Internal models and Solvency II

Life Strategies breakfast briefing

Conrad Hotel, Dublin

22 October 2009

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

Agenda

- Internal model – references in the directive
- Process for approval – CP 37

- What is an internal model?
- Tests & standards for model approval – CP 56

- Feedback to date on CP 37 and CP 56
- Issues still to be discussed
- Where to from here?

Internal models – an introduction

Mike Claffey

CEIOPS paper in 2005 - Entry point for internal models

- "The solvency system should be designed in such a way that it gives an **incentive** to the supervised institutions to **measure** and properly **manage** their risks."
- "This risk-oriented approach implies the recognition of internal models (either partial or full) provided these **improve** the institution's risk management, better reflect its **true risk profile** than under the standard formula and can be appropriately **validated**."
- "An internal model can result in a **higher or lower** amount for the SCR than the amount based on the standard formula, subject to a floor (the MCR)."
- "**Supervisors** can **require** undertakings for which the activities deviate substantially from the assumptions underlying the standard formula to develop an **internal model**."

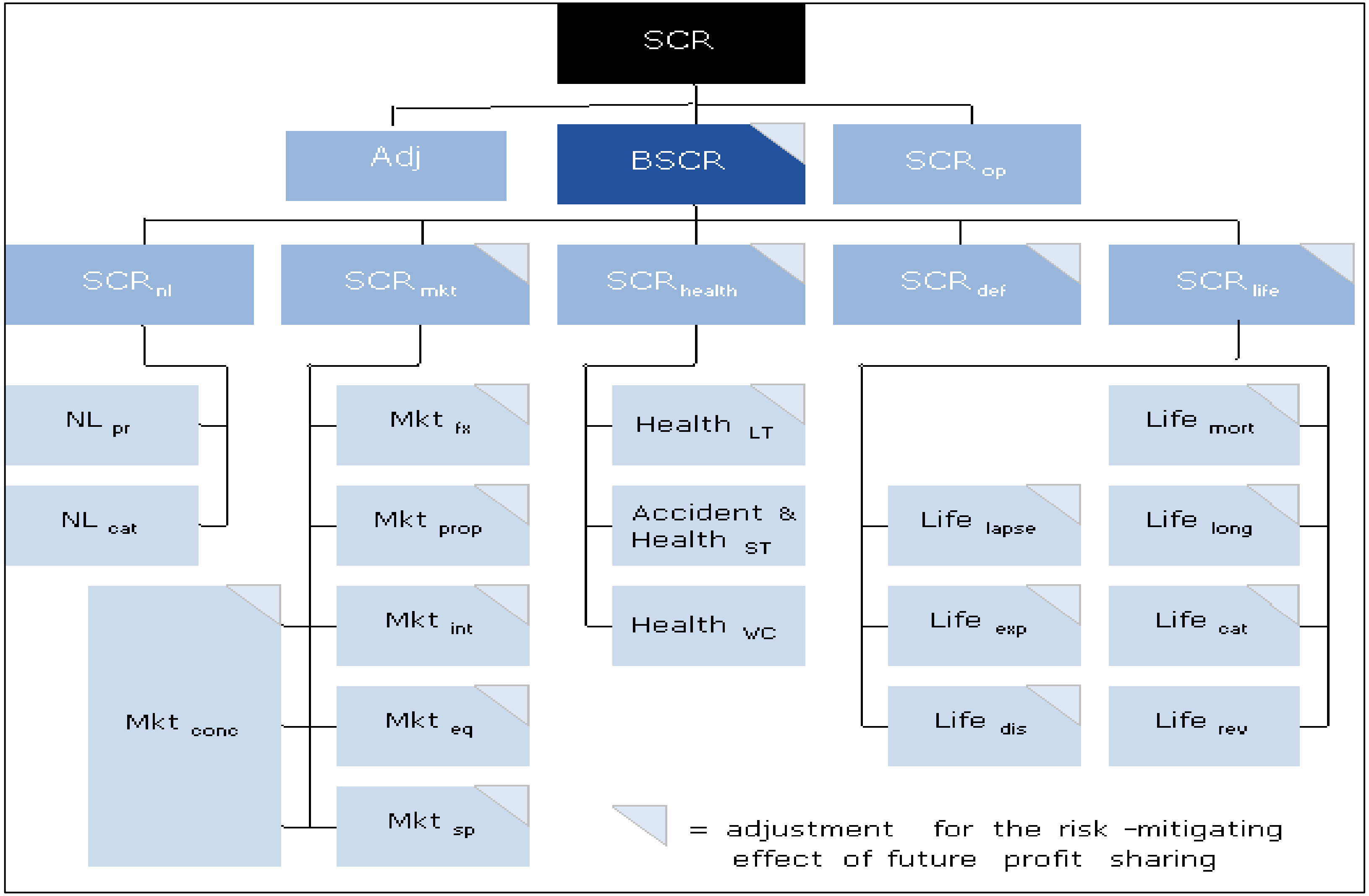
The Directive – Article 110 on approving internal models, and Article 117

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- "Member States shall ensure that insurance or reinsurance undertakings **may calculate** the Solvency Capital Requirement using a full or partial internal model **as approved** by the supervisory authorities."
- "… **identifying**, **measuring**, **monitoring**, **managing** and **reporting** risk"
- *And if you have an approved internal model, you may still be required to* "provide supervisory authorities with an estimate of the Solvency Capital Requirement determined in accordance with the **standard formula**"

- "Where it is **inappropriate** to calculate the **Solvency Capital Requirement** in accordance with the standard formula … because the risk profile of the … undertakings concerned deviates significantly from the assumptions underlying the standard formula calculation, the supervisory authorities may … require the undertakings concerned to **use an internal model** …, or the relevant risk modules thereof."

Standard Formula – quick reminder



Key Benefits of Internal Models

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

1. Potential for lower capital requirements
2. Better reflects the risk profile of the undertaking
3. Increased focus on risk management (including Board)
4. Other reporting purposes (MCEV, IFRS)
5. Other business purposes (Pricing, capital allocation)
6. Provides analysis and insight into risks for ORSA
7. Supports (and improves?) external credit ratings

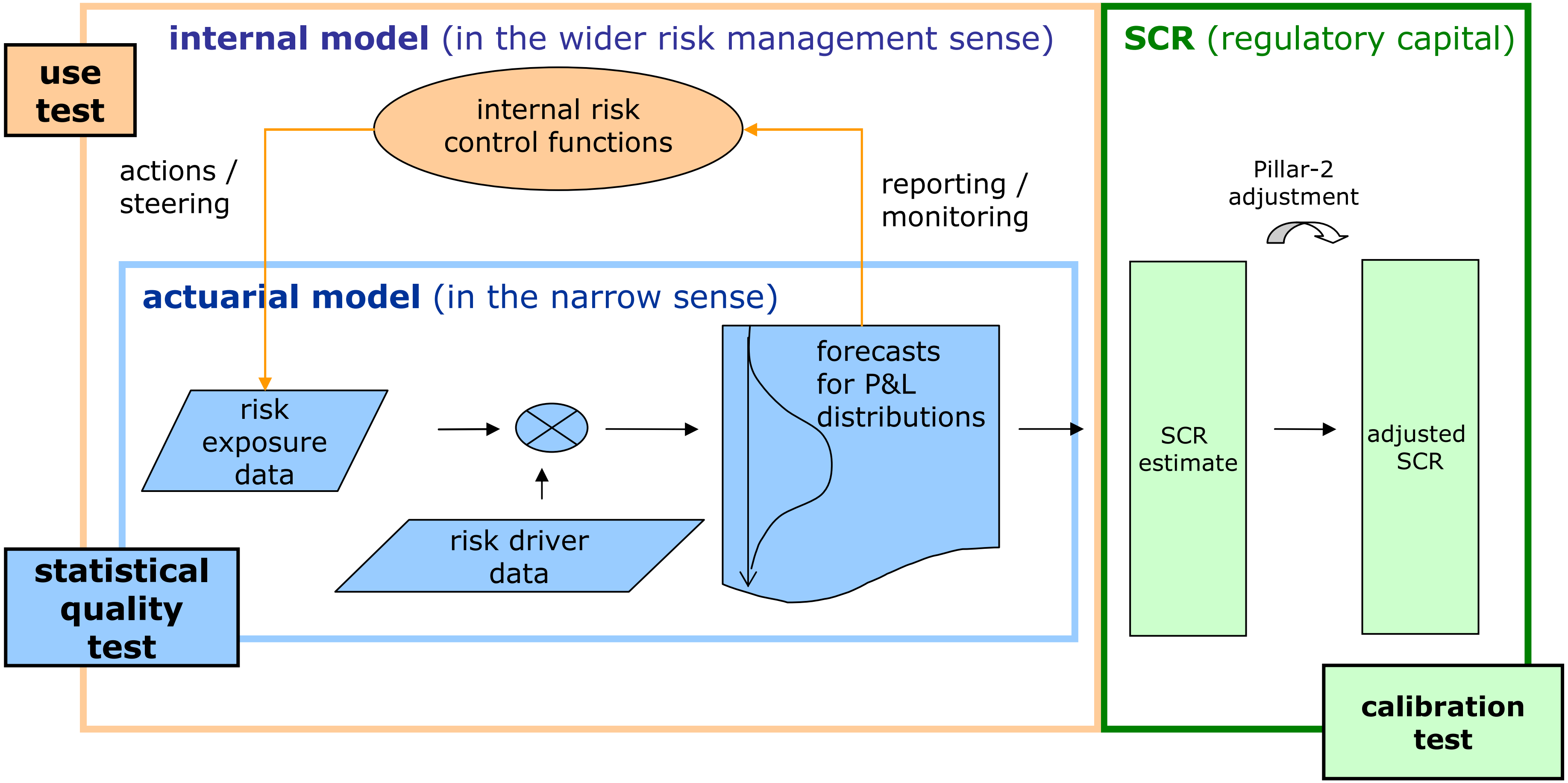
Key Disadvantages of Internal Models

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

1. Time to develop and implement
2. Resources and costs of implementation and maintenance
3. Supervisor approval process is not simple
4. Data used will automatically place reliance on past events
5. Risks associated with using the model - “model myopia”

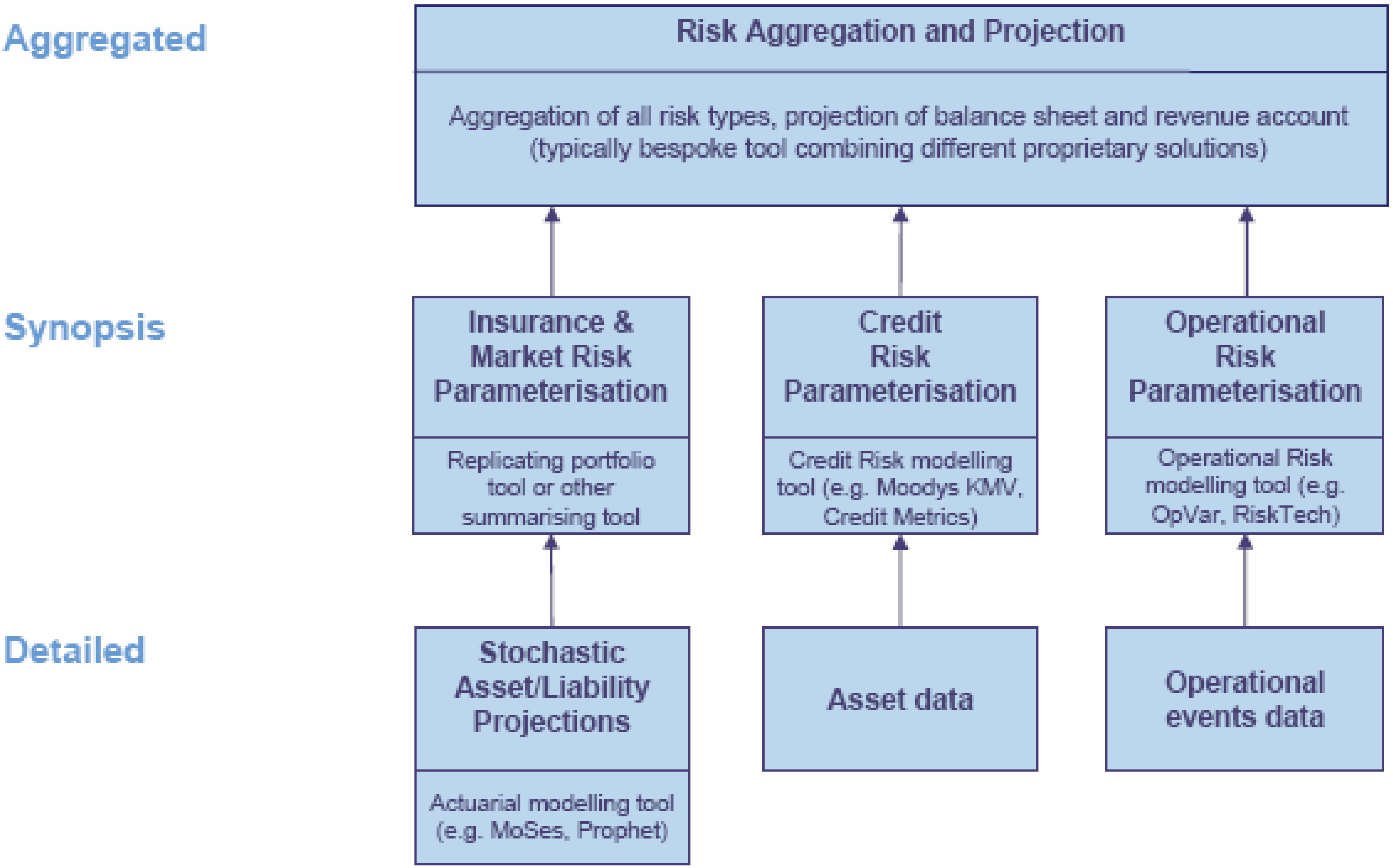
Internal Models Framework (FSA UK interpretation)

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING



Source – Paolo Cadoni, Financial Services Authority presentation in October 2008

An internal model (consultant's interpretation)

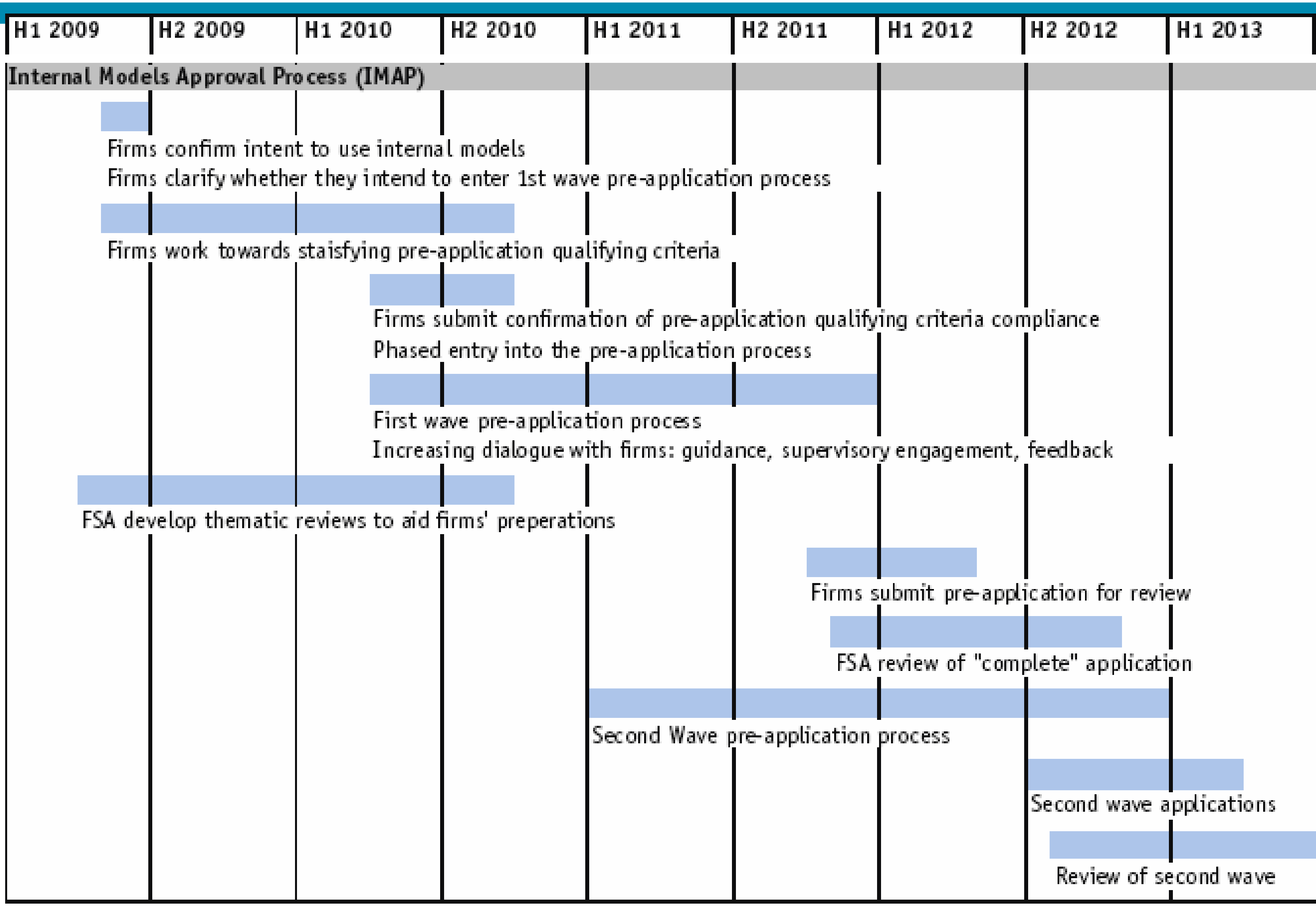


Source – PricewaterhouseCoopers

Internal Model Approval Process CP37

1. Pre-application stage – opportunity to liaise with Regulator
2. Application stage
   – Supervisor has 6 months from receipt of complete application
   – Minimum documentation specified in CP
3. Policy for changing models
   – Changes classified into minor and major
   – Major changes need to be communicated with Regulator in advance
   – Minor changes need to be reported
4. Assessment
   – Regulator analyses and assesses
   – May require modifications
5. Decision
   – If rejected, the Regulator must give reasons
   – Can reject full model and allow partial
   – Decision may be disclosed – info for others making similar applications

FSA UK – example of internal model approval timeline



QIS 4 Companies' plans

- Significant proportion of companies plan to use models
  - Half participants responded on internal models
  - 63% indicated intention to use (at least partial) in future
  - 69% of large respondents plan full internal model
  - 63% of small respondents plan partial internal model

- Which modules substituted?
  - Non-life, market and life
  - Life insurers indicated interest rate risk module

Will Regulators be busy?

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- Preliminary indications suggest that around 100 firms (out of approximately 460) in the UK are planning to seek approval.
- No feedback yet on Irish plans for internal models (we have 59 life companies, 133 non-life plus approx 120 reinsurers ≈ total 310)
- Anecdotal evidence that French and Italian Regulators have not commenced model verifications yet. German BaFin has made no announcements but may have commenced pre-approval.

- “Internal models” covers full and partial models, and Group and solo models. The FSA recently commented “Group issues are going to be significant in most cases”.
- Group approval will co-ordinate across the “college of supervisors”, this may make the process longer?

Internal models – the detail

Eamonn Phelan

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

So what is an Internal Model?

- A risk management system to analyse the overall risk position, to quantify risks and to determine the economic capital required
  - Capital required to support the business to a particular confidence level
- Models all risks which the company faces
  - Market, Credit, Insurance, Liquidity, Operational
- Incorporates
  - Risk profile of company
  - Interdependencies
  - Risk mitigation & management actions
  - …..
- To arrive at a figure for the company's economic capital requirement
- Solvency II will now allow such models to be used not only to determine economic capital but also <u>regulatory</u> capital requirements

Internal Model Approval (CP56)

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

Outlines tests and standards for internal model approval

- Standard 1 – Use Test and Governance
- Standard 2 – Statistical Quality
- Standard 3 – Calibration
- Standard 4 – Profit and Loss Attribution
- Standard 5 – Validation
- Standard 6 – Documentation

Standard "0" – The directive states "Supervisory authorities shall give approval to the [internal model] application only if they are satisfied that the systems of the … undertaking for <u>**identifying**</u>, <u>**measuring**</u>, <u>**monitoring**</u>, <u>**managing**</u> and <u>**reporting**</u> risk are adequate".

Use Test

- Foundation Principle: “use of internal model should be sufficiently material to result in pressure to improve the model”
- Principles
  1. Senior management able to demonstrate understanding
  2. Model shall fit the business model
  3. Covers sufficient risks – useful for risk management and decision making
  4. Widely integrated with risk-management system
  5. Integration in risk-management system on a consistent basis for all uses
  6. Used to support and verify decision making
  7. SCR calculated at least annually and if significant change in risk profile/assumptions/methodology
  8. Used to improve risk-management system
  9. Designed to facilitate analysis of business decisions

Governance

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- High Level Governance responsibility of Board
  - Approve application to use model
  - Strategic direction of model
  - Agree major changes in advance
  - …..
- Detailed Governance responsibility of Risk Management function
  - Design & implementation
  - Testing & Validation
  - Analysing performance of model
  - …..
- On-going feedback loop between Board and risk management function

Statistical Quality Standards (1)

- Probability distribution forecasts for individual risks
  - No explicit prescriptions regarding methodology
- Calculation methodology and assumptions
  - Adequate statistical techniques & justifiable assumptions
- Data
  - Accurate, Complete, Appropriate & up-to-date
- Evidence that model can rank risk
  - Coverage, Resolution, Congruence & Consistency

Statistical Quality Standards (2)

- Recognition of diversification effects
  - Identify key variables driving dependencies & provide evidence of diversification
- Recognition of risk mitigation techniques
  - Ascertainable economic effect (allowing for secondary risks)
  - Must be shown to work in extreme circumstances
- Future management actions
  - Any decision which undertaking has the right to make
  - Past practice must be considered

Calibration Standards

- Permitted to use different time period or risk measure than 1 year 99.5% VAR
- Must provide policyholders with equivalent protection
  - Demonstrate annually
- If different time period then undertaking must
  - Demonstrate that model takes account of time effects
  - Demonstrate that significant risks over one-year period are managed
  - Give special attention to data used
  - Justify choice
- Supervisor may require that model is run on benchmark portfolio or using external assumptions to verify calibration

Profit and Loss Attribution

- Must be a tool for validating the model and for managing the business
- Regularly review (at least annually) for each major business unit
- Very important tool for demonstration of compliance with Use Test
- Form of profit not defined in Level 1 text of Directive
  - IFRS, Change in own funds, MCEV, Other
  - However, profit measure must be “appropriate for system of governance”
- Attribution should
  - Aid understanding of risk exposures
  - Be sufficiently granular to identify model shortcomings

Validation (1)

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- Applies not only to calculation engine but to all quantitative and qualitative elements of the model
- Should cover at least
  - Data
  - Methods
  - Assumptions
  - Expert judgement
  - Documentation
  - Systems/IT
  - Model governance
  - Use test
- May use external review and systems to assist
  - But ultimate responsibility with Board and cannot be delegated

Validation (2)

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- Validation Policy required
  - Purpose and scope of validation
  - Validation tools used
  - Documentation
  - …..
- Testing against experience (“Back-testing”)
  - Define events which trigger investigations
  - Identify reasons for divergence from expected outcomes
- Analysis of robustness of internal model
  - At least sensitivity testing and further tests on stability of model
  - Especially important if expert judgement
- Stress and scenario testing
  - Analyse results, review risks and mitigating actions
  - What stresses would threaten viability (“Reverse stress testing”)

Documentation

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- General
  - Thorough, sufficiently detailed, complete & up-to-date
  - Include evidence that management understand relevant aspects
  - …..
- Design and operational details
  - Overview of historical development and version control
  - Documented policies, controls & procedures for management of model
  - Data management, testing and validation
- Outline of theory, assumptions and mathematical basis
  - All use of expert judgement
- Circumstances in which model does not work effectively (e.g. limitations)
- Major changes (design & operational implications)

External Models and data

- Document and explain role of external models / data
  - Assess impact on SCR
  - Reasons for using them & alternatives considered
  - Retain responsibility for any deficiencies
  - Validation and regular review of performance of:
    - External model results
    - Integrity of external data
  - Recognise and document the risks arising from use
  - Manual adjustments to output or data documented

Internal models – where now?

Mike Claffey

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

CEIOPS CP update

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- CEIOPS has received more than 20,000 comments from **105 stakeholders** on the 26 “wave 2” Consultation Papers.
- In the coming weeks, CEIOPS will analyse the comments and **finalise** the advice to be adopted at its Members Meeting at the end of October, together with the **final advice** from the first set for which the consultation ended earlier this year.
- A final **third set** of draft advice will be put forward for approval by CEIOPS Members at this meeting, for consultation until 11th December 2009.

- 25 replies received for CP 37 (internal models approval)
- 38 replies received for CP 56 (internal models).
- Expect CP on partial models in wave 3 of advice shortly
- And we have all the Level 3 process to be consulted!

CP37 Group Internal Model Approval

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

- Relevant supervisors will attempt to make a joint decision
- If no joint decision then group supervisor will decide
- Requirements generally consistent with solo model but with further additional information
  – Description of group and intra group transactions
  – Undertakings excluded from scope of internal model and rationale
  – Transitional plan to include undertakings excluded
- Application sent to group supervisor in language of member state unless otherwise agreed

Do you have to parallel run the internal model and standard formula?

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

Use and approval of internal models

The Directive Article on the general provisions for the approval of full and partial internal models stated in the original Commission proposal Directive that undertakings would be required to provide supervisory authorities with an estimate of the SCR determined in accordance with the Standard Formula for two years after approval. This provision remains; however, instead of a requirement for two years, there is now supervisory discretion as to whether undertakings will be required to provide this estimate.

Source – FSA UK

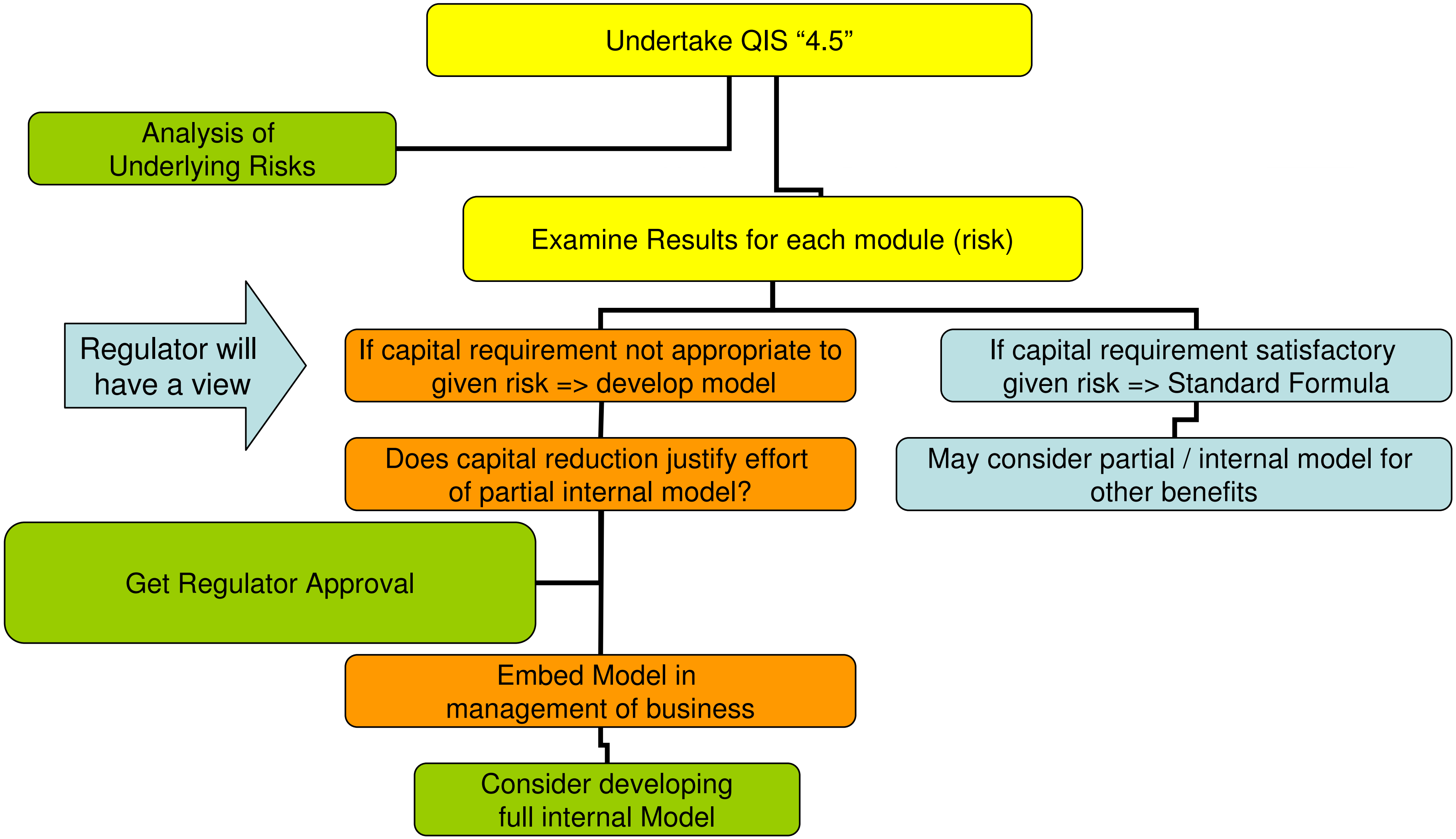
There is no mention of “two years” in the final directive, although the principle may resurface as Regulators approve internal (full or partial) models. The issue of “cherry picking” is also being carefully considered by CEIOPS.

Some interesting questions

- Can a new company have an internal model with no history?
- Do you have to use internal data only – is it statistically significant?
- What are the practical implementation issues – resource, timing, recruitment, liaison with Regulator(s)?
- What about potential capital add-on and disclosure of this?
- Are you ready for an internal model as part of QIS 5?
- Who really decides on implementing a full or partial internal model?
- If you plan to use a Group internal model, do you have to do anything in Ireland?

Possible next steps for you

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING



Key Messages

- Internal models are not just an actuarial exercise.
- Internal models are integral to your relationship with the Regulator.
- An internal model may represent (is?) a different way of running a business. Your Board (at least) has to accept this.
- Development and approval of internal models is a time and resource consuming process. You need to start now!
- You should develop a gap analysis and development road map for your internal model now.
- You might have to do this anyway for a partial model (i.e. for certain modules of the standard formula). The decision to use a partial model might not be yours (e.g. Regulatory request).
- We expect more draft advice on partial internal models from CEIOPS shortly.

lifestrategies
ACTUARIAL & STRATEGIC CONSULTING

Questions