(This is an non-binding English translation of the "Merkblatt zu Modelländerungen bei internen Marktrisikomodellen" as of 19 April 2010)

Guidance Notice

19 April 2010

on model changes

to internal market risk models

Contents

1 Preliminary remarks

The Solvency Regulation[1] allows institutions,[2] following permission by the Federal Financial Supervisory Authority (*Bundesanstalt für Finanzdienstleistungsaufsicht* – hereinafter: BaFin), to use internal risk measurement models to determine the regulatory (partial) capital charges for market risk positions in the trading book (internal market risk models, hereinafter: MRM). The suitability of the MRM as a prerequisite for permission

[1] Regulation governing the capital adequacy of institutions, groups of institutions and financial holding groups (Solvency Ordinance - *Solvabilitätsverordnung*) of 14 December 2006 (Federal Law Gazette (*Bundesgesetzblatt*) 2006, part I, No 61, p 2926), in the current version.
[2] This Guidance Notice applies accordingly to groups of institutions and financial holding groups.

sets requirements both for the quantitative model and for its integration in the risk management system.

It is in the interest of each institution and of the Deutsche Bundesbank and BaFin (Deutsche Bundesbank and BaFin hereinafter referred to together as supervisory agencies) that an MRM takes the special attributes of an institution into consideration and is adjusted to the changing overall situation in order to adequately capture the respective risk structure. Under section 313 (3) sentence 1 of the Solvency Regulation in conjunction with section 317 (2) (4) and (10) of the Solvency Regulation, an institution is required to constantly review its MRM and to adjust it as and when necessary.

Once initial approval has been given for an MRM, regular adjustments must be made to reflect, for example, changes in business activities or organisational structure, newly available data, validation results or other new information. When approval has been given for the MRM, the institution is responsible for recognising the need for adjustments and for duly implementing the necessary model changes.

The purpose of this Guidance Notice is to interpret, amongst other things, the provisions of section 313 (3) sentence 4 of the Solvency Regulation from the viewpoint of the supervisory agencies and to specify the supervisory requirements in dealing with model changes. Extensions to the existing MRM likewise constitute model changes within the meaning of this Guidance Notice.

This Guidance Notice replaces the repealed Guidance Notice on changes to internal market risk models of 7 March 2006 under Principle I concerning institutions' own funds (hereinafter: Principle I), the forerunner of the Solvency Regulation, and introduces the model extension as a further category. The internal model change policies submitted by the institutions to date will, as a general principle, continue to apply until it has been revised.

This Guidance Notice is designed to support institutions with the continuous development of their MRMs through the most transparent and efficient model change procedures possible and clear-cut communication procedures between the institution and BaFin. Furthermore, it seeks to ensure administrative consistency.

The categorisation of model changes into different degrees of radicality, which the institution is required to observe vis-à-vis the supervisory agencies both in terms of time (written application/notification before or after the model change is implemented) and in terms of the radicality of the model change (with or without renewed approval) is based on the principle of reasonableness.

In principle, any change to a confirmed MRM would formally result in a new model, and any existing confirmation of suitability (in the form of permission to use an internal risk model to determine the regulatory (partial) capital charges for market risk positions) would be rendered obsolete. However, the MRM is a key element of how an institution organises its risk management operations and, as such, is subject to constant change. Section 317 (4) of the Solvency Regulation requires each institution to review, on a regular basis, the suitability of the MRM for transactions covered by it and to adjust the MRM as and when necessary. Thus, supervisory approval also certifies that the institution is capable in principle of properly carrying out future model changes. It follows from this dynamic view of the model that the confirmation of suitability that has been given once must, in principle, continue to apply independently of model changes, unless these changes are so profound as to call the model’s suitability into question entirely. For this reason, each institution is always responsible for model changes. With the model's suitability, BaFin confirms that the institution is capable in principle of properly carrying out a model change. However, this does not mean that such change may be made without a graduated communication cascade and involving the supervisory agencies.

Each institution, in order to meet these permanent supervisory requirements for its internal MRM, draws up an internal model change policy for changes/extensions to the MRM (see section 4) and submit it to the supervisory agencies. In drawing up this model change policy, the institution clearly defines the principles of its model refinements and lays down internal rules for allocating model-changing measures to the degrees of radicality of model changes. As a general principle, BaFin deals with changes which are covered by the institution's model change policy according to the model change category assigned by the institution. If the institution does not submit an internal model change policy, it must submit each planned model change to the supervisory agencies for prior approval (permission) before implementation.

Excursus

Notification requirements under the Solvency Regulation versus requirement to obtain approval under Principle I

Pursuant to section 313 (1) and (3) sentence 4 of the Solvency Regulation, the supervisory agencies must be notified in writing of changes to the risk model. At this point, reference is made to the change in wording in section 313 (3) sentence 4 of the Solvency Regulation, according to which "BaFin and the Deutsche Bundesbank shall be notified in writing of any changes pertaining to the risk measurement model", compared with Principle I. In contrast, section 32 (3) sentence 3 of Principle I reads as follows: "Significant changes to risk models require a renewed confirmation of suitability pursuant to subsection (1)." As a result of the rewording, given its supervisory power to monitor risk models pursuant to section 313 (1) sentence 1 and subsection (3) sentence 1 of the Solvency Regulation, BaFin is not subject to any legal restriction with regard to how it ultimately evaluates model changes. The retention of the requirement of supervisory approval for all model changes to be categorised at least as significant even without explicit wording, derives from the preamble and the legislative intention of the provision. Explicitly, the institution is subject only to a notification requirement that is similar to a procedural requirement, without prejudice to the content-related and procedural supervisory requirements for a model change.

2 Classifying model changes

Changes to an MRM include both modifications to the mathematical-statistical methodology as well as changes to all other factors that are relevant to fulfilling the requirements pursuant to sections 313 to 318 of the Solvency Regulation. The manner in which planned model changes are dealt with varies according to their degree of seriousness. Nonetheless, all model changes must be adequately documented.

In principle, the degree of radicality of a model change is determined by the materiality of its effects. These effects may be quantitative (change of the VaR) or qualitative (change of processes). No planned model change may be considered on its own; such a change must be evaluated in the context of changes that have gone before or are applied for at the same time. The effect of a model change considered on its own not to be material can be material in the context of other model changes, and must then be dealt with in accordance with the more radical category.

Irrespective of the institution's internal classification, the supervisory agencies may determine a new degree of radicality for a specific model change and deal with it accordingly. Changes as a result of basing the model on weaknesses that were identified by the supervisory agencies are not deemed to be model changes within the meaning of this Guidance Notice. Communication between the institution and the supervisory agencies regarding such model changes is conducted as part of the procedure for following up deficiencies and may differ from communication regarding model changes. Nor do changes as a result of amendments to the underlying legal provisions (eg Solvency Regulation) constitute model changes within the meaning of this Guidance Notice. In such cases, communication between the institution and the supervisory agencies as well as the steps necessary to obtain approval (eg supervisory examinations) may deviate from the general procedure for model changes.

The supervisory agencies classify model changes according to the following four categories:

1. extensions,
2. material model changes,
3. significant model changes,
4. insignificant model changes.

Given the sheer range of possible model changes, there is no universal definition of the above categories which can be applied unambiguously in each individual case. It is the institutions' responsibility to define distinguishing criteria that are appropriate to their model and document them in their internal model change policy. BaFin will formally review this policy in terms of its compatibility with BaFin's own interpretation, although without the arrangements made becoming binding on the supervisory agencies as a result. BaFin thus reserves the right to allocate concrete model changes which the institution has classified in one category to another category and to deal with it accordingly. The examples shown in the annex are intended to illustrate for the institutions the contents of the above categories.

Depending on how the MRM change is categorised, different requirements apply to communication between the institution and the supervisory agencies.

3 Communication with the supervisory agencies

The necessary applications or notifications must be submitted to BaFin in writing, and copies sent to the Deutsche Bundesbank.

Notifications as well as applications for model changes (significant and material model changes as well as extensions) are also to be sent electronically to the following addresses well in advance so that initial agreement on further action may quickly be reached.

Recipient	Deutsche Bundesbank Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)		
by e-mail	B33_MRM_OPR_IT@bundesbank.de	Re.	<Name of the bank>: Model change

	qrm2@bafin.de		<date of planned implementation>
by post	appropriate Deutsche Bundesbank Regional Office		
	Bundesanstalt für Finanzdienstleistungsaufsicht - Abteilung QRM - Postfach 1253 53002 Bonn		

Documentation describing the model change as well as the cause, objective and effects of the change are to be attached. This may include, amongst other things, methodological concepts, amended model change policies or organisational structures and commented outcomes from benchmark calculations. The benchmark calculation comparing the old and new value-at-risk measures for each model change (significant and material model changes as well as extensions) must cover a period of as a rule 60, but no fewer than 10, directly consecutive working days. A description of the planned procedure and timeframe for implementation is to be attached for model changes.

Pursuant to the provisions of the Act concerning the Federal Financial Supervisory Authority (*Gesetz über die Bundesanstalt für Finanzdienstleistungsaufsicht (Finanzdienstleistungsaufsichtsgesetz-FinDAG)*) and of the Regulation concerning the Imposition of Fees and Allocation of Costs pursuant to the Act concerning the Federal Financial Supervisory Authority (*Verordnung über die Erhebung von Gebühren und die Umlegung von Kosten nach dem Finanzdienstleistungsaufsichtsgesetz*), a fee is charged for supervisory measures in connection with the granting of permission for planned model changes.

3.1 Communicating market risk model extensions

Before extending a model, the institution must submit to the supervisory agencies a written application on the basis of which the suitability of the extension is examined and decided on by BaFin. The model must be approved again (ie renewed confirmation of suitability given) before an extension is implemented. As a general rule, this approval is issued only after the planned extension has been examined.

3.2 Communicating material model changes

When changes to the MRM which may have a material effect on the calculation of the regulatory capital requirement are planned, a written application must be submitted to the supervisory agencies before these changes are implemented. Any material model change must be approved by BaFin before it is implemented in the model that has already been approved as suitable.

Documentation describing such model changes and their effects are to be attached to the application. This should include, amongst other things, the methodological concept and the commented outcomes from benchmark calculations. The planned procedure for productive use is also to be described.

As a general rule, approval is given only after the planned change has been examined. It is therefore advisable to apply to BaFin for approval well before the planned implementation of the material change. Where material model changes have to be decided on, as a general principle BaFin issues a new separate notice of approval.

3.3 Communicating significant model changes

In good time prior to implementation (ie allowing a reasonable period of time for the supervisory agencies to ascertain and evaluate the circumstances), the institution advises the supervisory agencies in writing of the planned significant change to the model, attaching documentation describing the change and its effects. This should include, amongst other things, the methodological concept and the commented outcomes from benchmark calculations. Based on the documentation submitted, BaFin notifies the institution informally whether and to what extent the supervisory agencies have misgivings about the significant change. The institution may not implement the model change without BaFin’s relevant notice (= approval in principle subject to later examination).

3.4 Communicating insignificant model changes

Insignificant model changes may be implemented without previously consulting BaFin. These changes must be clearly documented and be communicated cumulatively in writing to the supervisory agencies at regular intervals of at least once a year.

Table 1 Schematic overview of the procedural cascade for the different categories of model changes

Model change category	Institution notifies in writing by submitting	Institution requests approval		Supervisory agencies examine *before* implementa-tion	BaFin issues new notice of approval
		before implementation	after implementation		
Extension to the model	application	×		yes	yes
Material change	application	×		in principle, yes	in principle, yes
Significant change	notification	×		no	no* *approval in principle, subject to later examination
Insignificant change	subsequent notification (eg annually)		×	no	no

4 Internal model change policy

Every MRM institution draws up an internal guideline on dealing with model changes (hereinafter: model change policy) and submits it to BaFin. This model change policy contains appropriate distinguishing criteria for determining the degree of radicality, describes the process for implementing and documenting model changes and names the parties responsible. A copy is to be sent to the Deutsche Bundesbank.

Changes to the MRM are to be assigned to one of the above-mentioned categories of radicality in accordance with the model change policy and adequately documented. The extent of documentation depends on the type, scope and complexity of the model changes.

The model change policy must be amended as and when necessary to reflect also BaFin's published interpretations of the Solvency Regulation. BaFin must be notified of fundamental model change policy amendments in the same way as first-time notification of the model change policy.

5 Examples

The following examples are intended only as a general guide to the different categories of model changes. The list is therefore not exhaustive. Each institution must specify distinguishing criteria in its model change policy (see section 4). The classification of a specific model change determines the communication requirements vis-à-vis the supervisory agencies (section 3).

5.1 Examples of extensions

a) Extensions to the scope of application of the MRM

- abandonment of previous partial use for individual locations (eg foreign branches)
- abandonment of previous partial use to determine the partial capital charges for market risk positions (eg adding currency risk, adding specific equity price risk)
- integration of portfolios (eg in the case of portfolio acquisitions and corporate takeovers)

b) Extensions to the model

- introduction of an aggregation scheme (if there was previously no aggregation scheme, or only a simple aggregation scheme that needs to be replaced by an improved one)
- modelling of (credit) spread risk
- modelling of event risk
- modelling of other market risk positions (eg weather derivatives) within the meaning of section 2 (3) sentence 2 number and section 4 (7) of the Solvency Regulation.

5.2 Examples of material model changes

a) Material changes to the quantitative model

- fundamental changes in the procedures, eg change in the basic method, switch from Monte Carlo simulation to historical simulation (or vice versa), switch from analytical procedures to simulation-based procedures (or vice versa)

- switch from a sensitivity-based approach to an approach based on a revaluation of financial instruments (or vice versa)

- fundamentally new statistical methods and substantial changes to the aggregation scheme

b) Material changes to the risk management or risk controlling system

- fundamental change to the organisational and operational structure of risk management or risk controlling

- fundamental change to external data sources or the IT data landscape, in particular to the interfaces

- substantial changes to the market data supply processes

- outsourcing or insourcing of components which are material to calculating risk, eg

    - obtaining market data relevant to calculating risk and clean P/L

    - the switch from licence-based use of a system (computational module) to use of an application service provider (ASP))

- comprehensive technical or methodological changes to the risk management process (eg migration of the calculation of VaR to another technical infrastructure)

c) Other material changes

- all other model changes which lead to an abrupt change of VaR of 20% or more for the entire scope of application of the risk model, or for at least a sub-portfolio that is significant in terms of the overall risk

5.3 Examples of significant model changes

a) Significant changes to the quantitative model

- significant changes to statistical methods, eg

    - changes to the procedure for determining the covariance matrix, in particular by a different weighting of the time series

    - introduction of variance reduction methods

    - changes to the algorithms to generate the random figures

- the introduction of additional risk factors as a result of the inclusion of new products, the risks of which cannot be captured using the current model
- changes in the assumptions about the joint distribution of risk factors
- fundamental changes in the selection or definition of risk factors, eg switch from zero curves to par rates or swap curves, or vice versa
- change in the number of risk factors in a part of the risk modelling in which, for example, there was previously only one risk factor (eg implied volatilities)
- changes to the mapping procedure, whether for the entire portfolio or only parts of it
- substantial change to the valuation method with regard both to the economic P/L and to the clean P/L
- substantial change to the procedure for calculating changes in the value of the portfolio via backtesting

b) Significant changes to the risk management or risk controlling system

- structural changes to the core processes of risk management or risk controlling, in particular with regard to P/L calculation, VaR calculation, new product process, design of stress tests, reporting process and setting of limits
- change of the market data provider for input data for the risk model
- model changes in the form of extensive projects which will run for an extended period and may include several locations are to be classified in their entirety as model changes which are “significant and therefore require agreement”.
- fundamental amendments to the model change policy
- opening and closing down of trading locations
- substantial changes to the IT system with regard to data and interfaces
- transfer of significant product groups to another front office system

c) Other significant changes

- all other model changes which lead to an abrupt change of VaR of 10% or more for the entire scope of application of the risk model, or for at least a sub-portfolio that is significant in terms of the overall risk

5.4 Examples of insignificant model changes

a) Insignificant changes to the quantitative model

- introduction of individual new risk factors, eg exchange, change or addition of nodes along a yield curve as a risk factor

– introduction of new risk factors which affect business areas that have so far not been modelled, eg in connection with new products in the test phase, eg business constraints

– regular update/extension of the "reserve parameters" in keeping with market conditions, eg bid/ask spreads, liquidity haircuts on sales prices

– removal of individual risk factors

b) Insignificant changes to the risk management or risk controlling system

– minor changes to the existing system architecture – eg with regard to data flows and IT components – which result, for example, from a version change but have no effect on valuation methods or the calculation of sensitivities

– new stress tests/scenario analyses