The Actuarial Profession
making financial sense of the future

A Closer Look At Solvency II
Kendra Felisky & Mat Wheatley

Reserving for Solvency II
What UK actuaries will be doing differently

Solvency II and Technical Provisions
Why does it matter?

Article 77 – "The value of the technical provisions shall be equal to the sum of a best estimate and a risk margin...The best estimate shall correspond to the probability-weighted average of future cash-flows, taking into account the time value of money..."

The issue

- Reserving will change, in parts dramatically, under Solvency II
- No margins for prudence allowed
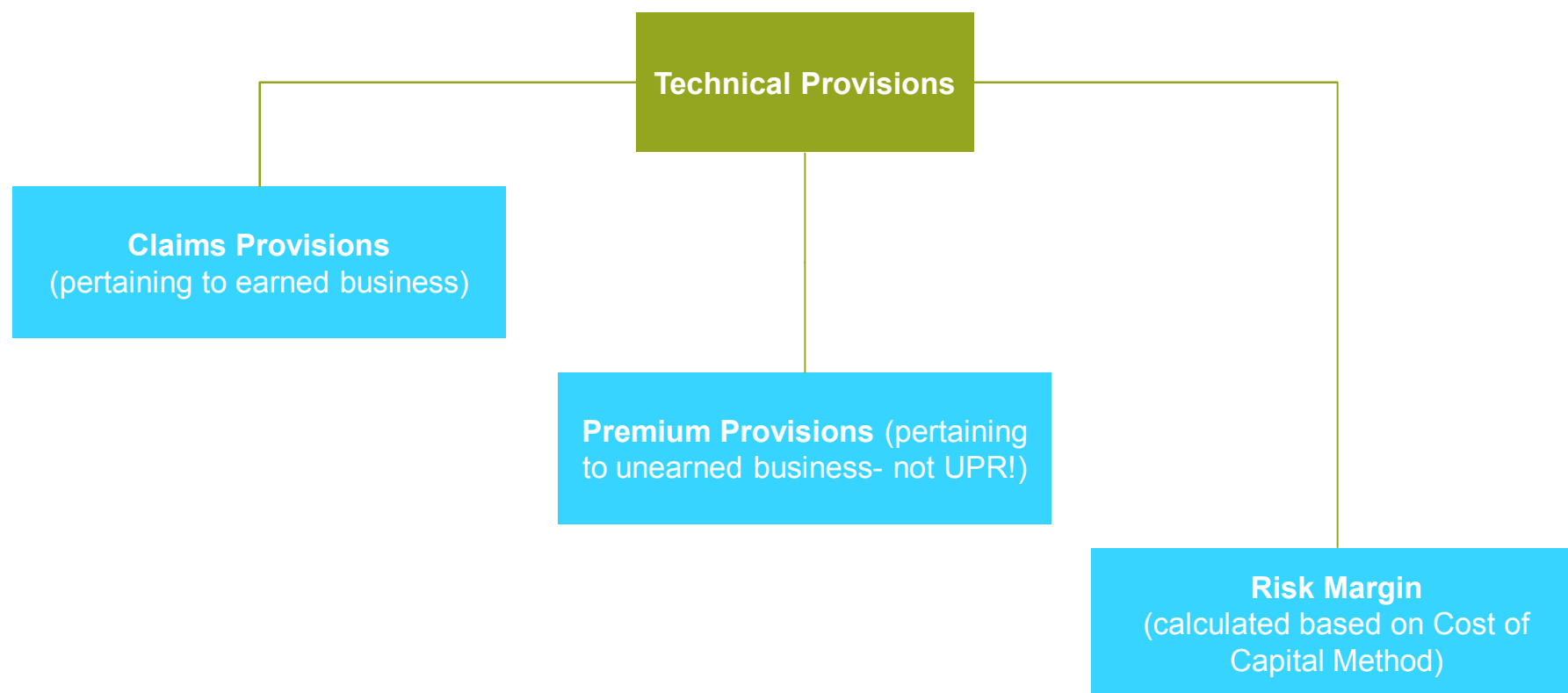- This will affect calculations as well as how you need to think about your business

Contents

The following topics will be covered during this presentation:

1. Provisions

2. Uncertainty

3. Risk Margins

4. Cashflows

5. Reinsurance

6. Reporting

7. Communication

What will "Reserving" look like under Solvency II?

Technical Provisions

Claims Provisions
(pertaining to earned business)

Premium Provisions (pertaining to unearned business- not UPR!)

Risk Margin
(calculated based on Cost of Capital Method)

The starting point continues to be the Best Estimate – probably with more accommodation for uncertainty including, but not limited to, 'binary events'

Valuation – Claims Provisions

Deterministic Models

- Can still be used – but for how long?
- Ref. CP 39
- Use stochastic models for checking?

Expenses

- Should be included
- Both allocated and unallocated claims management expenses (ALAE & ULAE)
- Going concern basis

Reinsurance

- Should be gross of reinsurance

Valuation – Premium Provisions

What is included?	What is NOT included?	Future Premium Payments
• Contracts when legal obligation is established, NOT when policy incepts • Cash-flows resulting from future claims events • Cash-flows arising from allocated and unallocated claims management expenses • Cash-flows arising from ongoing administration of the in-force policies	• Load to delay the recognition of profit.	• Future premium payments, on a cash flow basis – reflect all future premium receipts (regardless of the period these relate to) • What are these exactly?

These are not Unearned Premiums!

Uncertainty

Uncertainties arise in all stages of the reserving process:

Data → Model → Selection → Advice → Decision

Sources of error:
- Selection – in choice of data
- Specification – in defining model
- Parameterisation – in estimation
- Process – outcome of a random process

Prediction Error = Parameterisation + Process Error

Failure of "Law of Large Numbers"
- Events – catastrophes
- Exposure levels – changed risk appetite
- Activity levels – concentrated production
- Claims propensity – honest and fraudulent

Uncertainty

- Binary events (more on later)

- Inflation

- Other changes in demographic, legal, medical, technological, social or economic development

- Uncertainty as to timing included, both in base estimate and cash flows

- Other – already included?

- Documentation of actuarial judgement

- Reinsurance
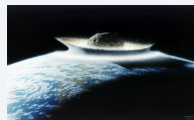
- Link to Capital Model

Binary Events

What are they?		Why bother?

What are they?

Health	• Nanotechnology • Aspartame • Electro magnetic fields • GM crops • Nuclear waste

DANGER Toxic hazard

Events	• Meteor strike • Mega Volcanoes

Social Environmental	• Global warming • Polluters

Legislative/ Political	• "Step change" in court rulings (e.g. Ogden) • "the greater good" e.g. asbestos, US Healthcare

Other	• Contract wording • etc

CONTRACT
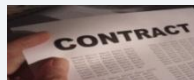
Why bother?

- Best estimate = Probability weighted average of **all** possible future cash flows

- Current methods probably underestimate a "true" mean
  - Data / parameterisation
  - Unknown unknowns
  - "Margin" used for binary events

- Binary events fill **part of** the gap between the current approach and the requirements

Uncertainty – Binary Events

- Recognise bias introduced by incomplete information

- Premium provisions
    - Cat & latent loadings – be consistent with pricing assumptions

- Claims provisions
    - Latent loadings

- Effect considered at various levels:
    - Deterministic projection
        - Standard actuarial projection (e.g. chainladder)
        - Make additional allowance for binary event
    - Stochastic projection:
        - Discounted cashflows
            - Fixed discount rate
            - Discount rate varies by term
        - Effect of reinsurance recoveries

Uncertainty

- Methodology:
  - Deterministic projection:
    - Estimate "mean" binary outcome
    - Explicitly adjust claims reserve
  - Stochastic projection
    - Select distributions (frequency/severity) for binary loss and model cashflows
    - Model cashflows for standard losses in normal way (eg bootstrapping)
    - Combine cashflows from two projections

- Results:
  - Deterministic projection:
    - Binary "allowance" can be reduced to a simple percentage increase in reserves
  - Stochastic projection
    - Required increase in reserve is clouded by effect of discounting and reinsurance
    - Investigations ongoing…

Risk Margins
Introduction

Topics to cover:

• What is a risk margin?

• SCR

• Current market thinking / Issues

• Next steps

Risk Margins
What is a risk margin (RM)?

- Amount required to ensure the value of the technical provisions is increased from the discounted best estimate to an amount equivalent to the theoretical level required to transfer the obligations to another insurance undertaking

- Where the best estimate and risk margins are calculated separately, risk margins should calculated using a *cost of capital* approach

- This is a new concept compared to current practice and it is envisaged that RM will be calculated to some extent using suitable simplifications

- Should <u>not</u> be calculated separately for premium and claim provisions

- Should be defined net of reinsurance only. For IM can be calc gross and RI separately

- Cost of Capital rate is a 'long term' rate above the risk free rate, not adjusted for market cycle

Risk Margins
SCR

- 99.5% VaR of the 'basic own funds' of an (re)insurance undertaking over a 1 year time period

- Calculate for all future time periods, needs 're-reserving'

- Standard formula (SF) vs internal model (IM)

- Circular calculation of RM, depends on SCR which depends on RM, need to consider simplifications / proxies as a starting point for RM

- Who's going to calculate SCR for RM?

- Underwriting risk (both reserve and premium)

Risk Margins
Current Market Thinking / Issues

- Choice of methods for calculating the SCRs for risk margin (SF, IM)

- Companies may be analysing classes at a lower level than the SII LOBs

- SII LOB is still to be decided

- Simplifications: A range from a complex to the simplest approach have been set out by CEIOPS

- Research papers – (EMB, E&Y, etc.)

- PPOs

Risk Margins
Next Steps

- Investigate underwriting risk (reserve/premium risk) calculation

- What are other companies doing? Interview Solvency II managers

- Further research – consult

- Look at the Standard Formula approach spreadsheets from QIS5

Cashflows
Introduction

Topics to cover:

- Creating deterministic cashflows

- Data

- Consistency

- Adding in volatility

- Validation

- Approaches for binary events / catastrophes

Cashflows

Creating deterministic cashflows

- Is this the best starting point?

- What if you don't use triangles/chain ladder for reserving?

- Can you just start with triangles?

- Large losses will need separate consideration.

- Actuaries should take care to avoid over-smoothing in their analyses.

Data

- Is suitable data available?

- What data should we be collecting now?

- Actuaries should consider the level of granularity they require to produce estimates that meet statistical quality standards of SII.

- The actuary should be guided by the overriding 'Use test' requirements and also proportionality.

Cashflows

Consistency

- What methods make it easiest to ensure consistency between point estimates and means of stochastic distributions?

- What are good approaches for capturing the relationship between paid and incurred losses?

- Actuaries will need to consider consistency in a number of different dimensions

- Use of stochastic distributions vs. practicality

Adding in volatility

- What are appropriate, suitable approaches?

- What distributions could be used?

- Consideration of correlations?

Cashflows

Validation

- How do we validate / justify initial approach?

- How do we monitor, validate and apply P&L attribution on an ongoing basis?

- What will be acceptable to the regulator, and how will this line up with model validation?

Approach for binary events / catastrophes

- What is the best approach?

- Should actuaries model date of loss and payment pattern separately?

- Links between gross and reinsurance

- Effect of counterparty default risk

Reinsurance
Introduction

Topics to cover:

- When to use net to gross techniques

- Timing of payments

- Impact on bad debt calculations

- Which contracts to include

- Allocation of RI recoveries

Reinsurance
When to use net to gross techniques

When net to gross techniques can be used:

- Net to gross techniques acceptable for most standard approaches (e.g. where triangles are used)

- Choice of netting down factors is subjective based on knowledge of the book and history and should be well within the actuarial function's current ability range

- Problems may remain of checking on limiting or exhaustion issues

When net to gross techniques shouldn't be used:

- Exposure analyses

- Complex outwards RI

- When consistency with gross calculation is required

- For a frequency severity model, explicit modelling of reinsurance may be preferable

Reinsurance
Timing of payments

The following two slides illustrate a simple model to look at interaction between timing of payments and materiality of results.

The following should be noted:

- Model used is for illustrative purposes only
- Model based on log normal gross pattern with
  - a fixed lag
  - a "stretch" on the payment pattern
- Model lets lags / stretch vary to simulate different timings relative to gross
- Model aim is to look at impact on net technical provisions

Reinsurance
Timing of payments

When are simplifications OK:

- Low reinsurance plus not much lag

Derived Cumulative Payment Development Patterns

Legend: Gross, RI, Net
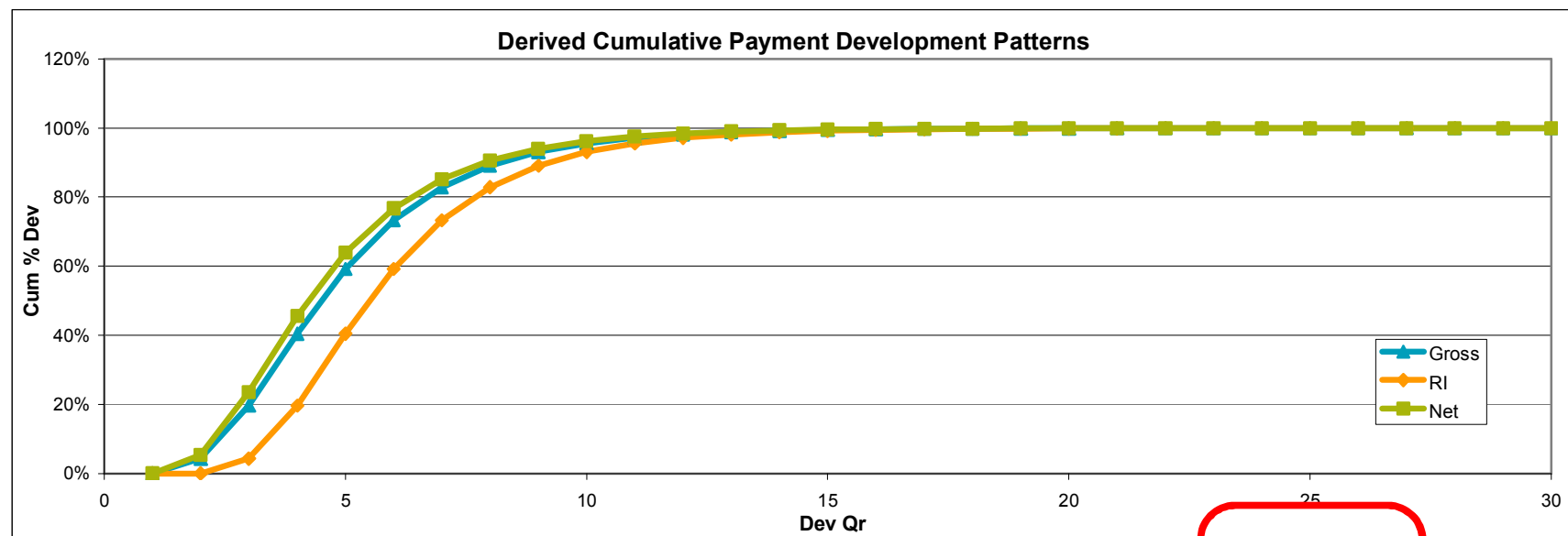
	Gross			RI	
Ultimate	1000		**Ultimate**	200	*Assume constant proportion of Gross*

RI Payment Pattern
(shifted gross)

|	
Shift	1
Scale	100%

Let these vary stochastically

Reinsurance
Timing of payments

When there is less potential to apply a simple approach:

- High reinsurance plus large lag plus stretch.

Derived Cumulative Payment Development Patterns

Legend: Gross, RI, Net

X-axis: Dev Qr (0 to 30)
Y-axis: Cum % Dev (0% to 450%)

	Gross			RI	
Ultimate	1000		**Ultimate**	800	*Assume constant proportion of Gross*

RI Payment Pattern
(shifted gross)

Shift	4
Scale	150%

Let these vary stochastically
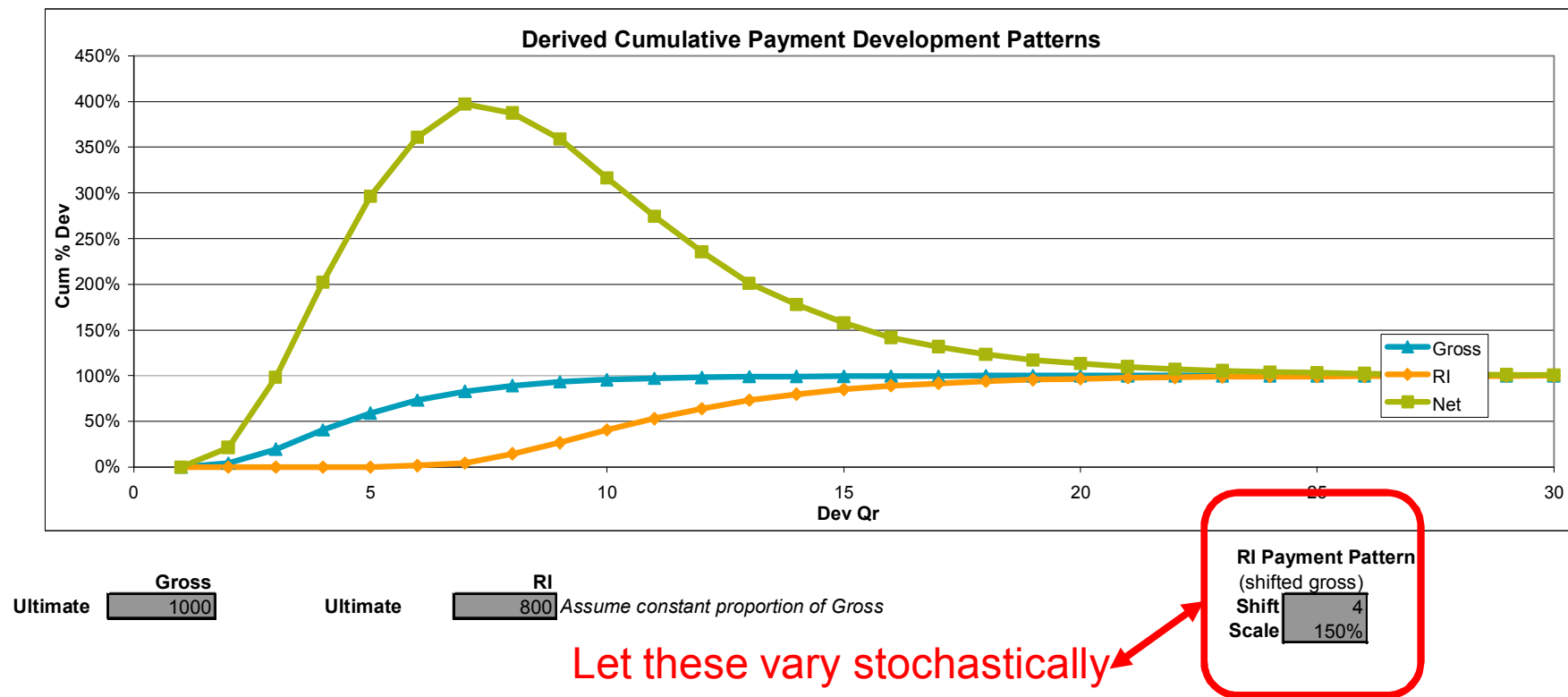
Reinsurance
Impact on bad debt calculations

Objectives:

- Similar approach was undertaken on timings of payments with use of an illustrative model

- Aim is to examine under which circumstances simplifications are "OK"

- OK here is defined as not having a material impact on the results

Approaches considered:

- Simple approach = credit related factors * expected recoveries (current approach)

- Less simple = link recoveries to timing of payments plus size of recoveries

  - May mean a stochastic approach should be taken

  - Link to capital model?

Reinsurance
Which contracts to include

Key Consideration:

- Principle of correspondence should underlie the calculations where possible
  – I.e. expected recoveries (and associated RI costs) for existing gross contracts should be included, but not for unincepted contracts
  – This may include assuming future RI purchases as future management actions
  – This is consistent with current approaches

Example 1

- LOD cover that incepts 1 April following 31/12 valuation
- Show what net technical provisions are if
  – excluding the cover
  – Including the cover in totality
  – Including the cover using correspondence
- Likely result it the TPs are higher by including the cover (but more realistic / accurate)

Example 2

- 12 month RAD cover that has already incepted (say 1 October before 31 Dec valuation)
- Show what net technical provisions are if
  – Including the cover in totality
  – Including the cover using correspondence
- Problems are exactly which future premiums to include (which may be adjustments)

Reinsurance
Allocation of RI recoveries

- Description of when RI recoveries may need to be allocated to lower levels (e.g. when calculated a whole account stop loss)

- Simple approach probably OK in most circumstances

- "Simple" means allocation based on an easy metric such as premium, incurred or reserves

- More complex methods may give indication of results by class

- Not expected to be controversial

- Consistency between premiums and claims is required

Reporting
Introduction

Topics to cover:

- Key aspects of the directive

- Form of disclosure

- Confidentiality

- What will need to be disclosed

- Next steps

Reporting
Key aspects of the directive

According to Article 35, reporting will need to take place at:

- predefined periods

- predefined events

Article 51.1.d requires:

- "A description, separately for assets, technical provisions, and other liabilities, of the bases and methods used for their valuation, together with an explanation of any major differences in the bases and methods used for their valuation in financial statements"

Reporting
Issues to consider

Issues to consider:

- Form of disclosure

- Confidentiality

- What will need to be disclosed

Reporting
Next Steps

Determine fundamental principles of guidance

- High-level principles

Suggest Profession's involvement

- Ongoing development of professional guidance

- Consultations/seminars as a forum for discussion in the run-up to Solvency II

Communications
Introduction

Topics to cover:

- Communication plan

- Understanding stakeholders

- Next steps

Communications
Communication plan

Stage 1: high level communication

- This should start now

- General education of key changes to the TP under SII

- Consider the most effective methods of communication to get message across clearly

- Stakeholders - who needs to know?

- Highlight how it impacts them

Stage 2: general principles

- More detailed description of suggested approaches to take

- Highlight pitfalls, issues, things to consider

- Tailor for main stakeholders/situations

- Consider wider audience (not in detail)

- Simple worked examples of key common concepts that can be used as additional tools for communication (depending on outputs of other workstreams)

Communications
Communication plan

Scope - Areas to communicate:

- Change to overall approach

    - role to educate wider group of stakeholders

- Unwinding of discount

- Earnings patterns

- Uncertainty

- Cashflows

- Risk margin

- Data requirements

Communications
Understanding stakeholders

Scope - Areas to communicate:

- Who do we need to communicate to?

- What information is needed for each?

- What are the key issues for them?

- What decisions will they make as a result?

- Any impact from introduction of Actuarial function?

Communications
Next steps

References to consider:

- Lloyds guidance on technical provisions under SII

- TAS-R, TAS-M, TAS-I

Next Steps:

- Stage 1: write up section on general education

- Stage 2: following outputs from other subgroups

- Write more detailed guidance

- Consider possible worked examples

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.