Significant progress has been made in internal model validation during 2013 but what challenges remain for 2014?
We would like to thank the participating firms for taking part in the internal model validation survey.

If you would like to discuss any aspect of the survey please contact Tom Durkin on +44 (0)20 7432 6606 or Charlotte Edwards on +44 (0)20 7432 6640 or email enquiries@lcp.uk.com. Alternatively contact the LCP partner who normally advises you.

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LCP Internal Model Validation Survey 2013/14

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Significant developments were made in internal model validation during 2013, but key challenges remain for 2014.

In late 2013, we met with over 30 firms in the Lloyd’s market to explore the latest trends in internal model validation. On average, firms believe they are 65% towards an ideal validation process for their business. However, key questions that remain are:

- How can you get genuine value from your validation work?
- What can you learn from the market’s experience in 2013, to help you prioritise your action list for 2014?
- How can you streamline your validation processes and reduce costs?

Key findings

- Firms have made significant progress with internal model validation work in 2013. Most firms are more than half-way towards their ideal validation process.
- There has been a market-wide refocus on adding business value in addition to meeting regulatory requirements. This is good to see, as internal models are most effective when they are driven by business needs, rather than by regulators.
- Firms are looking to reduce the long-term cost of validation. Key initiatives include streamlining processes, concentrating on the most important areas and having a rolling programme for testing.
- Timetabling is critical. By spreading work more evenly across the year, firms are looking to give management more time to engage with the model and validation, and to ensure hassle-free regulatory reporting.
- Firms are planning to build stronger links between the stress and scenario tests used for model validation and those used elsewhere in the business for risk management. This will avoid doubling up of effort and help firms to share useful ideas across the business.
- Other key challenges remain, including validating dependencies, managing and validating expert judgements, ensuring that validation has sufficient independence and setting effective pass/fail criteria for the validation tests.

2013 has been a great year. Firms are starting to get real value from their internal model validation. The work done so far has built trust in the models, but there is more to do in 2014 to get the most from the validation work.

Tom Durkin
Partner
LCP
1. Validation approach

The validation team
Most firms were happy with the structure and skill set of their validation team. However, some struggled to maintain an appropriate level of independence. This was typically driven by resource constraints, particularly within smaller firms.

There has been a trend towards using more internal resource for the validation work, but external input has been useful for performing benchmarking, deep-dives and independent high-level reviews.

LCP recommendation
An appropriate amount of independence is critical to ensure the validation process provides sufficient challenge. An independent internal resource, who really understands your business, can be invaluable here. External resources can bring a different perspective and experience from work with a range of firms.

Validation tests
Few firms re-run every validation test each year. Most firms either already set priority areas to validate, or are planning to do so.

Typical criteria used to prioritise validation tests:
- Key results used for business decisions
- Materiality relative to the SCR
- Model changes
- Recommendations from the board
- Remedial actions from earlier validation
- Regulatory feedback
- Market trends

Approaches range from formal arrangements with pre-defined criteria for prioritising tests, to informal assessments determining where to focus efforts. Other firms have rolling plans that spread the work over three to five years. Where a formal framework is used, most firms review the framework at least annually.
LCP recommendation

A framework for selecting the tests to run each year helps to get maximum value from validation given the available time and resource. In our experience, a smaller number of high-quality tests is an effective approach. This allows more time for each test, so that the results can be interpreted and understood by the business.

Each test needs to fight for its existence - focused and carefully selected validation tests can be efficient and add true business value, so don’t waste time on non-essential areas.

Illustration of a focused validation approach

If parts of your validation are done in conjunction with parameterisation or other model processes, details should be recorded as part of the main validation work. Having details of all validation in one place makes the scope of the work easier to understand and communicate, and also helps regulators give you credit for all the work you have done.

We want to continue to minimise the extra burden on our staff by taking advantage of the normal process of checks and balances as part of our validation process.
### Adding value
The types of validation tests that are seen as most useful differ significantly between firms, depending on the maturity of their validation process:

<table>
<thead>
<tr>
<th>Validation maturity</th>
<th>Tests typically seen as most useful</th>
<th>Key questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early stages</td>
<td>“Input/output” or reasonableness tests, which demonstrate the model is working as expected</td>
<td>Is the model doing what it says on the tin?</td>
</tr>
<tr>
<td>Developing</td>
<td>Sensitivity tests, which highlight the most material assumptions</td>
<td>How far can we push the model?</td>
</tr>
<tr>
<td></td>
<td>Risk ranking, which aids understanding of model output</td>
<td>What are the most important assumptions?</td>
</tr>
<tr>
<td>Developed</td>
<td>Back testing, which is typically less subjective than other tests</td>
<td>What are our biggest risks?</td>
</tr>
<tr>
<td></td>
<td>Scenario testing, which provides challenge to the model at various return periods</td>
<td>Are these the risks that are driving our capital number?</td>
</tr>
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</tbody>
</table>

### LCP recommendation
The ideal approach involves using a range of tests in order to get different perspectives on the risks faced by the firm. If the majority of your tests are of the input/output variety, you may not be getting the most out of your validation process. You may wish to consider additional focus on risk ranking and scenario tests.

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**Mark West**
Mitsui Sumitomo

We are looking to invalidate, not validate the model – the model is not going to be right forever.
Stress and scenario testing
Stress and scenario tests help put the model results in context by using meaningful business examples. This is valuable because it encourages wider challenge of the model.

However, some firms are not getting maximum value from the stress and scenario tests because:

- the tests are being produced by the capital modelling team without sufficient input from the wider business; or
- there is input from the wider business, but no clear connection between the tests and the internal model output.

A number of firms have acknowledged that they would like to do further work in this area.

LCP recommendation

Stress and scenario testing provides an ideal opportunity for the capital modelling team to interact with the wider business and to ensure that the internal model reflects the views of the underwriters and management. We recommend that firms establish a framework for assessing the return period of each scenario so that these can be compared meaningfully to model output.

One approach that we have seen work well is to allocate scenarios to three broad categories as follows:

1. **Adverse but foreseeable** eg up to a 1 in 4 return period
2. **Unlikely but possible** eg between 1 in 4 and 1 in 20 return period
3. **Extreme** eg greater than 1 in 20 return period

This avoids spurious precision when assessing the likelihood of different scenarios, especially in the tail of the distribution. Ensuring the business generates a sufficient number of scenarios in each category will help with the validation of the body and the tail of the modelled distributions.
2. Addressing key validation challenges

According to our survey results, the four most difficult areas of validation during 2013 were: dependencies; managing the timing of and resources for the work; setting pass/fail criteria; and expert judgement.

**Key validation challenges**

- **Dependencies**: Limited data makes parameterisation and validation of dependencies difficult. Complex statistical relationships can also make it difficult to understand and communicate the impact on the model outputs of changes in dependency assumptions.

**LCP recommendation**

One approach for improving understanding of dependencies is to consider a supplementary driver-based dependency model. This can support or validate the parameterisation of copulas. Other approaches include benchmarking against other firms or using third party data sources.
Timing and resources: For many firms, a key practical issue with model validation was the limited time available to carry out the work. As a result, firms have tended to focus on validating the draft LCR submission, with only limited validation carried out on changes between the draft and final LCR submissions. Firms would like to bring forward more of the validation work into the January to July period, alongside the parameterisation process.

Pass/fail criteria: For pass/fail criteria to be effective, the qualitative criteria and quantitative thresholds need to be sufficiently granular to highlight key issues without over-burdening the validation process – that is, they need to give a good “signal to noise ratio”.

Successful techniques used by firms in 2013 included:

- Harnessing involvement from the wider business – for example, having clear ownership by different functions for specific areas of the model. Each business function was able to use their deep understanding of the business to set appropriate quantitative criteria.
- Using consistent criteria across tests – for example, using a pass/fail criteria for all back-testing based on a standard return period, such as 1 in 25 years. In this case, any historical events that fall outside 1 in 25 of the modelled distribution are escalated for further consideration.
- Using the additional category of “pass with limitations” or equivalent, to manage minor fails.

Several firms commented that their pass/fail criteria have evolved over time. This is a pragmatic approach to fine-tuning the validation process.

LCP recommendation

Taking the time to set quantitative criteria before starting the validation is hard work, but extremely valuable. In general, you should avoid changing criteria mid-validation, but common sense should prevail and criteria should be changed where they are no longer adding value.
2. Addressing key validation challenges

**Expert judgement:** Capital models rely on a wide range of subjective judgements. Firms tend to include the validation of expert judgement implicitly within other tests, rather than validate the judgements explicitly. Around half of firms use an expert judgement log to record and track the judgements; however, several firms commented that further work will be required to ensure that the log is effective and remains up to date. There was a range of views on whether this level of documentation was useful for the business.

**LCP recommendation**
A simple log is extremely valuable for keeping track of expert judgements and explaining to the business the more subjective areas of the model. A log prevents expert judgements being lost within parameterisation and other processes. This is an effective way of demonstrating regulatory compliance.

**Other challenges**
Despite regulatory focus, there was less discussion than we expected on the difficulties or the approach for validating external models such as the ESG or catastrophe models. We recommend that the validation of external models is considered for next year’s action list.

Other difficulties experienced by firms included the following:
- Establishing a robust and well-structured validation framework.
- Gaining validation buy-in from the wider business.
- Clear communication of test results.
- Building an effective validation feedback cycle.

**Survey respondent**
*Calculation kernels are often more sophisticated than the governance processes surrounding them.*

**29%**
perceived expert judgement as one of the key validation challenges.

**Survey respondent**
*We validate expert judgement with more expert judgement.*

**Survey respondent**
*Validation should be collaborative rather than confrontational.*
3. Engagement with the business

Overall, firms feel positive about the level of engagement of the business with validation, although the extent of engagement varied from firm to firm. The most common barrier to greater engagement was the quality of communication of model and test results.

Most firms believe the board is sufficiently engaged with model validation. This is typically achieved by specific board members or sub-committees having a particular interest in validation and the rest of the board having a general understanding.

In a small number of cases, the business was not interested in the validation process itself, but were nonetheless engaged with model use for business decisions.

Successful techniques used by firms to engage with the board and the wider business, included:

- Linking model output to critical business metrics such as profit and loss and return on capital.

Communicating drivers of capital

Composition of the 50 trials around the 99.5th percentile (ordered by size of catastrophe loss)
3. Engagement with the business

- Using technical dashboards and visual aids to help encourage feedback loops.
- Producing tailored content for the business that is separate to regulatory reports, so that the key messages and issues can be highlighted in a business context.
- Using consistent presentation of test results and model output: for example, a standardised set of test output schedules, so that the business is familiar with the presentation even if the model output varies.

**Standardised validation test schedule**

![Diagram showing a standardised validation test schedule]

- The same layout for each test:
  - Purpose
  - Responsibility
  - Summary of results

**LCP recommendation**

*Developing clear management information from the model is an excellent way to improve engagement. This is most effective when the same style of output is used consistently across validation and model use. Using the common language of the business is also critical for ensuring genuine business engagement. For example, if the underwriters think and speak in terms of return periods rather than percentiles, then the same language should be used by the model.*
4. Plans for the future

Model validation is an evolving process and firms are at different stages of evolution. Firms have made significant progress with validation work during 2013 and most firms now have a clear view of where they want to be in the future.

Conclusions

Key areas requiring development in order to achieve the ideal validation process include:

- Spreading the validation work more evenly over the year by performing more of the validation work alongside the parameterisation of the model.
- Prioritising validation tests or moving to a rolling plan for validation.
- Ensuring validation is driven by business needs rather than regulatory compliance.
- Addressing some of the remaining hard validation challenges, such as dependencies, expert judgement and setting effective pass/fail criteria.
- Treating validation as an on-going business process rather than a periodic exercise.

These goals are eminently achievable with a clear vision, careful planning and healthy engagement with the business.
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