Financial Services Authority

Capital Requirements Directive Implementation

Industry Feedback: Advanced Measurement Approaches

March 2006

Why are we issuing this feedback?

Between May and December 2005, we visited several firms considering applying for the Advanced Measurement Approach (AMA) to operational risk. These visits helped us to assess industry readiness for implementation of the new Capital Requirements Directive (CRD).

At this stage, AMA solutions are 'work-in-progress'. We intend our observations to help firms that are aiming to adopt the AMA to review their implementation plans. We do this by highlighting those aspects where firms may need to direct their efforts to achieve a 'good state of readiness'. The paper is also intended to enhance senior management understanding of our expectations, to help them with certification and self-assessment preparatory to a waiver application.

This paper is not 'guidance' as defined in section 157 of the Financial Services and Markets Act 2000 (FSMA). We are still consulting on the FSA Handbook text that will implement the CRD in the UK. *Consultation Paper 06/3 Strengthening Capital Standards 2* sets out our latest policy position.

What progress have we seen?

Firms are making considerable progress in developing and implementing operational risk (OR) management and measurement systems. Implementation focus continues to be on developing and rolling-out data collection tools and techniques. However, the firms we visited had made less progress in developing a well-understood risk appetite statement; a stable and responsive model; and actionable, forward-looking management information.

So that firms have flexibility in formulating their AMA solutions, the industry has suggested that we not provide further detailed Handbook guidance on certain key aspects – such as data quality, model construction, the 'use test', and validation. As these are critical to the credibility of an AMA solution, we will expect firms to have developed and applied properly high standards. So far, few firms have discussed with us the standards they intend to apply. For some firms, there may remain substantial progress to be made before they will be ready to apply for a waiver and we remain open to dialogue through coming months.

A number of large and complex institutions have deferred their AMA ambitions, perhaps partly because of the US decision to delay AMA implementation until 2009. Other institutions for which we are the host regulator, intend to use the AMA at group level, but to apply a simpler approach for their UK subsidiaries[1]. Those simpler approaches will of course need to be based on OR systems and controls that reflect the nature, scale and complexity of the business done, together with a process of forward-looking risk assessment for their internal capital adequacy assessment process (ICAAP).

So here we set out more detailed feedback – divided into sections on data collection and management, model build and validation, governance and the use test, and documentation and review.

Data collection and management

1. Data requirements

The CRD specifies the use of four data elements[2]. As data requirements will depend on the specific details of the AMA solution, firms need to ensure that they have sufficient relevant data across all these elements.

Some firms we visited were implementing data collection processes before they had fully defined their data requirements for modelling and management information. Some shortcomings in internal communication were identified with those responsible for implementing data collection processes not systematically consulting business users and the quantitative modelling experts about their information requirements. This can hamper verification that data collected is 'fit for purpose'.

2. Data quality

The CRD requires the FSA to make sure that data flows are transparent and accessible. While the standard of controls necessary will depend on how the data is used, firms we visited seemed to risk an inadequate AMA solution more because of incomplete or poor quality data than because of problems with model design. During the visits we saw no formal data policy documents.

Some procedures for achieving data integrity appeared inadequate or inconsistently implemented:

- For 'objective data' (e.g. internal loss data), the principal data quality issue was uncertainty about the completeness and accuracy of the information. Some firms were trying to mitigate this by corroborating internal loss data against other sources, such as the general ledger. Others saw such an approach as infeasible. We accept that reconciliation is extremely difficult for certain loss types, such as dealing errors. However, at the time of our visits no alternative data quality procedures of sufficient robustness were demonstrated.
- For 'constructed data' (e.g. data based on scenarios, expert judgement or qualitative information), the principal issue was uncertainty about the consistency and integrity of subjective assessments. Firms can mitigate this by implementing strong compensatory controls and processes. This may include unequivocal instructions on how to complete the assessments; independent challenge of the results; and 'qualitative back-testing' (i.e. confirming the accuracy of qualitative judgements by corroboration against subsequent

1 We have not visited any firm with a parent based in another EU country.

2 These are internal data, external data, scenario analysis, and factors reflecting the business environment and internal control systems.

experience). Several iterations could be required to enhance the robustness of the process by which they produce subjective data elements.

An AMA model should determine the minimum capital threshold required to meet a confidence level comparable to 99.9% over the following 12 months; OR management information should be relevant and forward-looking. So an important aspect of ongoing data management is to update data promptly for changes that may impact the OR profile significantly:

- For 'transactional information' (e.g. crystallised or potential new exposures), firms require efficient collection procedures so that new information is reflected promptly in data stores such as the loss database, risk assessments, and scenarios. While most back office functions track operations errors promptly, we found that in many cases such monitoring did not extend to all OR event types or right across the organisation.
- For 'static information' (e.g. corporate restructurings, changing product offerings, and modifications in systems and processes), firms require effective maintenance procedures to update and cleanse data stores so the information continues to be relevant.

When applying for waivers, firms will need to set out the quality standards that apply to their data. They must also outline the processes they have established to achieve this and certify the standards have been materially met. Depending on progress since our visits in 2005, this may be a significant challenge for some firms intending to adopt the AMA on 1 January 2008.

3. Other data observations

External data

We observed that all AMA aspirants had access to at least one centrally-sourced external loss database, and we saw some convergence in the data providers used. We have not directly reviewed the quality of data in any external databases, but are aware that external data may not cover the full range of risks or the full costs of reported events. Although many firms are assessing the need to scale external data, the 'reliability' of such data did not appear to have been evaluated by many firms. One simple test a firm could carry out is to assess the quality of reporting of its own events in the external database(s) to which it subscribes.

Some business areas were making active use of specialist/niche databases, for example on fraud and IT incidents. However, there was limited awareness or recognition of these in the design of the OR framework and AMA solution. Greater use of such data sources in the model may enhance the estimation of key risks and also improve the link between risk measurement and day-to-day management processes.

Business environment and internal control factors

The use of self assessment was almost universal, although actual practice varied considerably. As most firms had not fully appreciated the biases inherent within the technique, they had not structured their procedures so that the results were more reliable and fit for purpose. The results of previous assessments often stood unchallenged; firms doing the self-assessment for the second or third time may find existing risks are not reappraised and emerging risks are not considered.

When conducting risk assessments, individuals naturally tend to make systematic errors. They are prone to:

- overestimate the likelihood of incidents that are easiest to recall (e.g. those that have recently occurred);
- underestimate the worst-case situation, even when a wide confidence interval is available; and
- underestimate the risk potential that exists in small business units.

Usually, self-assessment performed for day-to-day risk management is assessed at a much lower confidence level than is required for capital modelling. In these cases, the results are not an ideal direct input into a capital model. Some firms are performing self-assessment and scenario estimation as part of the same exercise. A well-constructed exercise could allow an estimation of the risks at several different confidence levels and produce results that will have greater credibility with business management.

Model build and validation

4. Model approach

Compared with previous years, clear progress was evident in firms' development of OR models. However, most firms continue to prefer discussing generalities and potential options with us. Firms' thinking remained at a high level, looking at broad modelling options rather than a detailed approach supported by 'live' data. To date, few firms have discussed with us credible solutions to critical issues such as completeness of risk coverage, the soundness standard, and correlation.

A significant proportion of firms were basing their models on scenario analysis, some because they have insufficient loss data for constructing a loss distribution approach (LDA) model. Several firms were developing 'hybrid LDAs' – using data constructed from scenarios to produce the frequency and severity distributions.

For many overseas institutions, modelling effort was led by head office with little or no input from subsidiaries. Most such institutions are proposing to use an allocation-based approach, although these methodologies did not appear to have progressed significantly.

5. Model construction

The CRD requires specific attributes in the AMA model, including:

- a soundness standard;
- the use of all four data elements;
- capture of the major drivers of risk;
- soundness and integrity in the systems for measuring correlations; and
- internal consistency.

Some firms we visited were proposing to use qualitative judgements in the model that may significantly impact the output. However, often these firms could only justify the adjustments as being 'intuitively correct'. Other firms had carried out an initial run of their model and reported that the outcome was too high; as a result, they were 'tweaking' the model to provide a more reasonable estimate of capital. A few firms asserted that capital under the AMA must be lower than under the simpler approaches, in order to provide an incentive for firms to implement a more sophisticated OR framework.

Some firms had weighted their AMA approach towards a single data element paying little regard to the other three. Often, firms were unable to justify the basis for the balance (including zero weights) between the four elements.

We saw no work on correlation that was supported by both data and analysis, although one firm engaged us with an analytical explanation of the independence of its 'tail events'.

Firms' waiver applications will need to identify key assumptions and inputs driving the model; the rationale for these assumptions; and an assessment of the impact of these assumptions on the results.

Firms' senior management will need to certify that their AMA model meets the attributes required by the CRD, such as the soundness standard. While a firm's AMA capital estimate may be lower than under the simpler approaches, a firm should not have a preconceived expectation this will be the case. We suggest that firms consider adding a margin of conservatism in their capital assessments to compensate for data input weaknesses (e.g. poorer quality loss and scenario data in earlier years) and model estimation errors. When data management and model construction processes are less robust, the range of potential error will be greater and this should be suitably reflected in the margin of conservatism.

6. Model validation

The CRD requires the FSA to verify that the internal validation processes are operating in a satisfactory manner. A number of firms visited contended that statistical rigour is neither necessary nor achievable for OR models because of well-recognised problems with the sufficiency and quality of the data inputs (i.e. the limited relevance and sufficiency of loss data points; the subjective nature of constructed data).

We recognise the difficulty of implementing robust statistical tests. Nevertheless, firms will need to establish a sound and comprehensive model validation programme using suitable techniques and diagnostic tools. Firms' waiver applications will need to outline the processes they have established over key aspects of the model. They can do this by:

- validating the reliability of the model **inputs** (e.g. integrity of internal data, relevance of external data, and robustness of subjective constructed data);
- evaluating the meaningfulness of the assumptions underlying the model **construction** (e.g. distribution assumptions, parameterisation, 'blending' and combining data elements);
- evaluating the sensitivity of the model **outputs** to the assumptions and to variations in the inputs (e.g. to gaps in the data or a single large new loss); and
- assessing the reasonableness of the model outputs over time (e.g. back-testing).

7. Other model observations

Expected loss

The CRD allows firms to exclude expected loss from their capital assessments if they can demonstrate that it is adequately captured in their internal business practices. Most firms we visited had yet to tackle the issue of expected loss. Some firms expected to be able to deduct an arbitrary figure with minimal justification. One firm, however, was establishing a business tool that links low-value high-volume loss experience to the budgeting process and general ledger, which could provide a potentially credible approach.

Insurance and other risk transfer mechanisms

None of the firms appeared to have explored in detail how they might use insurance (or other risk transfer mechanisms) in their models; perhaps because it would not be included in firms' initial models. For insurance to be a credible mitigant, firms will need to demonstrate – amongst other things – how their insurance coverage matches the risk exposures identified in their models.

Governance and the use test

8. Senior management understanding

The principle of 'senior management responsibility' is well-embedded in our Handbook. In almost all institutions, the Board reserves responsibility for decisions on capital to itself. Board directors need sufficient understanding of the details of the AMA to be able to make informed decisions. Other senior management need an understanding of the AMA framework sufficient to oversee adequately the processes for which they are responsible.

Apart from authorisation of the significant costs of the OR programme and resource, we saw limited evidence of senior management engagement in the design, building and implementation of the OR framework. Some firms were deliberately waiting until the framework was fully implemented, and management information and model numbers were available, before they started an 'education programme' for their senior management. Given the impact and potential benefits of the OR framework on senior management's responsibilities for systems and controls, more proactive senior management involvement throughout the implementation programme would be useful to promote success.

Given senior management's interest in establishing a well-understood risk appetite statement, we would expect substantial involvement by them on this topic; however, formal statements of risk appetite had not progressed significantly at most firms we visited. Some firms planned to link risk appetite to capital, which then requires the model to be completed so that a quantitative statement of risk appetite can be derived. Even in such cases, however, firms would benefit from giving the topic early consideration given the links between appetite, loss data thresholds and reporting requirements.

Where a UK subsidiary of an overseas institution is using an 'allocated' group AMA model, we will expect suitable integration between the group risk measurement system and local risk management activities. Hence, local senior management will need to have sufficient understanding of the OR framework and AMA solution. Indications from our visits were that both integration and awareness were low in many cases.

9. Management information

The CRD requires risk measurement to be closely integrated into day-to-day risk management, and regular reporting of operational risk exposures and losses – the 'use test'.

Firms we visited had generally not yet developed the quality of OR reporting required for senior management and decision-making committees. Several firms were scaling-down the volume of OR information to provide management reporting that was easier to understand and fit-for-purpose.

Some OR reports we saw tended to signal the position as perpetually 'green' or 'amber'; they seemed biased to a view that everything is under control with no need for action. Other reports showed 'red' indicators for long periods, with little evidence that mitigating actions had been considered or taken. In some cases the OR reports firms provided us had no clear linkage to the AMA framework.

The developing reporting which we saw during our visits generally seemed to embody a good deal of communication of information upwards and to the centre. There was frequently little feedback from the centre, sharing of OR experience between different parts of the organisation, or comparison of assessments between similar functions.

In their waiver applications, firms will need to explain how the 'use test' is satisfied. As part of our future review work, we will aim to review a 'vertical slice of management information' (i.e. information at all levels of the organisation from business unit to the Board), for example on a particular issue or incident. We will also apply some simple tests:

- When was the last time OR reporting has made a difference to business decision-making?
- When was the last serious debate about the content (not the quality) of the OR report?

10. Other use test observations

Risk culture

Typically, firms we visited stated that responsibility for day-to-day risk management lay with business functions. However, this was rarely reflected explicitly in business management objectives, appraisal or remuneration; few firms required staff to read and accept the 'OR Policy'. This suggests to us that the OR framework may not yet be properly embedded into business activity.

Business engagement

Firms typically seemed to have a 'hub and spoke' model – small central OR functions and a number of risk managers embedded in the business. Risks are discussed at a range of central and business function committees.

Our evaluation of business understanding and engagement with the OR framework gave mixed results. At one extreme, there was cynicism about the value that the OR framework added; at the other extreme, an approach where the OR managers in the business were almost more proactive and aware than the central team.

Most business functions had been exposed to the OR framework, principally through loss reporting and the self-assessment process. Institutions where the central OR team had sat down with the business and facilitated workshops appeared to have seen most value, especially compared with those where the self assessment had been done largely in isolation with the OR function merely reviewing the results later. Some OR programmes seemed to have lost goodwill by not rationalising and streamlining with other assurance activities, for example Turnbull and Sarbanes-Oxley compliance.

Key risk indicators

Key risk indicators (KRIs) are one way of obtaining data on 'business environment and internal controls factors'.

Despite several industry initiatives, most firms we visited were not yet getting significant value from their KRI programmes. Differences exist in industry opinion between those who believe that KRIs are the 'holy grail', and those who believe that KRIs are solely performance indicators. None of the firms visited were yet demonstrating that the KRIs they are developing are predictive.

KRI thresholds and 'triggers' are logically linked to risk appetite. Firms' failure to define risk appetite in well-understood terms may be responsible for the difficulties they are encountering with establishing the role of KRIs. However, one firm indicated it had a comprehensive procedure to attach trigger values for escalation to key indicators.

Documentation and review

11. Documentation

The CRD requires the OR framework (e.g. polices and procedures, model approach, evidence of review and challenge) to be well documented.

At the time of our visits, the overall standard of firms' OR framework documentation was not at the level we will require to assess a waiver application. A couple of firms had produced commendably easy-to-understand, comprehensive, and detailed policies and procedures, though other documentation was less effective.

At the time of waiver application, documents will need to be sufficiently detailed, consistent and up-to-date to provide an accurate picture to relevant users within the firm, including senior management and Internal Audit.

12. Assurance activity

The CRD requires us to verify that internal validation processes are operating in a satisfactory manner.

Most firms visited had yet to give detailed thought to the review and validation work they will need to do in support of an AMA application. Few firms had a project task for 'assurance'. While we saw some evidence of management activity to review and validate aspects of the OR framework, procedures and results were generally not well-documented.

In their waiver applications, firms will need to outline their approach to self assessment and validation; they will also need to identify any exceptions, including an assessment of the materiality of those exceptions.

Firms will benefit from developing and documenting an assurance strategy that identifies the range of review and validation activities necessary to meet internal and regulatory requirements, and apportions responsibility suitably between business, risk and audit functions. Documentation should demonstrate there is sufficient review of all aspects of the OR framework and minimum standards are consistently applied across the organisation.

13. Internal audit

The CRD requires the OR framework to be subject to regular internal (or external) audit review. Senior management is likely to place considerable reliance on audit functions as part of its certification of the waiver application.

At some firms, audit functions were not yet engaged in this area and appeared to want to delay auditing until the framework was fully embedded. That would risk losing an opportunity to challenge the composition of the framework, with potentially negative implications for buy-in by senior management and business areas, and increased risk that the firm may fail to meet the AMA criteria.

Other firms communicated a comprehensive vision, though not always fully documented, of the work they need to do in relation to both the OR management and measurement systems. Their audit functions recognised that new skills and additional knowledge and experience may be needed, and relevant steps were being planned. The internal audit mandate was not solely to assess whether the firm would meet regulatory criteria, but also to verify that the OR framework was set to provide an effective risk management tool.