

## **Solvency II : Internal Model Approval Process (IMAP) - Making It Simple**

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Workshop B14, 7 October 2008

### Objectives of this Workshop

#### - Some Words of Warning

- The objective of the workshop is **to share some initial views on a few key issues** - and to kick off discussions about how the requirements might apply in practice
- Doesn't need to be said but;
  - CEIOPS have published a **large volume of high level principles for IMAP**
  - **These principles are still in DRAFT**
  - How these principles will be finalised, and ultimately be applied in practice **will only emerge over the next 12-24 months**
- There will be an Institute working party focussing on these and other IMAP issues during 2009/2010



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## Focus of today's workshop

### What we have done

- Selected a few of the most interesting/ challenging requirements in CP56
- Spoken to a small sample of 'keen' capital actuaries to get views on these requirements might apply in practice

### What we will cover today

1. Use Test
  - Planned uses for the internal model
  - Challenges in demonstrating the use test
2. Calibration
  - Plans to address some of the recalibration issues in Solvency II
3. Statistical Quality & Expert Judgement
  - What the requirements are for assumption setting
  - Possible responses
4. Meeting the entry criteria for the FSA's first wave IMAP submission ("dry run")
  - How much do you plan to achieve by April-October 2010

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## Introduction to IMAP

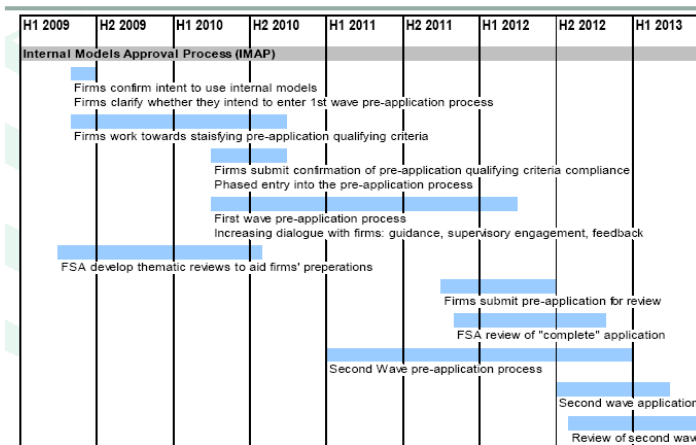


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## Preparing for Solvency II internal model approval

### IMAP timetable

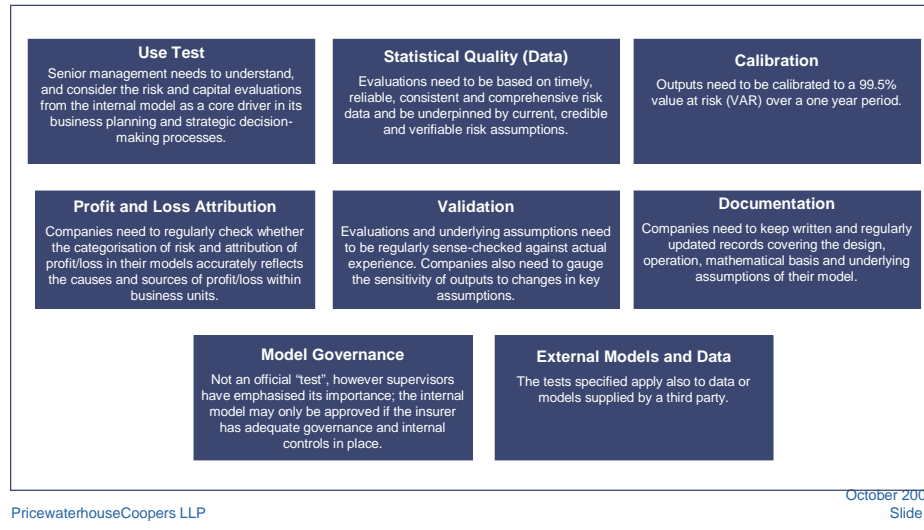


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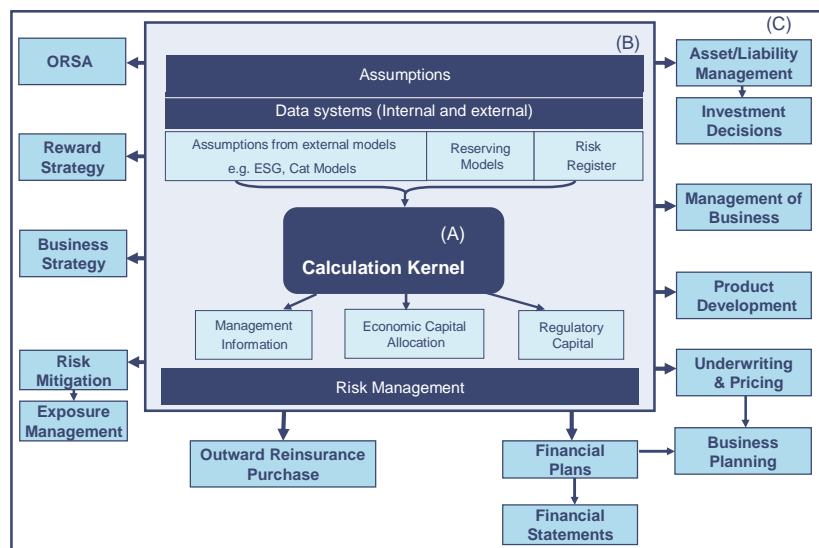
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## Requirements for internal model approval

The recent consultation paper specifies certain requirements that (re)insurers must pass in order to get their models approved to calculate their SCR



## Internal model definition



## Topic 1 – The Use Test



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## Use Test

<http://www.ceiops.eu/media/files/consultations/consultationpapers/CP56/CEIOPS-CP-56-09-L2-Advice-Tests-and-Standards-for-internal-model-approval.pdf>

### Principles

- 1) **Senior management shall be able to demonstrate understanding of the internal model.**
- 2) The internal model shall fit the business model.
- 3) The internal model shall cover *sufficient risks* to make it useful for risk management and decision-making.
- 4) **The internal model shall be widely integrated with the risk-management system.**
- 5) The integration into the risk-management system shall be on *a consistent basis for all uses*
- 6) **The internal model shall be used to support and verify decision-making in the undertaking.**
- 7) The SCR shall be calculated *at least annually* from a full run of the internal model, and also when there is a significant change to the undertaking's risk profile, assumptions underlying the model and / or the methodology.
- 8) The internal model shall be used to improve the undertaking's risk-management system.
- 9) Undertakings should design the internal model in such a way that it facilitates analysis of business decisions.

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## Example Uses

*Note these are potential examples of model uses set out in CP56, and do not form a 'checklist' or list of required uses for model approval*

- Adequate pricing
- Asset / liability management
- Business planning / strategy
- Capital Management
- Development and monitoring of risk appetite
- Development of risk strategies
- Efficient use of capital
- Exposure management and limit setting
- External risk reporting
- Financial Reporting - internal model provides market valuations for IFRS
- Incentive / target setting
- Internal Risk monitoring (through MI)
- Investment decisions e.g. strategic, tactical and operational decisions
- M&A
- Measurement of material risks
- ORSA
- Other risk mitigation
- Portfolio transfer pricing
- Producing MI
- Product development / Pricing
- Regulatory capital (SCR for solo and for groups)
- Reinsurance decisions e.g. strategic
- Reinsurance strategy and development of reinsurance programme
- Reporting on MCEV / EV
- Reporting on business performance
- Risk Mitigation
- Setting profit targets
- Underwriting policies

## Example Uses - Potential Priorities for Non-Life firms

*Note potential areas of priority (in **bold**) are suggestions only*

### Within the Corporate Calendar

- Adequate pricing
- Asset / liability management
- **Business planning / strategy**
- **Capital Management**
- **Development and monitoring of risk appetite**
- Efficient use of capital
- **Exposure management and limit setting**
- **Reporting on business performance**
- External risk reporting
- Incentive / target setting
- Setting profit targets
- Product development / Pricing

### External Reporting

- **ORSA**
- **Regulatory capital (SCR for solo and for groups)**
- Reporting on MCEV / EV
- **Financial Reporting** - internal model provides market valuations for IFRS

### Risk Management

- **Measurement of material risks**
- Development of risk strategies
- Other risk mitigation
- Internal Risk monitoring (through MI)
- **Producing MI**
- Risk Mitigation
- Underwriting policies

### Strategic

- **M&A**
- Portfolio transfer pricing
- **Reinsurance decisions e.g. strategic**
- Investment decisions e.g. strategic, tactical and operational decisions

Which uses might be in your 'scope' for the use test by 2011?  
Strawman A: Small, mutual

Business Need

- Strong focus on downside risk management and policyholder protection
- Planning for capital calls, accurate pricing
- Limited resources, including management time and actuarial/modelling

Possible solution

- Annual or quarterly economic and solvency capital reporting
- Capital Planning
- Business Planning e.g. testing new plans
- Simpler Risk Management – quantifying, managing at mitigating risks
- Pricing?

Which uses might be in your 'scope' for the use test by 2011?  
Strawman B: Medium Sized Corporate, Buys into Capital Allocation

Business Need

- Deliver on shareholder expectations
- Policyholder/ Broker relationships
- Monitoring risk-adjusted performance by LOB (e.g. RORAC)
- Optimise reinsurance purchase vs capital held

Possible Solution

- As A – with quarterly economic and solvency capital assessment
- Risk Appetite (e.g. EaR, VaR) quantified and monitored on quarterly basis
- Performance Targets integrated into business planning MI
- RI strategy developed using main or parallel (consistent) models

## Which uses might be in your 'scope' for the use test by 2011? Strawman C: Large, Group, Capital Allocation Sceptic

### Business Need

- Deliver on shareholder expectations
- Policyholder/ Broker relationships
- Enhanced performance, risk and capital management - clear line of sight across divisions and entities

### Possible Solution

- As A – quarterly or monthly risk & capital assessment
- Risk & Capital Metrics integrated into all business planning and governance MI (risk committee, underwriting, investment, reinsurance, etc)
- Risk Appetite (e.g. EaR, VaR) quantified and monitored by division/ entity
- Performance measured on risk adjusted basis by division and entity
- Portfolio / Reinsurance Optimisation [sic]

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## Use Test : Potential Cultural Challenges

*Sample of top three issues from interviews*

1. Demonstrating the Use Test
  - Senior Management Understanding
  - Evidence
2. Change in focus from regulatory (ICA) to economic
  - Focus on assumptions in near-term v tail
  - Consistency of assumptions for different uses/ decisions
3. How invasive to make the test
  - Built into decision making, before, during or after the decision (1<sup>st</sup> line)
  - Used as check/ test (2<sup>nd</sup> line)



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Which of the following options best represents the likely use of your model by 2011 (=point of final submission)?

A  
Risk Appetite,  
Economic and  
Regulatory Capital  
Assessment, Business  
Planning, Strategic

B  
.....+ Use in  
Reinsurance  
Purchasing &/or  
Investment Decisions

C  
.....+ Performance  
Monitoring by LOB  
(e.g. RORAC)

D  
.....+ Pricing by policy/  
contract

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## Topic 2 - Calibration



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## Calibration of the SCR

The key difference – time horizon

***“Firms’ economic capital might differ from regulatory capital as a result of a different calibration of the regulatory capital requirement compared with the firm’s risk appetite... for internal model approval, where firms develop their economic capital models to assess required capital at the level of their own risk appetite, they would then need to recalibrate to different levels, including the regulatory level of 99.5% over one year (SCR).”***

FSA08/04

### ICA (at t=0)

99.5% VaR over 1 year new business,  
emergence of risk measured over  
lifetime of liabilities

INSPRU7, confidence level and measurement

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### SCR (at t=0)

99.5% VaR over 1 year new business,  
emergence of risk measured over  
12 month time horizon

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## Calibration of the SCR (continued)

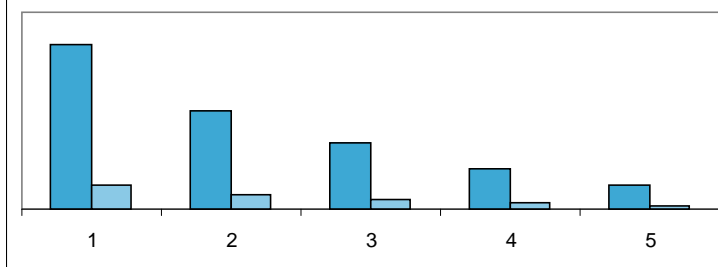
Emergence of risk beyond 12 months is captured within technical provisions

### Technical Provisions (at t=0) – Valuation Basis

Technical Provisions = Discounted Best Estimate + Risk Margin

Risk Margin =  $\sum(i) \text{ CoC factor} \times \text{SCR}(i) \times v(i)$

**Determine the cost of holding future SCRs, by multiplying the projected SCR by the COC factor**



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## What modelling approaches are being considered Some 'strawmen'

Full Annual Cashflow Modelling	<ul style="list-style-type: none"> <li>Annual cash-flow modelling for years 1, 2, 3, ...</li> <li>Underwriting and reserve risk modelled on a more consistent basis</li> <li>Reserve deteriorations and investment income modelled on annual basis</li> </ul>
Half way	<ul style="list-style-type: none"> <li>Explicit assessment of capital requirement in year 1</li> <li>Deterministic pattern applied to run-off year 1 capital over years 2, 3, ... (e.g. QIS4, SST, MCEV - in proportion to reserves or reserve volatility)</li> </ul>
No change	<ul style="list-style-type: none"> <li>Model unchanged from ICA ('run-off' basis)</li> <li>Deterministic pattern applied to total capital requirement to spread over year 1, 2, 3, ...</li> </ul>
Undecided	<ul style="list-style-type: none"> <li>Waiting for additional guidance from the FSA and Lloyd's</li> </ul>

*Route taken likely to depend on management's requirements  
(e.g. risk appetite definition).*

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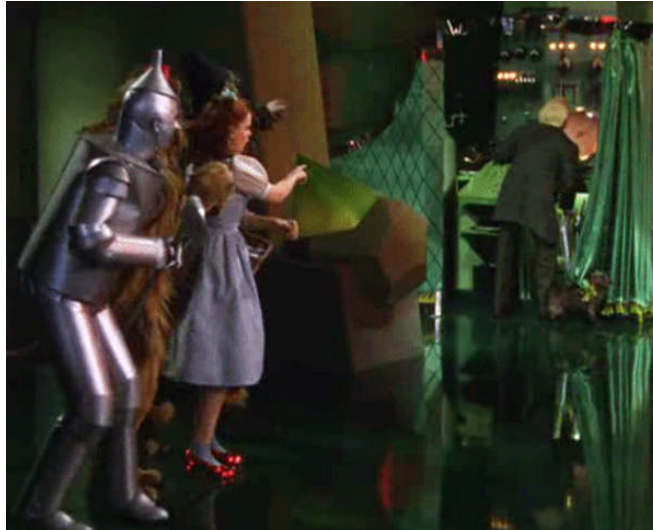
## How do you plan to calculate the SCR (1 year time horizon)?

<p><b>A</b></p> <p>Full annual cashflow modelling</p>	<p><b>B</b></p> <p>Half-way i.e. assess year 1 capital requirement</p>
VOTE	
<p><b>C</b></p> <p>No change to ICAS model i.e. assess 'to ultimate or run-off' capital requirement</p>	<p><b>D</b></p> <p>Undecided</p>

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### Topic 3 - Statistical Quality, Expert Judgement, and what the requirements mean for setting assumptions



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### Requirements for statistical quality: CEIOPS view

*An overview of the requirements*



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## What role does expert judgement play in the stat quality test?

*One interpretation of the current draft requirements*

### Methodology & Assumptions

- Actuarial & Statistical Methods must be "adequate" and fully justified
- Assumptions are "current & credible"
- "Competence" requirements - appropriate experience, qualifications & peer review

### Data Quality (& Expert Judgement)

- Combination of expert judgement and data leads to model assumptions
- "Expert Judgement if admissible only if ...
  - ... it is falsifiable, refutable, testable & applied with known or potential error rate
  - ... it is validated and documented"

### Correlations

- Requires information or data which may not be available / is unknown
- Expert Judgement requirements then apply



### Senior Management Understanding

- Management must demonstrate understanding of model limitations and show that these are considered in decision making
- Strengths and limitations of the internal model are understood & considered in decision making

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## What might the statistical quality test mean in practice? Strawman A – More Explicit Assumptions (e.g. Parameterisation)

### CP56 Draft Requirements

- All assumptions identified, justified and documented (5.115, 5.118)
- Explain significance, associated limitations, model risk, alternative assumptions and implications (5.116)
- Demonstrate senior management understanding of above (Principle 1)

### Possible solution

- Enhanced documentation and version control (live or offline)
- Documented standards
- Where possible, statistical analysis (e.g. goodness of fit)
- External and internal benchmark data ?
- Clear governance & control, including independent peer review and internal audit testing

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What might the statistical quality test mean in practice?  
Strawman B – More Implicit Assumptions (e.g. Model Structure)

**CP56 Draft Requirements**

- Regular methodological reviews, including assessment of alternative methods
- Same requirements for justification, documentation and senior management understanding as for more explicit assumptions !

**Possible solution**

- Little appetite for anything more than peer review and external challenge
- Problems with objective tests (e.g. mini or parallel models, on / off switches) noted –including challenge to make these work in practice
- Stress/Scenario including reverse stress testing seen as a pragmatic solution

**Key challenge**

- To increase transparency around judgement/ limitations – without

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What might the statistical quality test mean in practice?  
Strawman C – Materiality of Assumptions

**CP56 Draft Requirements**

- To assess materiality of assumptions (5.117)
- Qualitative and Quantitative assessment of materiality (5.117)

**Possible solution**

- Clear statement on materiality
  - opportunity to reduce burden of statistical quality, validation tests?
- Different views of materiality
  - Impact on SCR
  - Impact on key metrics (e.g EaR)
  - Impact on users / decisions made (e.g. reinsurance purchase / pricing)
- Linking to users understanding of real world events
  - clearer understanding of key risk drivers & combinations of risk drivers

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In which of following will you make progress over next 6-12 months?

A

Additional analysis  
(e.g. benchmarking,  
goodness of fit, etc)

B

Developing policy/  
standards on statistical  
quality

C

Communicating  
assumptions /  
limitations to users

D

Governance including  
documentation, peer review  
& Internal Audit testing

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#### Topic 4 – Planning for entry to the FSA's First Wave Pre-Approval Process ("PreApp")



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## Readiness for the “Pre-App” The FSA’s view (from October 2008)

*‘Worthwhile initial progress ... we shall be discussing with the industry, in the IMEG and elsewhere, what kind of qualifying benchmarks should be set ... they are likely to include ...*

- the **QIS4 spreadsheet** ... and any QIS spreadsheet subsequently specified by CEIOPS or the Commission;
- made **substantial progress towards documentation of its model**, including an indication of progress towards satisfying the various requirements to be set;
- prepared a **Solvency II implementation plan**, to get its modelling, risk management and associated systems embedded and fully compliant;
- a **plan to develop iteratively its internal model**, including periodic recalculation of its SCR, through a systematic process designed to ensure continuing compliance with requirements’

FSA DP08/04

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## Requirements for IMAP submission to the regulator CEIOPS view (CP37)

- A. Cover letter requesting approval
- B. Confirmation that all clarifications and documentation have been provided
- C. Application approval from the administrative or management body
- D. Results of the latest **ORSA** and details of business and risk strategies
- E. **Scope** of application – full or partial model approval
- F. Risk management process and risk profile
- G. **Self-assessment** (of internal model for compliance with the six tests) including strengths and weaknesses of the model
- H. Technical characteristics of the internal model
- I. Use of external models and data
- J. Model governance, systems and controls including documentation
- K. Relevant organisation charts
- L. Up-to-date **independent review/validation report**
- M. **Change policy** for the full/partial model and other model governance policies
- N. Plan for future model improvement
- O. Capital requirement, including an estimate of the SCR using the standard formula

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Which of the following activities do you plan to complete by entry to First Wave PreApp (April to October 2010)?

*Some activities firms are considering now – note further FSA guidance will follow on form of PreApp submission*

A  
The basics – QIS4,  
implementation plan,  
self assessment v tests,  
documentation

B  
Design of  
model governance and  
control framework

C  
First attempt at ORSA

D  
Fundamental 'rebuild'  
of 'Solvency II' model  
e.g. cashflows, investment

E  
Independent Review/  
Validation

F  
Calculation of SII  
capital requirement  
(SCR)

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## Questions and Close



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