

Explanation of role of Expert Groups.

Expert Groups consist of industry representatives and are facilitated by FSA staff. The Expert Groups provide outputs for discussion at the Credit Risk Standing Group with the overall aim of providing proposals for the FSA to consider.

USE OF EXTERNAL MODELS AND EXTERNAL DATA IN THE IRB APPROACH

Executive Summary and Core Principles

1. All firms use external data and external models in their risk management processes. This note provides guidance for firms, external vendors and regulators in the type and level of information that firms should provide when submitting their application for IRB approval. ECAs and their application are out of scope.
2. The expert group agreed upon the following high level principles.
 - In general, the same standards apply to external data and external models that a firm applies to its internal data and internal models.
 - The emphasis should be on fitness for purpose commensurate with the way in which a firm uses external data and external models. For example, a generic score/rating provided by a third party model, a model built by a third party for a specific organisation using industry-level data and specific data from the organisation, a model built by a third party for a specific organisation using just industry level data, or a benchmark for model validation purposes.
 - The same standards apply to all firms, big and small, although the level of sophistication is likely to be greater taking account of a firm's size and technical development.
 - Proprietary information is not an excuse for a firm failing to understand whether a particular dataset or model is fit for the job that it is doing. Transparency and understanding of the data and model limitations in their application to a particular portfolio are essential. This includes where, for example, a different definition of default is used.
 - Where data is scarce, for example in low default portfolios, data pooling initiatives are encouraged. The onus is on firms to satisfy themselves on fitness for purpose concerning any data or definitional inconsistencies.
 - The FSA will not accredit any individual model or vendor.
 - The Vendor Grid is a useful way in which information can be collated although while encouraged, it is not mandatory.

- The potential role of the expert group as an ongoing vehicle that engages with vendors needs to be considered. The group felt there would be benefit to firms, vendors and regulators if the expert group continued, further developing the approaches and standards at an operational level. The exact status of this group would need to be agreed, but it was envisaged the group would operate in an advisory capacity with FSA representatives ensuring overall standards are adhered to.
3. There is widespread support for this approach from firms, vendors and the FSA. The group thinks there would be benefit in this approach being shared with other supervisors through CEBS and the AIG given the international nature of some of these models.

Background

4. Although the Foundation and Advanced credit risk approaches introduced by the Draft Directive are quite explicitly intended to be based on *internal* ratings, a potential role for the use of external data and/or externally developed models is permitted. Used sensibly, external data and models enrich a firm's understanding, risk processes and controls, often providing a reliable and cost effective supplement to internal data and models.
5. In CP189, the FSA proposed a "Vendor Grid" that would capture the essential information that firms should know relating to external models. Whilst it is no longer intended that a formal template shall be used, much of the content of that former work remains relevant and is embodied in this paper. We have, however, also taken into account a number of developments since the Vendor Grid was first published. These include:
 - The publication of the EU draft Directive and the consequent need to take into account the legal text which it provides.
 - A desire to separate requirements for "external data" from those for "external models".
 - Discussion between the industry and the FSA on the uses of data pools; recognition of ECAs; and the treatment of low-data portfolios.
 - Developing work by AIG and CEBS working groups.
6. The discussion below is intended to bring the earlier work up to date and to give clarification to firms, in a broad sense, of how they will be able to demonstrate to supervisors that they have sufficient understanding of external models and data to permit their use in the calculation of regulatory capital.

Directive Requirements

7. Whilst the Directive allows external models and data to be used, it is quite clear that the same standards are expected when using external and internal information. For models, Annex VII part 4 36 says:

Use of a model obtained from a third-party vendor that claims proprietary technology is not a justification for exemption from documentation or any other of the requirements for rating systems. The burden is on the credit institution to satisfy competent authorities.

8. For data, references to the need for data to be representative of the firm's own population of obligors are in Annex VII part 4 31 & 52. Further, Annex VII part 4 58 says:

If a credit institution uses data that is pooled across credit institutions, it shall remain responsible for the integrity of its rating system. The credit institution shall demonstrate to the competent authority that it has sufficient in-house understanding of its rating systems, including effective ability to monitor and audit the rating process.

9. These paragraphs make it clear that, whilst external data and models are allowed, the burden remains on firms to understand how they have been constructed and how they can be sensibly used as part of their own risk quantification processes.
10. The Expert Group agrees that it expects a firm to have a good understanding of any external information that it uses as part of its risk management processes. In the context of IRB qualification, a firm's senior management should ensure that the strengths and weaknesses of external information are properly understood and factored into risk estimates. Internal staff should be adequately trained in the use of external information. Typically this would be evidenced through training statistics, up to date publications, demonstration of adequate quantitative skills.
11. We also note that firms' own models could effectively be seen as "external" where a banking group operates in several jurisdictions. Models developed for group-wide use in the home jurisdiction might be viewed by host supervisors as external to a subsidiary where they are used. It would facilitate cross-border supervision if firms were to develop documentation and internal processes with this in mind.
12. The FSA does not regulate suppliers of models and data for the purposes of IRB qualification. The FSA's interest is in the application of models and data by individual regulated entities. The FSA will need to be satisfied both that the underlying model or data is sound and also that the firm using that model or data is using it in an appropriate way and with a proper understanding of its strengths and weaknesses. The FSA is not in a position to give blanket accreditation to particular models. Vendors themselves should therefore have an interest in transparency, ensuring that firms have a good understanding of the models and data that they are purchasing as, without that, the firm will not be able to meet the qualifying standards for IRB.

EXTERNAL MODELS

13. In respect of its IRB risk models, a firm should be able to provide information and explanations to its supervisors in respect of:
 - Model design and purpose
 - Standards for appropriate model use
 - Known data or other limitations
 - Quantitative tests that can demonstrate appropriateness of the model for the individual firm
 - Qualitative tests (checks and balances) that are applied in using the model
 - Responsibilities in respect of operational support and maintenance
14. This information should be in place for both internal and external models and applies to all risk estimates i.e. to models of LGD and EAD (and, if appropriate, EL) as well as PD.

15. The next few paragraphs illustrate the type of information that supervisors will expect firms to be able to provide in respect of each of these broad areas. This is not intended to be either a minimum or a maximum list of required information but should be read as illustrative of the areas that supervisors will consider as part of deciding whether a firm's application of external models is fit-for-purpose in the calculation of regulatory capital.

16. Model design and purpose

- The type of portfolio for which the model was developed
 - Eg what customer type/product type; how this relates to the regulatory asset class; to which countries/regions does it relate
- What the model is designed to be used for
 - Eg origination; credit approval; provisioning; account management
- Model definitions
 - Eg how do the model's definitions of default, loss etc relate to the regulatory definitions. Note that the Directive explicitly requires firms "*that use external data that is not consistent with the definition of default*" to demonstrate "*that appropriate adjustments have been made to achieve broad equivalence with the definition of default*". (Annex VII 4 46)
- General description of the data used to build the model
 - Eg length of data history; approximate sample sizes; source of data
- Technical design
 - The theoretical basis of the model (where relevant); the statistical techniques employed in its development; key factors that drive the model's performance.
 - We are aware that there may be a conflict between a firm's need to understand model performance and the vendor's need to maintain commercial confidentiality. In this context, it is not essential for vendors to disclose full details of their parameter construction or of the weights that the model applies to particular characteristics. We would, though, expect vendors to be willing to give a general indication of the relative importance of broad types of input variable, for example that industry type plays a significant role whilst firm size does not; or that borrower's age is relevant but of much less significance than declared income. It is our experience that vendors are usually willing to provide sufficient detail to meet this requirement. In the unlikely event that firms were not able to obtain sufficient information themselves to assure the FSA that the model was fit-for-purpose, it is possible that bilateral discussions between the FSA and the vendor could help provide that assurance. The expert group is seen as an ongoing vehicle through which this might be achieved.
 - A specific issue arises where firms are using composite bureau scores as one input to a model that may have been developed internally. There is a danger of bias or otherwise inappropriate weighting being introduced if the firm does not have at least a general idea of the characteristics that contribute to the composite bureau score. Firms should be able to explain why they believe that the statistical

properties and predictive power of models are not adversely affected by possible interrelationships between composite scores and other included characteristics.

17. Standards for appropriate model use

- Key assumptions and approximations
 - Eg granularity of industry/geographic definitions; use of proxies
- Interpretation of outputs
 - Eg can the outputs be treated directly as PD, LGD or EAD; do they need to be transformed; should they be interpreted as cardinal or ordinal measures

18. Known data or other limitations

- Types of obligor for which the model is known to be inappropriate (eg property companies)
- Segments for which development data were not available / treatment of gaps
- Constraints built into the model (if any)
- Suggestions for mitigation
- Vendors should also be encouraged to make clear the nature of any information they are not willing to disclose due to confidentiality considerations

19. Quantitative performance tests

- Vendors should be able to provide performance statistics for their models and to give details of what regular monitoring they undertake to ensure that performance remains acceptable. Out-of-sample and out-of-time performance data will be especially relevant.
- Firms should also demonstrate that the model performs effectively on their own portfolios. As external models are often used in cases where the firm has limited data of its own, it may take some time for the firm to develop sufficient experience to rely solely upon its own performance testing. In such cases, it will be all the more important for the firm to assure itself that the vendor's testing procedures are adequate.

20. Qualitative checks

- The draft Directive requires that, where statistical models are used “*The credit institution shall complement the statistical model by human judgement and human oversight to review model-based assignments and to ensure that the models are used appropriately. Review procedures shall aim at finding and limiting errors associated with model weaknesses. Human judgements shall take into account all relevant information not considered by the model. The credit institution shall document how human judgement and model results are*

to be combined.” (Annex VIII 4 31e). The FSA has acknowledged that this does not require an open-ended review of all possible alternatives but that it should relate to a fit-for-purpose review of factors that may plausibly affect risk assessments but are not covered by the model itself.

- Firms should monitor the extent to which the outputs of external models are being overridden as part of internal review procedures. High levels can be an indication of lack of confidence in the model’s ability to measure risk.
- Firms should also undertake at least a qualitative comparison of the population on which the model was built with the population to which they intend to apply the model. This should be supplemented where possible with quantitative comparisons based on the principal discriminating characteristics.

21. Responsibilities for support and maintenance

- In many cases, risk parameter models are not only initially supplied by external vendors but are also housed, maintained and updated on the vendor’s own systems with appropriate feeds to/from the purchaser’s data. Such arrangements should be subject to normal principles of outsourcing as already required by FSA regulations. Service agreements should include the extent of support that clients can call upon in the understanding and use of the models.
- As techniques for risk modelling advance it is to be expected that vendors will upgrade and enhance their models. Firms and vendors should have a clear understanding of how new developments will be brought in and what entitlement the firm has to receive and/or request specific enhancements.

EXTERNAL DATA

22. Accuracy, completeness and appropriateness

- Annex VII 4 31 of the draft Directive requires firms to “*have in place a process for vetting data inputs into the model which includes an assessment of the accuracy, completeness and appropriateness of the data*”. In this context, and subject to any reciprocity agreements that exist, we interpret accuracy, completeness and appropriateness as follows:
 - **Accuracy** refers to the degree of confidence that can be placed on the data inputs. Data must be sufficiently accurate to avoid material distortion of the capital calculation. This would include a requirement for the data to be reasonably up-to-date.
 - **Completeness** means that data bases provide information that is comprehensive in that it covers all relevant business lines and all relevant variables/characteristics. Whilst missing data for some fields or records may be inevitable, firms should attempt to minimise their occurrence and aim to reduce them over time subject to any data protection act and model performance issues,

for example, d.o.b. may not be available in all cases but its omission does not materially impact the model performance.

- **Appropriateness** means that the data contains no quantitative or qualitative biases that make it not fit-for-purpose.

- Firms should have their own standards for ensuring data quality and strive to improve them over time. They should also measure their performance against these standards. When using data supplied by an external vendor, the firm may not be in a position to carry out thorough checks on data quality by itself. It will need to rely to some extent on the vendor to provide assurance that it manages the quality of data to a standard compatible with the Directive's requirements. However, there are still some checks that the firm itself can and should carry out. These might include reviewing data sets for the amount of missing data; implausible values; or significant changes from previous periods.

23. Representativeness and comparability

- It is also essential that a firm using external data should ensure that the data is appropriate for the use to which it is being put. In particular, that the data is representative of the firm's own population of obligors.
- The Directive has several explicit references to data needing to be "representative of" or "comparable to" the firm's own portfolio. In general, comparability should be based on analyses of the population of exposures represented in the data, the lending standards used when the data was generated and other relevant characteristics in relation to the corresponding properties of the firm's own portfolio. Other relevant characteristics could include the distribution of the obligors across industries, the size distribution of the exposures and similarity with respect to the geographic or demographic distribution of the exposures.
- Similar considerations would apply where data from one region was used as a guide to behaviour in other regions, as for example where a firm used house price movements or borrower behaviour in the South and East in its assessment of risk in the North or Wales. Firms should be able to explain why it was reasonable to assume comparability.
- Firms may not be able to obtain full details of external data for comparison purposes but should nevertheless be able to undertake quantitative comparisons on the basis of at least a subset of plausible criteria. In assessing the comparability of lending standards, commercial confidentiality is likely to preclude detailed comparisons. Even so, firms should be able to obtain from vendors sufficient information about the nature of other contributors to pools of external data to be able to assess whether those pools could reasonably be taken as representing similar exposures to their own.

24. Consistency of definitions

- Firms may want to use a mixture of external and internal data when developing and using their risk models. They should take care to ensure that the definitions used in compiling different sources of data are consistent. Whilst this is an explicit requirement of the Directive in respect of the definition of default, it would seriously undermine the

credibility of risk parameter estimates if, for example, different definitions of "gearing" or "market value" were merged within a single data set.

25. Data storage and IT requirements

- External data (including outputs of external models) is subject to the same requirements for data storage as any other type of data (Annex VII 4 37-40). Firms IT systems should be capable of storing and retrieving the relevant data and subject to adequate contingency and disaster recovery planning.

How the Information should be supplied

26. The FSA does not intend to specify a particular format in which firms should collect and supply information relating to external models and data. This is a decision for the industry and the FSA does not intend to specify that this must be done nor any particular format in which it might be done.
27. However, the group considered that the vendor grid, included as Appendix 1, remained a helpful way in which information could be provided with advantages for both vendors and firms if this becomes a standard part of their service and this seems to be working satisfactorily with those vendors that have trialled the approach.
28. Similarly, firms may find it useful to develop their own internal policies on the use of external models and data in general. Documentation relating to specific models and data can then refer to firm-wide policies, highlighting only any deviations from those policies that apply.

Role of the Expert Group going forward

29. Good progress has been made toward developing a suitable framework for capturing the requisite information where firms are using external models and external data. However, the group felt that it would further assist UK implementation if this group, or a similar group, were to continue as a vehicle which engaged with external model and data vendors.
30. The status of this group would need to be agreed, but it was felt that a mix of FSA and industry representatives would facilitate ongoing dialogue and ensure appropriate and consistent operational standards were met.

Appendix One Draft information pack

This table explores some of the areas that we envisage being covered in a vendor information pack. A separate grid is to be completed for each model that the firm uses in calculating regulatory capital, as well as for credit risk management purposes.

The pack applies to generic and firm specific models and is split into 4 parts:

- Part A covers model development;
- Part B covers model validation;
- Part C covers operational standards and responsibilities, including how the model builders recommend the model should be used ; and
- Part D covers planned future development and other relevant information.

Part A : Model development		
	Heading	Description
A.1.	The type of portfolio the model has been developed for	Designed to capture model characteristics, including model time horizon. Show customer type e.g. wholesale customers, medium corporate, small businesses, residential mortgages, purchased retail receivables, qualifying revolving exposures. May be more granular, e.g. buy-to let.
A.2.	What the model is designed to be used for	Show process that the model supports e.g. origination/credit application, account management to detect early stage delinquency, recovery/collection scorecard.
A.3.	What is the model performance definition	What is the question the model is trying to answer in quantifiable terms, e.g. to predict default, two cycles down delinquency, etc..
A.4.	What is definition of default	Describe definition of default used in model development.
A.5.	How the model is developed	Describe how model was built e.g. in-house, bespoke/ custom (by external vendor), pooled (closed user group) bureau/ credit reporting agency, expert/ judgmental.
A.6.	Key assumptions and approximations	Detail the main assumptions used in model build to cover market conditions or other known factors introducing uncertainty. [Question for firms - are these assumptions fit for purpose?]
A.7.	Use of data/ other models	Describe the dataset used for model creation. Where a model includes as a component another model, e.g. a risk score from a credit reporting agency (external) or a behavioural bankruptcy score (internal), this should be made clear. If other internal or external data, (i.e. in addition to that used in the model) are used in combination with scores to decision credit exposures, e.g. credit policy rule of 'no new loans to applicants with CCJs', the accuracy, completeness and delivery mechanisms for such data should also be discussed.
A.8.	Type of delivery mechanisms for data	Describe internal and external sources.
A.9.	Known data or other limitations	Detail any data or other issues arising, including how to mitigate any known limitations. Full and frank disclosure is encouraged.
A.10.	Additional considerations	Describe the following: Technical specifications for calculation of scores/model values, Software for calculation of scores/model values; Model outsourced to 3rd party vendor). output (e.g. score and reason factors, if ongoing delivery.

Part B : Model validation		
	Heading	Description
B.1.	Quantitative tests to demonstrate current/ continuing appropriateness of model for individual firms	Evidence the key tests undertaken to confirm accuracy & power of model. Show monitoring/tracking and archiving of performance data for re-development as needed. List key reports used for management review.
B.2.	Validation steps	Factual list to include: Number of defaults for each time period. Number of years covered.
B.3.	Qualitative review for firms regarding process in which models are used in practice (checks and balances)	List operational checks and balances. Describe how users can influence model outcomes.

Firm and vendor responsibilities and accountabilities

Firms should indicate who is responsible for delivery of the models and different types of data they use. For example, a model developed by one outside vendor may use data provided by both the firm (internal) and another outside vendor (external) while software calculating scores and/ or using scores in decisions may be housed at the firm or with a third party processor.

Part C : Operational standards and responsibilities		
	Heading	Description
C.1.	How the model should be used	Describe minimum or good practice standards. Provide examples of good practice. Confirm use of model is for portfolio/ purpose it was designed for. (one page or less)
C.2.	Operational standards (model and data delivery support)	Show standards of support: initial and continuing. Detail any special features.
C.3.	Impact and influence (vendor/firm liability)	Describe the extent of vendor liability, obligations and responsibilities.

Part D Future developments & other relevant information		
	Heading	Description
D.1.	Market influence	Provide any relevant comment on market standing and overall market development.
D.2.	Latest developments and initiatives	List developments in risk practice. Summarise plans to rebuild pooled models. Describe availability of new data sources.
D.3.	Contribution to stress tests, including market and procyclicality regulatory concerns	Describe process, and good practice.