

Draft response

FRC Board for Actuarial Standards “Modelling: Consultation Paper” November 2008

The emerging actuarial standard on modelling of the Financial Reporting Council’s (FRC) Board for Actuarial Standards (BAS) comes at the right time and will set the scene for some time to come, reaching beyond the British Isles. Groupe Consultatif would like to express their appreciation for the fine work of the modelling advisory and working groups.

Besides the direct responses to some of the various questions asked at the end of most sections, we will also comment on some specific paragraphs.

To 2 Purpose and Scope

1. Will the proposed purpose of the modelling TAS as set out in paragraph 2.9 help to ensure that users of actuarial information can place a high degree of reliance on its relevance, transparency of assumptions, completeness and comprehensibility?

GC answers this question to the affirmative. Before answering the question proper let us comment on an aspect of modelling that was possibly not enough stressed in the paper, namely the side effects that come with modelling activity.

Modelling for whatever purpose tends to discipline thinking of those active in it and helps them to better understand the topic, business or risk. One could go further and claim that quite generally models provide the language used in dialogue about reality, in our case insurance actuarial reality. Seen from this perspective the BAS’s definition of a model (as in 2.13) is possibly too narrow. The value of conceptual models for example might lie primarily in gaining a deeper insight into business reality or laying the ground for decisions.

This links directly to paragraphs 1.20ff, which comment on the theme of how well models are or have to be understood. Firstly, we think that a description of reality is always based on a preconceived model of it, i.e. that the tendency to view every problem in the light of a nail if you have a hammer and nothing else is inescapable. We would go further and claim that the problem of inappropriately using a model, is not primarily a lack of understanding the model, but lacking to understand reality enough. If you lack the language to express reality, what we claimed models are, you cannot say something about it. Models capture our understanding and inadequate or inappropriate models most often are representative of our insufficient knowledge and insight.

In our view paragraph 2.9 expresses well the requirements one should pose on models’ based actuarial information. In light of our understanding of one role of models as an expression of one’s perception of reality the requirements can be read as requirements on models as well as requirements on those that design and implement models, use and explain them or their outputs.

2. Will the definition of a model given in paragraph 2.13 encompass the full range of models that contribute to actuarial information?

In a strictly mathematical sense we believe that the BAS definition encompasses the full range of models that can contribute to actuarial information. However, an average reader of the modelling standard might probably be misled to thinking that models are calculating devices, the purpose of which is to produce some output figures. This would be too narrow a definition, in our view. A model primarily has to give some simplified representation of reality and serve some purpose. For example the model of a planned high rise building in the City of London serves to give the viewers an idea of how it will look and lets them decide whether they will like it or not. Presenting the business model of a new life insurance company might be aimed at convincing investors to invest into the venture and the risk model of a mature firm could assure its board of being within the given risk tolerance.

In particular, the description that a model needs to “... [consist] of a set of formulae and algorithm ...” is probably too constraining, whereas not requiring explicitly a modelling purpose might miss

pragmatic opportunities. 2.31 explains why it is advantageous to mention the modelling purpose: “In particular, a model that is designed to answer a particular narrowly defined question may well not meet the standard if it is used for another purpose.”

We therefore recommend to explicitly add to the definition of model the requirement to describe the modelling objective. It will then also be easy for mentioning a criterion to discern simple from too simple models, namely that a model has to be “fit for purpose” or “appropriate for purpose”. (As additional support for our recommendation, please note the documentation requirement to mention purpose in 3.15.)

2.14 and 2.15 discuss the relationship of the BAS definition to the one of an internal model as given by CEA/GC. If the BAS definition of model is consistent with its uses in common language, science, mathematics and of course actuarial work, it can't be that an “internal model” is more general than a model in general. A white house is a house that is white, and an internal model must a model that is of a special internal kind. Admittedly, the authors of these comments had similar difficulties at first with the CEA/GC definition. However, these can be resolved and the CEA/GC definition be made consistent with the BAS one, if one formulates slightly differently, thereby clarifying what must have been meant:

“An internal model is a *model of the* risk management system developed by an insurer to analyse the overall risk position, *to value all assets and liabilities*, to quantify risks and to determine the economic capital required to meet those risks.”

We additionally added a reference to value measurement, clarifying another possibly misleading omission of the CEA/GC definition.

To 3 General Concepts and Principles

3. Do respondents have any comments on the proposals in section 3, especially those in paragraphs 3.15, 3.22 and 3.27?

Yes, we agree, recognising the difficulties one encounters when trying to define “the right amount of information”. It is a fact that important information is often hidden between a lot of unimportant one, so quantity does not solve the problem in general, but obviously too little information can just as well create unbearable opacity. We would tend to advise on rather more than less to be documented, because redundancy creates consistency and plausibility checks. The potential risk of overload of information can be countered by requirements to have various kinds of summary documentation. (As a comparison: well written abstract, introduction and main text allows the reader of a, say, scientific paper to go into details as much as she wishes to.)

4. Do respondents have any comments on the definition of materiality that is proposed in paragraph 3.5?

We think this is a well chosen definition, but we have doubts whether it could be applied easily in practice. (For this definition to be practical, we think that complete documentation would have to exist at the outset. Most documentation on the other hand is incomplete in reality. It could, say, miss arguments contra a case, but contain the pro arguments, tilting decisions in the pro direction. Leaving out the pro arguments could be material, but overall the documentation could be more balanced and therefore fitter for making decisions.)

5. Should the modelling TAS include principles concerning the need for documentation as discussed in paragraphs 3.9 to 3.18?

Yes.

To 4 Representing the Real World

6. Do respondent have any comments on the proposals concerning relevance and parsimony that are presented in section 4, especially those in paragraphs 4.12 and 4.17?

We fully agree, especially with 4.12 and 4.17.

To 5 Model Inputs and Outputs

Before answering the specific questions, we would like to place some general comments on this section.

In 5.12 it is stated that “[D]ata may fall short of the ideal through incompleteness, inaccuracy or irrelevance”, implicitly claiming that the ideal is complete, accurate and relevant data. We would caution to use such a definition of the “ideal”, before the meaning of complete, but also of accurate and relevant was given. It is the possibly surprising fact that for many kinds of insurance few data have to be known, without compromising its viability. As an example take term insurance protecting a mortgage. It is not uncommon to grant cover based on just the bare minimum, let alone complete and possibly even relevant information.

Data used for modelling might not only be incomplete because of conscious decisions, but because it might be so by its nature. Take incurred, but not yet reported claims. By the very nature of claims data, it is incomplete and the very reason for some actuarial models to exist.

The other general comment to this section is on the use of “uncertainty”. In 5.4 you write “[f]inally, methods of measuring risk and uncertainty are discussed.” When discussing risk and uncertainty one should mention that there exist non-measurable situations. The section leaves a bit too strongly the impression that everything should be quantifiable, if only one tries hard enough. It is important to understand that for some factors of interest not even a distribution can be estimated.

7. Do respondents have any comments on the proposals concerning inputs and outputs that are presented in section 5, especially those in paragraphs 5.17, 5.28, 5.29, 5.35, 5.42 and 5.51?

5.17: As we have already commented the requirement for data to be complete, accurate and relevant is meaningless unless a reasonable definition of completeness is given. In fact, this requirement does not address the actual actuarial problem for how to deal with incomplete or inaccurate data.

Whereas we agree with the proposed principle in 5.28, the principle in 5.29 seems to be too onerous.

5.35 seems to be almost self evident, were it not for 5.34, which we did not fully understand.

Whereas we sympathise with the requirement of full explanations, the requirement in 5.42 (like the previous one in 5.29) seems to be too onerous to us. We would generally prefer a principle applying to data and models saying that professional judgement will have to be applied whether full explanations are needed or can be safely left out.

5.51 we fully agree that a best estimate, whatever its definition, should be unbiased and independent of the model purpose.

We found the discussion of the various definitions that apparently are used for “best estimate” useful. Different from the view expressed in 5.53 we do not think that the issue is whether best estimate refers to the mean, median or mode. Depending on the issue at hand a mean, a median or a mode might give the right answer to the question and best estimate refers to the process determining it. It seems to us that this is what one finds in practice: “best estimate” describes the estimation process and not so much the estimated value.

We would therefore propose the use of appropriate language, which possibly solves the issue expressed in 5.57. For example within actuarial texts one could speak of “best estimate mean (expected value)”, “best estimate median” or “best estimate mode”.

We are not familiar with the view expressed in 5.50, but would nevertheless mention that e.g. the mean m of a random variable X , i.e. mathematical expectation $E(X)$, minimises the function $f(x')=E[(X-m')^2]$ (if these latter integrals exist).

8. Should the modelling TAS include:

a) any requirements relating to the disclosure of known or suspected shortcomings in data, over and above those expected to be included in the reporting TAS?

b) requirements to provide an estimate of the effects of any data shortcomings, and that any compensating adjustments should avoid bias?

To 8a) No, we don't think so. Shortcomings should be documented and the models / methods used to overcome them described and possibly qualified and quantified, but TAS can safely omit more constraining rules, at least for the moment.

To 8b) Yes, the TAS should make clear the principles to follow to justify using the results of actuarial modelling. As using unbiased estimates, i.e. in avoiding safety margins, a paradigm change to past actuarial traditions is proposed, this should be made explicit and supported by principles. At the same time, at least for some transit period, it is necessary to remind professional that in place of safety margins uncertainty is taken into account in the risk buffering economic capital.

9. Should the modelling TAS include a requirement that, if data is grouped, the effects of the grouping should be quantified?

The possible effects of higher uncertainty due to grouping should be disclosed in the same way other measurement uncertainty and risk is disclosed.

10. Do respondents agree that best estimates (and other similar estimates) should be independent of the use to which they will be put?

Yes.

11. Do respondents have any views on:

a) whether biased estimates such as those concerning prudence depend on context?

b) the practicality or otherwise of requiring that the equivalent best estimate be presented alongside every prudent estimate, and the benefits to users of actuarial information of doing so?

a) Would biased estimates be required, they would have to depend on context, as implicitly the bias would have to serve a purpose, which can only be derived from context.

b) Maybe for some transit period, but the general reason why unbiased best estimates should be preferred over those with implicit margins is increased transparency. We would have no objection in asking to split economic capital into a part buffering measurement risk and other uncertainty and a part for buffering the remaining risk.

12. Do respondents have any views on the practicality or otherwise of requiring the use or a range in conjunction with every single point estimate?

Yes, we have views. To increase transparency requiring ranges around point estimates is highly desirable. Requiring such ranges with every point estimate doesn't seem to be practical nor reasonable.

To 6 Fit for Purpose

13. Do respondents have any comments on the proposals concerning the fitness for purpose of models that are presented in section 6, especially those in paragraphs 6.8, 6.12, 6.20, 6.28 and 6.33?

We agree with all the principles set out here. The only proviso we have is with 6.33 that, if the requirement to justify each removal of an outlier is applied strictly, seems a too onerous requirement to us.

In 6.9 the TAS touches on the issue that models are built by humans, but seeing this as a non-technical actuarial matter the paper concludes that human related technical matters should not be

within the BAS' remit. Model review in our view should actually take account of the fact that models are designed, implemented and used by humans. Only seemingly this is not a "technical actuarial matter". The BAS' view on this relies too strongly on the belief that truth can be determined in an absolute manner. In the same context we would like to mention that many actuarial activities rely on implicit assumptions, which are often dependent on local actuarial traditions and fashions of the time. No doubt models depend on current knowledge and understanding that is changing over time. Reviewing a model not taking into account this human context might miss essential features.

14. Are there any types of model that cannot be implemented in such a way that they exhibit reproducibility?

Maybe, even though we cannot think of any actuarially useful ones. (As a possible, non-actuarial example: there exist quantum ciphers which should not be reproducible.)

15. Should the modelling TAS include a principle concerning back testing?

a) Are there any models for which back testing is impossible?

b) Are there any practical difficulties that might arise if back testing were to be a requirement?

Models are simplifications of reality and it is legitimate to require some "reality check" assuring users that the simplification was not overstretched. Back testing is one such check and when it is feasible it is a useful one. Take for example claims resulting from motor accidents between £1000 and £100'000. There are plenty of accidents in a period of a few years to sample indicative statistics to calibrate a model to the expected distribution curve and to back test this model with either future years experience or with another past period's experience. If on the other hand the model is supposed to indicate very large claims in excess, say, of £ 100 million, it is a daring job to calibrate the model and close to impossible to back test, because too few events of such magnitude happen.

b) Yes, practical difficulties might arise, because the requirement to comply with standards without being allowed to apply discretion – or professional judgement as many would say - would soon result in hypocritical behaviour rendering the rest of the standards equally doubtful.

16. Would it be desirable and practical for users of external models to document the judgements they make, the checks that they perform and other relevant matters, and include explanations of the inputs, outputs and limitations in the same way as they would for models that they themselves have developed? Respondents who believe that this would not be practical should suggest alternative ways in which the objective set out in paragraph 2.9 could be met by users of external models.

Our view is that this is not only desirable and practical, but absolutely necessary. If double standards existed, particularly with easier to comply requirements for external models than for internal ones, not only would this give disincentives designing, implementing and using internal models, but the desired side effect that comes with modelling, namely learning about one's own business and its risks and thereby getting better control over them, would disappear (with the negative consequences which should be avoided).

17. Do respondents agree that requirements for robustness and reasonableness would not be enforceable and could have undesirable consequences?

We agree with the opinion expressed in 6.52, but we don't think that the matter should be left without any standards. Public disclosure explaining why a firm is convinced about the reasonableness of the assumptions underlying its internal models should be put in place of difficult or impossible to comply criteria.

To 7 Limitations of Models

18. Do respondents have any comments on the proposals concerning the limitations of models that are presented in section 7, especially those in paragraphs 7.29 and 7.41?

No, we agree with the views presented in 7.29 and 7.41.

19. Does the discussion in paragraphs 7.7 to 7.24 include all the major sources of limitations in models?

We tend to agree that all the sources or model limitations and errors are listed, provided “errors from expert judgement” contains the situation that the designer, implementer or user of a specific model is lacking adequate knowledge and skills for the activity. This is in line with our already expressed view that model validation and review has to be mostly scrutiny of the professionals involved in modelling or user activity.

20. Do respondents have any comments on the proposals concerning the limitations of models that are presented in section 7, especially those in paragraphs 7.38 to 7.42?

We have the same preference as the BAS Board, i.e. the principle expressed in 7.41, which is somehow in the middle between requirement no explanations of limits and extensive waiver of all possible shortcomings.

21. Should the modelling TAS identify specific types of limitation that should be explained in actuarial information?

Yes, particularly because the TAS would then have to identify essential shortcomings of human beings and actuaries, in particular.