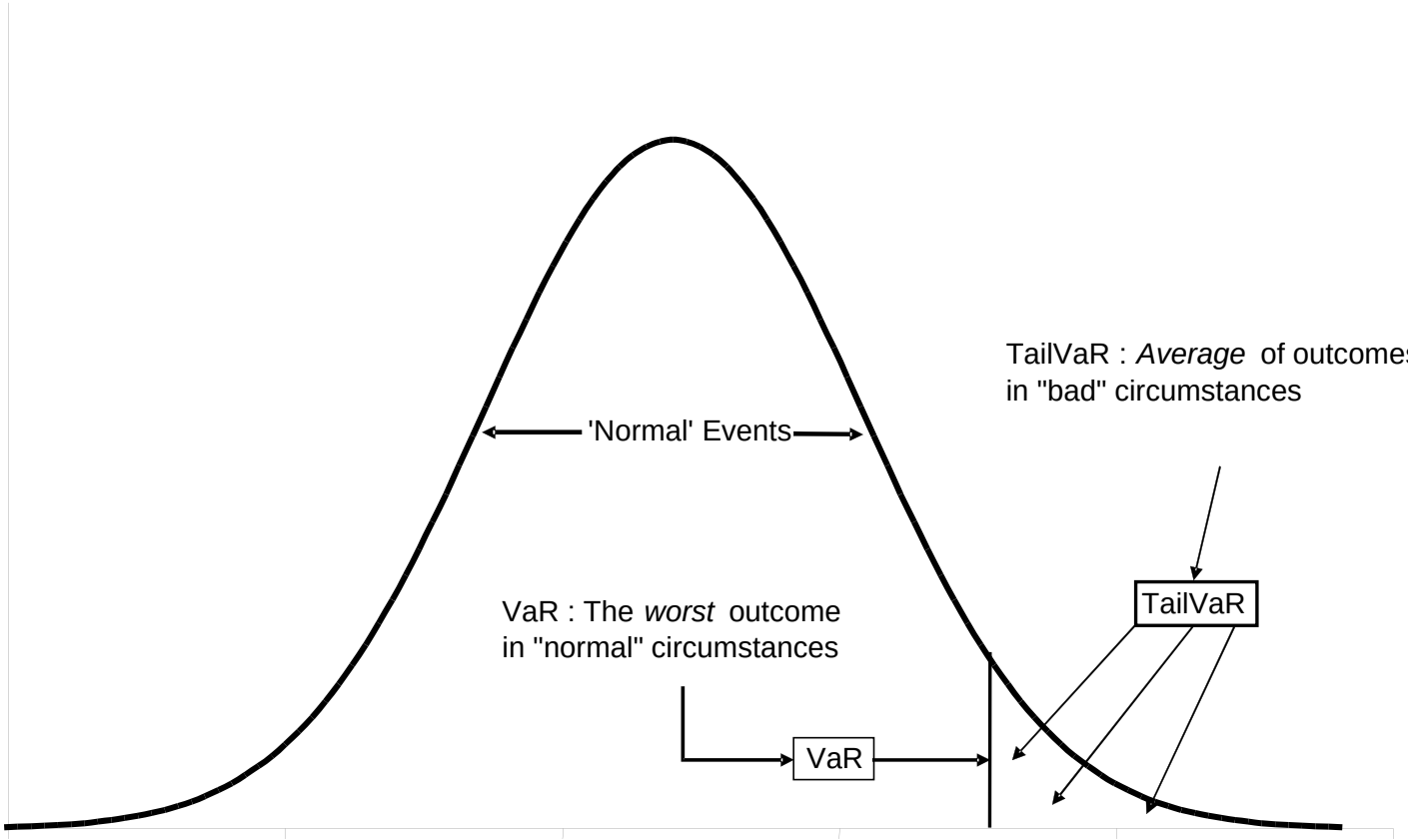
2 Mean and variance increase linearly.

3 Standard deviation increases with the square root of number of bets

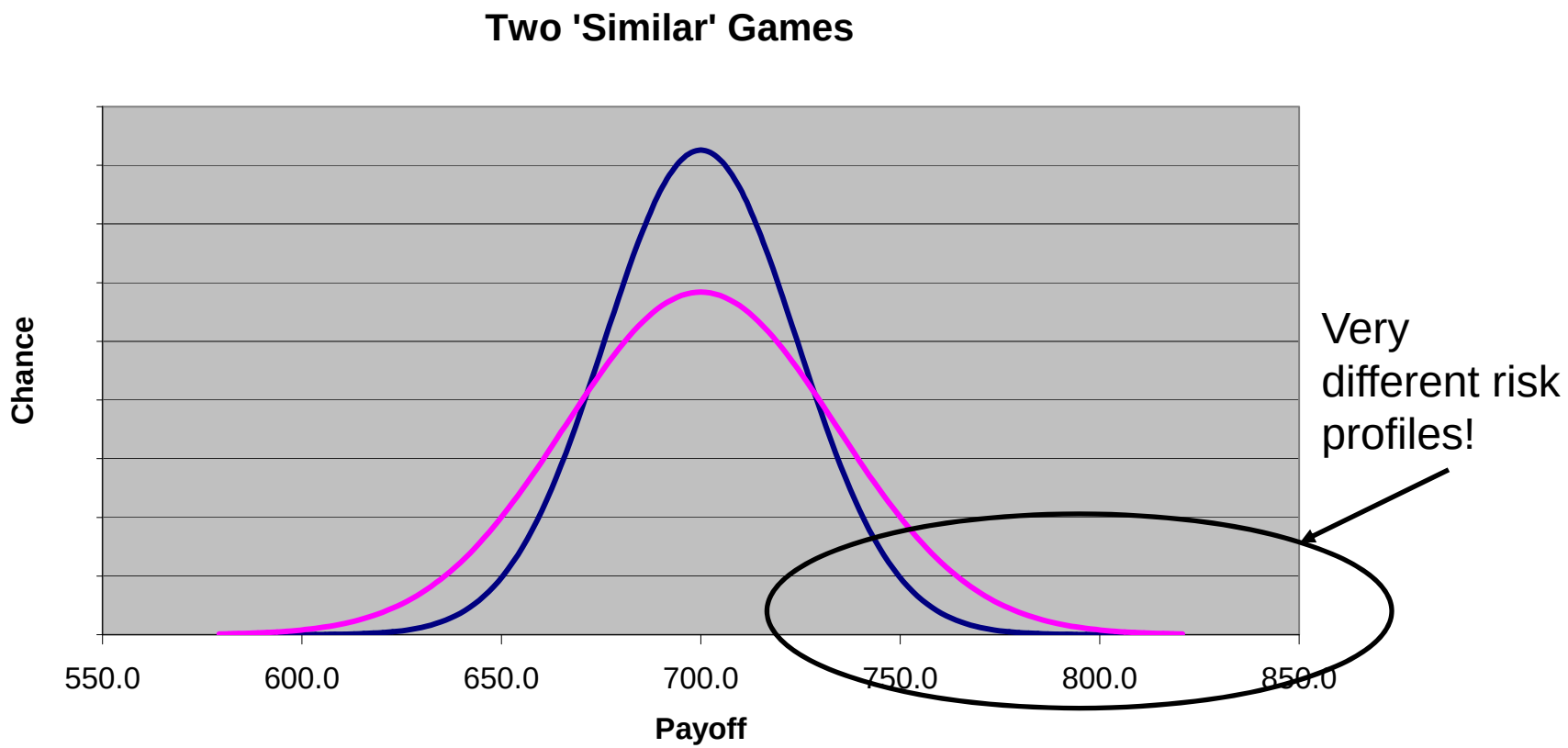
Number of Dice	Average	Variance	Std. Dev.	CoV
1	3.5	2.92	1.71	0.49
2	7.0	5.83	2.42	0.35
10	35.0	29.17	5.40	0.15
100	350.0	291.67	17.08	0.05
200	700.0	583.33	24.15	0.03

4 So the risk to reward ratio (CoV) falls

Risk profiles are best illustrated by tail risk measures – VaR and TailVaR (or CTE)



The impact of changing risk is demonstrated by two similar games with very different payoffs



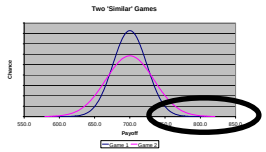
1 Payoff is the sum of 200 rolls of a dice

Mean = 700
St Dev = 24.15

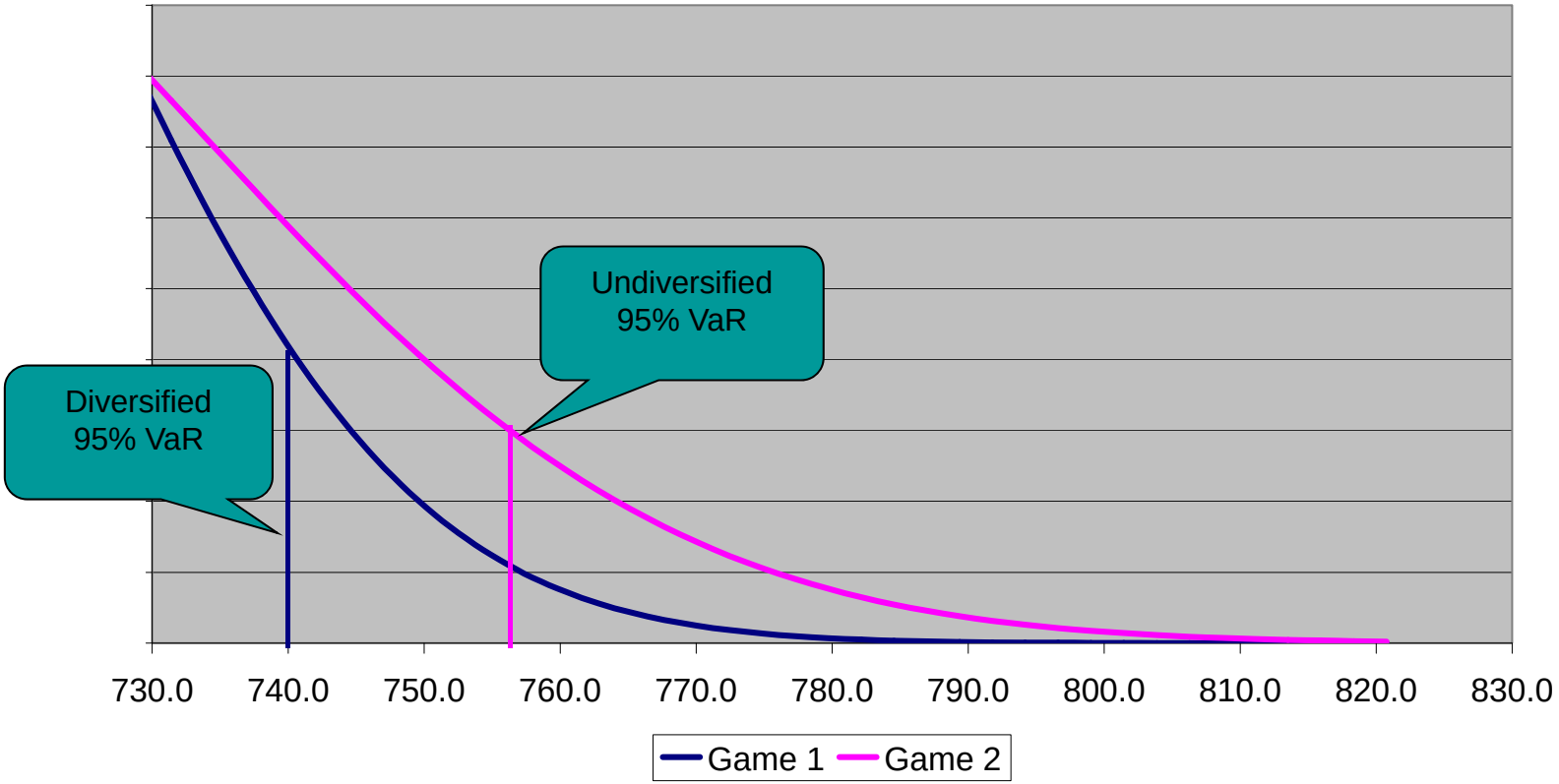
2 Payoff is twice the sum of 100 rolls of a dice

Mean = 700
St Dev = 34.15

Change in game changes the risk !



Tail Risk from Two Games



Using Risk Appetite to set Capital & Liabilities
If these “games” were 1 yr insurance payouts

	Game 1	Game 2	
Expected Claims	700	700	
VaR (If @ 99.5%)	762	788	
Economic (Risk) Capital Needed (If @ 99.5% VaR)	62	88	
Profitability Required if a 10% pa RoC is required on Economic (Risk) Capital (If @ 99.5% VaR)	6.2	8.8	
Equivalent Liability Risk Margin at outset	6.2	8.8	
Gives liability required	706.2	708.8	
Determines PoS for Liability VaR	60%	60%	