

Position paper of the
Association of German Banks
on retaining model-based capital charges

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Contents

1. Summary	3
2. Introduction	4
3. Loss of confidence in internal models – how did it happen?	5
3.1 Market risk models	5
3.1.1 <i>Performance in the financial crisis</i>	5
3.1.2 <i>Divergence of model results</i>	7
3.2 IRB models	9
3.2.1 <i>Performance in the financial crisis</i>	9
3.2.2 <i>Divergence of model results</i>	10
4. Alternatives to internal models	12
4.1 Overview	12
4.2 The leverage ratio	13
4.3 Regulatory standardised approaches	15
5. Restoring confidence in internal models	17
5.1 Overview	17
5.2 Role of supervisors in restoring confidence	17
5.3 Enhancing transparency	18
5.3.1 <i>General considerations</i>	18
5.3.2 <i>Market risk models</i>	18
5.3.3 <i>IRB models</i>	18
5.4 A comprehensive approach to model validation	19
5.4.1 <i>What is comprehensive validation?</i>	19
5.4.2 <i>Market risk models</i>	20
5.4.3 <i>IRB models</i>	20
5.5 Reducing the variation in model results by means of standardisation	21
5.5.1 <i>Dangers of excessive standardisation</i>	21
5.5.2 <i>Market risk models</i>	22
5.5.3 <i>IRB models</i>	23
5.6 Highlighting the positive developments to come out of the trading book review	24
5.7 Strengthening the use test concept	25
5.8 Consideration of model risk	25
5.9 Voluntary commitment by banks to a code of “model ethics”	27
6. Bibliography	28

1. Summary

This position paper analyses

- why stakeholders came to lose confidence in the results generated by internal models,
- whether it still makes good sense, from a prudential perspective, to continue basing capital requirements on internal model results and
- how confidence can be restored, thus meeting a prerequisite to retaining models for prudential purposes.

The paper confines itself to the most important internal models, namely market risk models (VaR models) and IRB models. It is nevertheless likely that its analysis could also be applied to other types of model.

The key conclusions of the paper can be summarised as follows:

- A risk-sensitive and model-based approach to calculating capital requirements for banks should be retained.
- Risk sensitivity is the central objective of the regulatory framework and should be given top priority to avoid creating perverse risk management incentives and regulatory arbitrage. Comparability, with the aim of ensuring the framework's acceptance, should take second place in the hierarchy of objectives. And finally, simplicity should be a guiding principle and binding secondary condition in any form of regulation.
- Not only should model-based approaches be formally retained, but there should also continue to be a capital incentive to use these approaches. This means
 - no overriding leverage ratio and
 - no floor set at too high a level.
- Non-risk-sensitive approaches to calculating capital requirements, such as the leverage ratio, should at most be used in a complementary capacity, serving merely as indicators and not as binding limits. Otherwise, dangerous perverse incentives will arise.
- Risk-sensitive standardised approaches carry dangers, too, because these may overestimate or underestimate the actual risk.
- Even if used in combination, the leverage ratio and standardised approaches are not an adequate substitute for internal models and are thus an insufficient basis for calculating capital requirements.
- Variation across model results is something we need to live with to a certain extent.
- Diverging model results do not, moreover, mean that some of the results are inaccurate. In addition, diverging results have a positive impact on financial stability.
- There are nevertheless some ways in which models could be standardised to reduce divergence, and also other methods of restoring confidence and improving comparability.

- But these should not compromise the ability to use models, or the diversity of the models themselves.

We see the following ways of restoring confidence in model results:

Enhancing transparency
A comprehensive approach to model validation
Reducing the variation in model results through standardisation
Highlighting the positive developments to come out of the trading book review of market risk models
Strengthening the use test concept
Consideration of model risk
A voluntary commitment by banks to a code of "model ethics"

What is more, we assume that restoring confidence is not a task for banks alone: it is also the responsibility of supervisors.

2. Introduction

Since 1997 ("Basel 1.5"), banks have been allowed to calculate their capital requirements for market risk in the trading book using internal value-at-risk (VaR) models that have passed a comprehensive and stringent supervisory vetting and approval process. Basel II and Basel III saw the introduction of further internal models alongside the existing standardised approaches – take, for example, the internal ratings-based (IRB) approach to credit risk under Basel II and the advanced credit valuation adjustment (CVA) approach to counterparty risk under Basel III. During the financial crisis, particular criticism was directed at internal market risk models and, to a far lesser degree, IRB models. This position paper therefore confines itself to examining these two most important categories of model, which are a good starting point for explaining and commenting on the current debate. Much of the following applies to other types of internal model as well.

Banks and supervisors learned many lessons from the sometimes unsatisfactory performance of market risk models in the crisis. This led, at bank level, to a range of improvements in methodology, and also to the realisation that not all products and portfolios are suitable for internal modelling. At supervisory level, Basel 2.5 swiftly ushered in an initial reform with rules that were much better at capturing extreme risks (tail risks) and that increased capital requirements at least threefold. Work on a fundamental trading book review (frequently referred to as Basel 3.5) is also underway and will bring further methodological improvements to regulatory requirements.

Criticism of the performance of IRB models was more muted. True, some critics argued that the models were too slow in making adjustments both in economic downturns and in upswings. But there were understandable reasons for this. Nor did the claim that the models exacerbate procyclicality ultimately prove tenable. So when regulatory

requirements were revised in the wake of the financial crisis (especially under Basel III), changes to the IRB approach were limited to a few tweaks.

Nevertheless, internal models in general are continually criticised as being

- too error-prone,
- only suitable for use in “fair-weather” conditions,
- too variable in their results when analysing identical risks,
- insufficiently transparent for investors and
- manipulated by banks, with the tacit acceptance of supervisors, in order to reduce capital requirements.

As a result, the credibility of model results and thus their suitability for use as a basis for calculating capital requirements have repeatedly been challenged. Take, for instance, the following statement by the academic advisory board at the German Ministry for Economic Affairs: “Behind these flaws (in risk modelling)¹ lie fundamental problems that call into question the system of model-based capital regulation as a whole.”² More recent criticism was expressed by Daniel Tarullo, Member of the Board of Governors of the US Federal Reserve System. In a speech delivered in May 2014, he said he considered the IRB approach problematic. He believed it should be modified or even eliminated altogether.³

It therefore makes good sense to explore the suitability of possible alternatives to basing capital requirements on the results of internal models. The Association of German Banks has concluded that model-based capital charges should be retained. But extensive efforts are needed to restore confidence in model results.

3. Loss of confidence in internal models – how did it happen?

3.1 Market risk models

3.1.1 Performance in the financial crisis

The market disruption which accompanied the start of the financial crisis in the second half of 2007 took the form in banks’ trading units of sharply falling prices with a corresponding impact on their daily P&Ls after a prolonged phase of low volatility. Securitisation instruments rapidly became a cause for concern. Uncertainty grew about the accuracy of the estimated probabilities of default, the default correlations and the loss given default of the underlying loans, and thus also about the probabilities of default and recovery rates of the securitisation instruments themselves. This in turn caused spreads to widen, volatility to increase and market liquidity for securitisation products to dry up. A major exacerbating factor was that many market participants responded in the

¹ Wording in brackets inserted by the author.

² Wissenschaftlicher Beirat beim BMWi (Academic advisory board at the Federal Ministry for Economic Affairs and Energy) (2010), p. 19.

³ Cf. Tarullo (2014), pp. 13ff.

same way (“flight to simplicity”, “flight to quality”). Later on, there were also jump events such as downgrades. Calibrating the above parameters proved especially problematic in the frequent absence of adequate historical default or market data. Unlike in the period before the crisis, even AAA-rated senior or super senior tranches of securitisation instruments, which only start to absorb loss much later than their riskier counterparts, suffered considerably in value as the protective cushion of more junior tranches melted away, necessitating substantial write-downs.⁴

The performance of internal market risk models was not always satisfactory, especially in the second half of 2007 and in the “Lehman year” of 2008. In this period, a number of banks found that the daily loss limits forecast by their models were sometimes significantly exceeded (backtesting outliers).⁵ Since 2009, backtesting results have improved. The performance results of some banks show that losses on certain sub-portfolios were evidently serious enough to have an impact on the overall performance of the banks’ trading units. This demonstrates the extremely strong market disruption which can follow an external shock. In addition, the number of outliers at some banks was far higher than that which would be anticipated. When backtesting a model’s performance, the current clean P&L – $P\&L_t$ – is compared with the previous day’s VaR forecast, VaR_{t-1} . Although the models’ performance sometimes looks bad at first sight, the question nevertheless arises as to whether or not these outliers are really the models’ “fault”, so to speak. By their very nature, models can only do what they have been designed to do (“If you’re in trouble, don’t blame your model”). To function properly, the models needed liquid markets, adequate historical market data and total coverage of all market risks, particularly migration and default risk. These prerequisites were not always met by markets and banks. Anyone using a model has to be aware of its limitations and exercise caution when working with its results. Even Germany’s Federal Financial Supervisory Authority BaFin pointed out that, given the extreme combination of circumstances on the market in connection with the financial crisis, the figures do not automatically lead to the conclusion that the predicative quality of the models is inadequate.⁶

The flaws banks identified in their models following the outbreak of the crisis revealed that a variety of areas needed work and improvement. These improvements have since been carried out. Some examples of model weaknesses which banks have now resolved are:⁷

- *No coverage of default-risk driven “jump events”, such as rating changes and issuer defaults:* at the outbreak of the crisis, models often failed to cover the growing default risk in the trading book. The introduction of IRC models⁸ to cover migration and default risk helped to overcome this problem.

⁴ Cf. Gaumert (2009), p. 128.

⁵ Cf. Bundesverband deutscher Banken (2008), p. 8.

⁶ Cf. BaFin (2008), 2007 Annual Report, p. 133.

⁷ Cf. Senior Supervisors Group (2008), pp. 13-17.

⁸ IRC stands for incremental risk charge. This refers to risks such as migration and default risk, which were not covered by traditional market risk models before the crisis.

- *Insufficient coverage of market liquidity risk:* it was often not possible to liquidate or hedge positions within the ten-day holding period assumed under Basel 1.5. This led to risks being underestimated. Basel 2.5 takes account of market liquidity risk explicitly and in a differentiated way, at least for IRC models. Full coverage will be achieved under Basel 3.5 (trading book review).
- *Slow response to external shocks (outlier clustering):* the introduction of stressed VaR under Basel 2.5 went a long way towards eliminating the problem of underestimating risks in benign market conditions. In addition, historical market data for “normal VaR” are now adjusted daily, while monthly or quarterly adjustments were the norm before the crisis.
- *Insufficient consideration of the risk factors involved in securitisation:* as a result, models designed for securitisation portfolios may no longer be used to calculate capital charges (with the exception of the correlation trading portfolio). Even before the rule change, some banks had already decided themselves to stop using these models.
- *Flawed proxy approaches:* prior to the crisis, it was often possible to assign a newly introduced product to an existing one and assume the market risk would behave in the same way. During the crisis, this assumption proved to be flawed.⁹ The supervisory treatment of such approaches is now much more restrictive.
- *The approximation of changes in the price of financial instruments cannot accommodate large price movements (delta-gamma approximations):* full revaluation of instruments is now standard practice.
- *No and/or flawed scaling to longer time horizons:* scaling practices of this kind, such as square-root-of-time scaling, now have to satisfy prudential requirements designed to ensure their suitability.

These problems were the basis of the review of market risk rules under Basel 2.5 and, as described above, were able to be eliminated both by banks themselves and by new supervisory requirements.¹⁰ Despite this large-scale and appropriate response, which is continuing under the trading book review, distrust of internal model results and their use for prudential purposes persisted, leading to further fundamental discussions.¹¹

3.1.2 Divergence of model results

Continuing distrust at the most senior level of the Basel Committee led to the commissioning of the Standards Implementation Group for Market Risk (SIG-TB) to compare the results generated by the internal models of various banks when applied to the same hypothetical trading portfolios. A major point of criticism has always been that

⁹ Cf. Gaumert (2009), p. 133.

¹⁰ Cf. Gaumert/Schulte-Mattler (2009), pp. 59ff., Hartmann-Wendels (2012), p. 39.

¹¹ Cf. section 4.

internal model results are too variable even if the risks involved are the same. In January 2013, the SIG-TB published its analysis.¹² The following factors were identified as the key drivers of variation:

- *The legal framework:* some of the banks in the sample did not yet have to apply Basel 2.5. This means the US banks, for instance, supplied data from models that had neither been fully implemented nor approved. Analysis showed that some of these banks had significantly overestimated risk, though this did not, in practice, translate into higher capital requirements.
- *National supervisory rules for calculating capital requirements:* differences were noted, for example, in the multipliers set by supervisors for converting model results into capital requirements. In addition, some supervisors had already imposed restrictions on the type of model that could be used and/or set specific capital additions.
- *Legitimate modelling decisions taken by the banks, expressing differing assessments of the risk involved:* among the most important of these was the choice of model (spread-based, transition matrix-based) in the absence of a market standard for modelling rating migration and default risk (IRC models). Different assumptions about default correlations also led to different results. In VaR and stressed VaR models, major factors were the length of data histories (at least one year, no maximum limit), the weighting system, the aggregation of asset classes and of general and specific market risk, and the decision whether to scale a one-day VaR up to ten days or estimate a 10-day VaR directly. The choice of stress period for the stressed VaR also played an important role.¹³
- *Influence of parameter estimates and instrument models:* a further source of divergence was the differing assessments made, especially of complex financial products for which there is no market value as such. Banks themselves frequently have to estimate factors which influence their valuations. These valuations are fed into the stochastic models and can therefore indirectly influence the model results.

In summary, the differences noted were the result of legitimate decisions taken by banks with the approval of supervisors and of variations between supervisory approval procedures. Differences can also be explained by variations in the applicable legal framework and in the market phase on which the study was based. An issue related to the market phase is the length of the historical observation period used. Observation periods of differing lengths will have an impact if, for instance, the volatility of market data has changed from high (during a period over one year ago) to low (last year). In this example, a bank using a one-year data history will not capture the phase of higher volatility. This volatility will, by contrast, most certainly be captured by any bank using a longer data history (with the extent also depending on the weighting system applied to historical data).

¹² Cf. Basel Committee on Banking Supervision (2013a).

¹³ Cf. Basel Committee on Banking Supervision (2013a), p. 10.

It is also important to note that the study was based on a hypothetical portfolio approach at the lowest portfolio level and not on real portfolios. The study does not address the inherent weaknesses of this method. One major weakness is that the test portfolios used do not reflect portfolio structures in the real world. Portfolios for which banks calculate VaR are normally located at a far higher level in the portfolio “tree” and are consequently more diversified. If the portfolios analysed had been more realistic, variations would probably have been significantly less marked.¹⁴

Even if the variation between results can be readily explained and cannot be “blamed” on the banks, it is nevertheless difficult to communicate differences of, for instance, around 13 to 29 million euros in the results for the most highly aggregated portfolio.¹⁵ Efforts are most certainly needed to reduce the amount of variation by means of further standardisation (see section 5.3), even if complete alignment would not make good sense. The goal should be to separate desirable from undesirable variation.

3.2 IRB models

3.2.1 Performance in the financial crisis

The Association of German Banks takes the view that, generally speaking, IRB models performed much better than market risk models during the financial crisis. There is no evidence that risks were systematically underestimated. We therefore see no need for a fundamental overhaul of IRB models or for higher capital requirements.¹⁶

Nor should it be forgotten that the introduction of IRB models in the course of implementing Basel II brought significant progress in terms of the quality of banks’ quantitative credit risk measurement and credit risk management. In addition, banks using the IRB approach had to exercise greater discipline in collecting data. This enhanced the quality of their data, which also played a part in significantly improving risk management. The close linkage of internal risk management and the calculation of capital requirements is a huge asset and should not be abandoned.

Discussion about a possible need to review IRB models centred on the question of whether PD model results had responded too slowly to changes in creditworthiness both in an extremely severe economic downturn (the 2009 crisis) and in the subsequent recovery. The slow response can be explained by prudential requirements and banks’ internal needs, however. Economic developments influence rating results differently depending on a bank’s rating philosophy. Under the point-in-time (PIT) approach, the rating aims to reflect actual creditworthiness at any given time. Through-the-cycle (TTC) measures, by contrast, consciously exclude or smooth economic influences. It is true that

¹⁴ The study by the SIG has now been expanded to cover more complex portfolios, cf. Basel Committee on Banking Supervision (2013e). The results are comparable.

¹⁵ Cf. Portfolio no. 25, Basel Committee on Banking Supervision (2013a), p. 27.

¹⁶ Nor should this be undertaken for the purpose of aligning capital requirements with the level of capital required under the standardised approach to credit risk.

supervisors require probabilities of default to be estimated as one-year PDs. But these one-year PDs can be estimated either as a PD forecast for the next period (i.e. point in time) or as an average of the following periods over an entire economic cycle (i.e. through the cycle).

If a PIT rating system is used, the length of time a borrower's rating stays at one level tends to be shorter. Changes in the economy as a whole are sufficient to trigger relatively frequent rating downgrades or upgrades and corresponding adjustments to capital charges. (A downgrade, for example, means a higher PD estimate for the lower rating level. This translates into a higher capital charge.)

Under a TTC rating system, a change in rating would ideally not be triggered by general economic influences, but only by changes in the creditworthiness of the individual borrower and/or industry-related factors. It is true that annual default rates per rating level also vary when a TTC rating system is used. PD estimates are nevertheless more stable because they are calculated on the basis of historical annual default rates over a longer period of time.

The advantage of PIT rating systems is their greater sensitivity within the economic cycle: they allow up-to-date analysis of the borrower's situation and provide precise input for internal risk management. TTC rating systems, on the other hand, cause less rating migration, which allows risk to be determined over the medium to long term and thus a more long-term risk to be reflected. Which approach is used depends on a bank's business model and risk management philosophy. Both are currently in use, sometimes in parallel at the same bank, and both are consequently necessary.

We do not believe it would serve as useful purpose to prescribe the use of PIT systems alone. Furthermore, such a step could be criticised for potentially exacerbating procyclicality.

In its recent analysis of the internal ratings-based approach, the EBA concluded that there was no empirical evidence of procyclicality caused by capital requirements thus calculated.¹⁷

3.2.2 Divergence of model results

As in the area of market risk, the Basel Standards Implementation Group for Credit Risk (SIG-BB) has examined the reasons for variation in model results.¹⁸ As the group itself states in its report, much of the variation (75%) in a top-down analysis can be explained by differences in the composition of banks' portfolios.¹⁹ The variation is also a reflection of different business models. The originate-to-hold model, which is widespread in Europe,

¹⁷ Cf. EBA (2013), p. 29.

¹⁸ The EBA has also carried out a number of analyses; cf. EBA (2013) for an overview.

¹⁹ Cf. Basel Committee on Banking Supervision (2013f), p. 7.

normally leads to lower risk-weights than does the originate-to-distribute model, for example. Different business models also result in different portfolio and risk structures.

The remaining variation – also as in the area of market risk – stems from differences in the rules set by supervisors for calculating capital requirements and in legitimate choices by banks about modelling practices and processes.

- *Rules set by supervisors for calculating capital requirements*²⁰

- a) *Definition of default*

It is true that all EU member states apply the standard definition of default under Article 178 of the CRR and that there is a high degree of consistency as a result.

Some discretion for national supervisors nevertheless remains, as does some variation in interpretation and interpretation guidance. This applies to

- the number of “days past due” (180 days versus 90 days, Article 178(1)(b)),
- the treatment of immaterial positions (RTS mandate in Article 178(6)),
- restructuring involving some loss (has a default occurred or not?),
- capital charges for defaulted loans,
- requirements concerning cure periods, and
- the PD to be assigned after recovery.

- b) *PD estimates*

In the area of PD estimates, rules set by national supervisors differ on

- so-called cyclical adjustments in both directions, e.g. for a short data history,
- margins of conservatism for model risk, e.g. for low-default portfolios, and
- the length and weighting of data histories.

- c) *LGD estimates*

Similar differences in supervisory rules apply to LGD estimates. These include

- the level of application of the LGD floor,
- margins of conservatism for model risk if little data are available,
- monitoring compliance with requirements to incorporate downturn conditions, and
- the length and weighting of data histories.

- *Legitimate modelling practices and differences in banks’ processes*

The SIG-BB Group notes a high degree of consistency across banks in the ranking of individual borrowers, but differences in the levels of PD and LGD estimates. These reflect variation in banks’ historical experience of default and cannot be objected to.

Differences also arise from the decision to use PIT, TTC or mixed rating philosophies. These differences should not be eliminated either (cf. section 3.2.1). The EBF study found a clear preference in practice for PIT and mixed rating systems; TTC rating is hardly used at all. Divergence due to the choice of rating is therefore limited.

²⁰ The analysis of differences in supervisory rules is based on a study by the European Banking Federation (EBF) on residential mortgages; cf. EBF (2012).

Differences in banks' operational processes can also produce different PD and LGD estimates. Sending out reminders and overdue notices at a very early stage, for example, may avoid less "serious" or technical defaults. This has an influence on both PD and LGD estimates. In addition, it is often possible to reduce unsecured exposure before default by acting on early-warning indicators. Banks do so in different ways and to differing extents. Finally, the success in realising collateral (amount realised, time needed for liquidation) will depend on the quality of the liquidation process. These differences have an effect on LGD estimates.

In summary, the differences in results can be satisfactorily explained by economic factors, supervisory choices, legitimate modelling techniques and differences in banks' processes. They are not evidence of inappropriate modelling. Possible ways of standardising the modelling process without compromising the use of IRB models should nevertheless be explored (cf. section 5.5.3).

At first glance, the differences under both the IRB approach and the IMA (see section 3.1.2) could be interpreted as a quantitative measure of the uncertainty surrounding model results or, in other words, as an expression of model risk. Section 5.8 will examine whether this view is accurate and whether establishing a dedicated capital charge for model risk is an avenue that should be pursued. As the following section shows, a ban on the use of internal models for prudential purposes would not be the right response to the observed weaknesses.

4. Alternatives to internal models

4.1 Overview

Given the difficulties associated with modelling and the variation in results, it is legitimate to ask whether model-based, risk-sensitive capital charges should be dropped altogether. Such a step would significantly simplify regulatory requirements, though it would not necessarily simplify supervision. A better question might be whether it would not make more sense to address the undoubted weaknesses of internal models by means of the reforms already in place or in the pipeline without "throwing the baby out with the bath water". In other words, should we not try to learn from past mistakes instead of just giving up? These questions can best be answered systematically by examining to what extent the existing regulatory proposals could, together or on their own, replace model-based capital charges. There are essentially two alternatives under discussion:

- dropping risk-sensitive capital charges and introducing a leverage ratio as the sole "risk metric";
- regulatory standardised approaches: applying risk-sensitive capital charges while abandoning model-based ones.

4.2 The leverage ratio

An exclusively applicable, binding leverage ratio – defined as the ratio of tier 1 capital to total assets including off-balance-sheet and derivative positions²¹ – is only a logical response if it must be assumed that neither banks nor supervisors are capable of measuring the risks involved in banking. Advocates of this approach talk of the “illusion of the measurability of risk.”²² They argue that we are in a situation of “uncertainty”, not “risk”. Uncertainty in decision theory is characterised by two things: neither are all conceivable results known, nor is it possible to assign probabilities to the results or estimate a probability density function. In this case, it would not, for example, be possible to calculate a VaR (or expected shortfall) defined as a quantile of a portfolio loss distribution. This is only possible under “risk”.

The concepts of “uncertainty” and “risk” are abstract, theoretical extremes, however, while the various situations observed in reality usually lie somewhere between the two. The answer to the question of whether it is more appropriate to assume a risk situation or an uncertainty situation is determined above all by the availability of the data needed for the model estimate (such as market data or historical default data). If, in addition, the risk factors associated with the financial instruments are known and taken into account, and if the potential changes in the value of a trading portfolio can be satisfactorily measured, (quality of the stochastic model, no normal loss distribution as a rule), determining a VaR of portfolio losses is likely to be appropriate.²³ This may be assumed for the vast majority of trading portfolios. Analogous arguments can be made for PD and LGD estimates.

Should the data relating to a particular portfolio not be sufficient, regulatory standardised approaches could then be used since these normally require less data to be available. Reviewing and adjusting models is a never-ending task for banks. The model risks which undoubtedly exist (e.g. estimation errors) are also a focus of supervisors’ attention.²⁴ Such model risks do not, however, make the use of models obsolete: the key point is to be conscious of their limitations.²⁵ Although modelling by its very nature always involves a simplification of reality, quantitative and qualitative model validation is crucial. Supervisors set and enforce stringent rules for such validation.²⁶

Advocates of the “uncertainty approach” propose a so-called heuristic as a “rule of thumb” and as a risk metric at least for supervisors. Leverage ratios with widely differing minimum levels have been suggested as a heuristic for ensuring the solvency of banks.

²¹ The most recent revision of the Basel Committee’s definition of the leverage ratio can be found in draft form in Basel Committee on Banking Supervision (2013b) and, in its final form, in Basel Committee on Banking Supervision (2014).

²² Cf. Wissenschaftlicher Beirat beim BMWi (*Academic advisory board at the Federal Ministry for Economic Affairs and Energy*) (2010), p. 19.

²³ Cf. Gaumert (2013a), p. 36.

²⁴ Cf. section 5.4.

²⁵ Cf. Gaumert (2013a), p. 36.

²⁶ See also section 5.4.

The levels proposed range from 3% to 30%.²⁷ As is generally recognised, it is not possible to infer a specific minimum level from theory.

The question of whether a leverage ratio is actually a suitable heuristic for ensuring solvency has not been satisfactorily answered, however. Empirical studies to determine to what extent the leverage ratio is a statistical, univariate risk factor that can distinguish between banks that survive and those that fail come to different conclusions.²⁸ The Basel Task Force on the standardised approach to credit risk, for instance, concluded on the basis of its own statistical analysis that a risk-based capital ratio (such as a CET1 ratio) was better at forecasting possible defaults and should therefore be given preference over a leverage ratio for determining the capital treatment of bank exposures. Often, the leverage ratio cannot be shown to have much or any ability to predict solvency or insolvency. This may have an economic explanation since the leverage ratio, as a vertical metric on the liabilities side of the balance sheet, cannot act as a horizontal metric of a bank's risk-bearing capacity by means of which sources of loss (causes of insolvency), which are mainly to be found on the assets side of the bank's balance sheet, are compared with a loss-absorbing indicator (capital). This can, by contrast, be accomplished by ratios such as the "core tier 1" (CET1) or "tier 1" ratio. If, moreover, a leverage ratio were a measure capable of predicting the insolvency of certain types of banks, it would probably swiftly cease to be a good measure once it became a binding target (Goodhart's Law).

What is more, the leverage ratio has a very long – and already widely discussed – list of drawbacks.²⁹ These are the points of most relevance here:

- Perverse incentives and the potential for arbitrage: there are strong incentives to make business models more risky. Because assets are measured on a non-risk-weighted basis, an AAA investment, for instance, ties up just as much capital as does a B investment.
- A leverage ratio is by no means "model free": highly complex valuation models or even simulation approaches are sometimes needed to measure derivatives on a marked-to-market basis, for example. In a broader context, this is more or less true for all balance-sheet valuations. So even a leverage ratio cannot claim to be the simple, robust rule that proponents of a heuristic approach are looking for.³⁰
- It makes it impossible to compare capital adequacy across banks. The adequacy of a bank's capital resources cannot be assessed without measuring the associated risks.

²⁷ Cf., for example, Wissenschaftlicher Beirat beim BMWi (*Academic advisory board at the Federal Ministry for Economic Affairs and Energy*) (2010), p. 23 (15% leverage ratio), cf. Hellwig/Admati (2013), p. 182 (20-30% leverage ratio). Leverage ratios set at this level would override risk-based standards, thus rendering them obsolete.

²⁸ Cf., for example, the summarising article of Zimmermann/Weber (2012), pp. 26f.

²⁹ Cf., for example, Frenkel/Rudolf (2010) or Gaumert/Götz/Ortgies (2011), p. 58.

³⁰ The discussion about a suitable definition of the leverage ratio also shows that improved definitions invariably lead to significantly greater complexity; cf. Basel Committee on Banking Supervision (2014).

For these and other reasons not mentioned here, the international banking community continues to reject the leverage ratio as a sole indicator and as a binding limit. At most, it may make sense to monitor *changes* in a bank's leverage ratio, but not its absolute level; this is the approach of the German Banking Act at present.³¹ Supervisors have widely differing views on the leverage ratio. Even Haldane/Madouros (Bank of England) by no means call in their "*The dog and the frisbee*" speech for a leverage ratio on its own or a minimum leverage ratio set at such a high level that risk-based requirements are overridden and therefore indirectly rendered obsolete (leverage ratio as a frontstop instead of the Basel backstop). Owing to the massive perverse incentives which they, too, have noted, they talk instead of placing leverage ratios on an equal footing with capital ratios (CET1 ratio, tier 1 ratio).³²

4.3 Regulatory standardised approaches

Standardised approaches, i.e. approaches which spell out in detail how to calculate capital requirements on the basis of prudential algorithms ("supervisory models"), will always be needed for smaller banks which cannot or do not wish to develop internal models. But larger banks need standardised approaches too – as a fallback solution if their internal models are or become unsuitable for all or for certain portfolios. Cost/benefit considerations may also play a role in deciding whether or not to roll out internal approaches. Flexible solutions should be facilitated (cf. sections 5.5 and 5.6). Having said that, a standardised approach alone is by no means sufficient for larger (and smaller) banks with a complex risk structure. The reasons are as follows:³³

- It is invariably true of a standardised approach that "one size does not fit all banks". Since a standardised approach is not tailored to an individual bank's portfolio structure, it cannot measure certain risks (such as certain basis risks in the area of market risk) or can only do so very inaccurately. It is normally much less risk-sensitive than an internal model. The standardised approach to credit risk, for example, is entirely insensitive to risk when measuring the risk of counterparties that have not been externally rated.
- A related problem is that a standardised approach is usually designed with comparatively simple portfolios in mind. This can result in risk being overstated or understated.
- It normally fails to capture diversification and hedging effects, or cannot do so adequately.

³¹ Cf. Section 24 (1) (16) and (1a) (5) of the German Banking Act (*Kreditwesengesetz*, KWG).

³² Cf. Haldane/Madouros (2012), pp. 19 f: "The case against leverage ratios is that they may encourage banks to increase their risk per unit of assets, reducing their usefulness as an indicator of bank failure – a classic Goodhart's Law. Indeed, that was precisely the rationale for seeking risk-sensitivity in the Basel framework in the first place. A formulation which would avoid this regulatory arbitrage, while preserving robustness, would be to place leverage and capital ratios on a more equal footing." A leverage ratio of at least 7% would be necessary for this purpose, in the authors' view.

³³ Cf. Gaumert (2013a), p. 37.

- Standardised approaches can thus be more dangerous than internal models because it is often easy to “game the system”. Trading revenue, for instance, can be generated seemingly without risk, enabling trading units to inflate risk-adjusted earnings.³⁴
- If supervisors no longer permit the use of internal models, they will have to forgo the input of banks’ risk-management expertise.
- Standardised approaches are simple models. But as all proposals for standardised approaches to date have shown, supervisors are by no means better at constructing models than are the banks themselves.

A further alternative would be scenario-based approaches, which are often relatively similar to models. Take, for instance, the scenario-based approaches which may currently be used for calculating capital charges for options under the standardised approach to market risk and which will probably be adopted in a modified form as a standardised approach under the Basel Committee’s trading book review.

Scenario approaches may be regarded as a kind of “halfway house” between risk-sensitive standardised approaches and internal models. If they are prescribed as a regulatory standardised approach, they may also demonstrate the weaknesses of standardised approaches described above. The key criteria for evaluating such approaches are the scenario generation technique and the process/algorithm used for calculating valuation adjustments on the basis of the scenarios. An especially critical question is to what extent the loss risk of the instruments and portfolios concerned can be captured. There is room for doubt about the ability of simple scenario approaches to do so. At one end of the spectrum are approaches that merely differentiate between a couple of scenarios (e.g. base case and adverse case) and make no attempt to estimate loss distribution. At the other extreme are internal models which simulate such a large number of scenarios that it is possible to estimate a loss distribution on the basis of which a parameter such as VaR or expected shortfall can be calculated. Another important question is whether or not the scenario generation takes account of stressed environmental conditions.

But even scenario-based capital requirements cannot reduce model risk if the bank’s losses are calculated on the basis of internal models. If macroeconomic downturn (or stress) scenarios have to be translated into changes to the relevant risk parameters (e.g. negative rating migration, increase in LGD), additional models are needed, which will actually cause model risk to rise further.

To sum up, standardised approaches have considerable failings when it comes to measuring risk. On their own, they are not an adequate basis on which to determine appropriate capital requirements. The outlined shortcomings of standardised approaches

³⁴ One example: when supervisors set risk factors in the standardised approach model, basis risk is often ignored because different risk factors are (and must be) mapped to the same regulatory risk factor. This is part of the model simplification process. It is often easy to design a trade to exploit the “difference”.

also mean they are not suitable as a floor for model-based capital requirements. So it may be concluded at this point that, together or separately, a leverage ratio and standardised approaches are inappropriate and insufficient – including from a supervisory perspective. Internal models must remain the first choice. Confidence in internal models needs to be significantly strengthened, however.

5. Restoring confidence in internal models

5.1 Overview

A number of proposals are currently under discussion. The Association of German Banks believes that, together, these could go a long way towards restoring confidence in internal models.

Issue	Section
Role of supervisors in restoring confidence	5.2
Enhancing transparency	5.3
A comprehensive approach to model validation	5.4
Reducing the variation in model results by means of standardisation	5.5
Highlighting the positive developments to come out of the trading book review	5.6
Strengthening the use test concept	5.7
Consideration of model risk	5.8
Voluntary commitment by banks to a code of “model ethics”	5.9

Trust needs to be won back first and foremost from external third parties. These include external analysts, rating agencies, bank stakeholders (shareholders, staff, customers, etc.), journalists and the general public.

5.2 Role of supervisors in restoring confidence

Top priority should be given to standardising supervisory vetting and approval processes so that this major source of variation in model results can be significantly reduced. A single set of approval and review standards should be developed for application worldwide. A globally consistent procedure needs to be enforced for granting and withdrawing permission to use models. With activities of this kind, supervisors themselves could make a substantial contribution to restoring confidence.³⁵

³⁵ For example: the range of multipliers (“3+x” multipliers) which convert market risk model results into capital requirements, and the reasons for their application, differ widely from one jurisdiction to another.

5.3 Enhancing transparency

5.3.1 General considerations

Many steps are already underway to improve transparency. The goal is to

- disclose model methodologies in more detail,
- make backtesting results more transparent and
- explain why changes made to a model can result in changes in capital charges.

Initially, transparency of this kind will primarily benefit informed experts and analysts. These experts then face the difficult challenge of preparing their analyses in such a way as to be comprehensible to, or at least better understood by, the general public. The public at large cannot be expected to be the primary addressees of a bank's disclosures. Someone without specialist knowledge is unlikely to be able to understand a risk report, for instance. Nor is it the task of banks to write their reports in a manner that makes such specialist knowledge unnecessary. This is by no means an argument against greater transparency. There is nevertheless a need to discuss at what point the additional cost of transparency incurred by banks will exceed the additional benefit to stakeholders. From an economic perspective, this may be regarded as a transparency ceiling.

5.3.2 Market risk models

The work of the Enhanced Disclosure Task Force (EDTF) is a welcome contribution³⁶ and some banks have already implemented its recommendations in their trading units voluntarily. The slide from Deutsche Bank's presentation for analysts on 31 January 2013 is just one illustration.³⁷ This explains, in particular, the changes in market-risk-related RWAs (mRWA flow), i.e. it is made clear what brought about the reduction in capital requirements in the trading area. The reasons include reduced multipliers (for converting model results into capital requirements) on the back of significantly better review results, approval of models (IRB approach, IMM) for some additional products and the consideration of additional netting agreements and collateral in the calculation of capital requirements.

5.3.3 IRB models

The EDTF has made a number of recommendations for IRB models, too. Their implementation under pillar 3 or their voluntary implementation by banks could have a positive impact on the acceptance of results calculated under the IRB approach. The SIG-BB has also recommended improving transparency in this area.³⁸

³⁶ Cf. Enhanced Disclosure Task Force (2012). Recommendations for market risk (nos 22-25), cf. pp. 12, 51-55. Cf. recommendation 11 on presenting a flow statement.

³⁷ Cf. Deutsche Bank (2013).

³⁸ Cf. BCBS (2013f), p. 9.

As with VaR models, it makes good sense here, too, for banks to publish flow statements explaining the reasons for changes in model results and/or capital requirements, and also to disclose validation results.³⁹ In addition, the recommendation to explain internal policies for distinguishing between performing, non-performing and impaired loans will make it easier to make comparisons across banks.⁴⁰ The aim should be to establish a standardised, comprehensive framework which will enable every bank's "RWA narrative" to be understood.

5.4 A comprehensive approach to model validation

5.4.1 What is comprehensive validation?

Comprehensive quantitative validation comprises not only backtesting but also benchmarking. In prudential terms, benchmarking consists of analysing differences in model results which may occur even if the models are used on identical (hypothetical) portfolios. As demonstrated in sections 3.1.2 and 3.2.2, these differences do not necessarily mean the models are flawed. The fact that the analysis is based only on hypothetical and not actual portfolios is another reason to interpret the results with a degree of caution. The EBA is in the process of drafting technical standards on benchmarking internal models; the final standards are scheduled for release by the end of 2014 and their precise form remains to be seen. If practicable, these standards could, among other things, help to ensure that prudential requirements are applied more consistently across jurisdictions. This would, in turn, reduce some of the divergence in results and ultimately help to win back trust.⁴¹

It will be essential to retain the risk sensitivity of internal approaches in the benchmarking exercise: benchmarking should not be misused to force banks into uniformity. This can best be ensured by generally according higher status to backtesting than to benchmarking in the validation process. At the very least, this should happen when the methodologically robust backtesting systems are available. A situation should not arise where adjustments have to be made as a result of benchmarking although backtesting has demonstrated that there is no need for action. It needs to be made clear that even substantial differences in RWAs are permissible as long as the reasons for these differences can be satisfactorily explained. They should not be automatically eliminated.

Further discussion in this section will confine itself to backtesting, since this should remain the principal quantitative validation tool, and to qualitative methods of validation (e.g. analysing a model's individual components, or the sensitivity of its results to input changes in order to test its robustness).

³⁹ Cf. Enhanced Disclosure Task Force (2012). Recommendations for credit risk (nos 26-30), cf. pp. 12, 51-55. Cf. recommendation 11 on presenting a flow statement.

⁴⁰ Cf. Enhanced Disclosure Task Force (2012), recommendation 27, pp. 12, 57.

⁴¹ Cf. EBA (2014b).

5.4.2 Market risk models

It should be borne in mind that conventional backtesting methods cannot be performed on IDRC models. Instead, the EBA has issued special guidelines based on indirect methods such as stress tests, sensitivity and scenario analyses.⁴² A distinction therefore needs to be made between “normal” market risk models and IDRC models. Though validation standards already exist for IDRC models, they can by no means be described as comprehensive.

For normal market risk models, a comprehensive approach going beyond purely quantitative backtesting and the P&L attribution process could be supported by banks themselves. The German financial watchdog BaFin already has some concrete ideas about how this could be achieved.⁴³ It would be worth examining whether the minimum requirements for the IRB approach could make an additional contribution. These minimum requirements already pursue a comprehensive quantitative and qualitative approach to validation, though many of the solutions found there may not be transferable to the area of market risk.⁴⁴

5.4.3 IRB models

There have been clear rules on validating IRB models since Basel II was implemented in European and national law in 2007. These rules remain essentially unchanged under Basel III and the CRR. It is therefore safe to assume that international banking supervisors saw no need for reform in this area.

A bank cannot apply the IRB approach unless its models meet the validation requirements set out in the CRR. Among other things, banks have to

- validate their models annually,
- monitor the accuracy and consistency of the models’ systems and processes,
- compare the models’ estimates with actual default rates (backtesting, review of calibration, analysis of divergence) and
- have internal standards in place to deal with situations where realised PDs, LGDs, conversion factors, etc. differ significantly from the models’ expectations.⁴⁵

It is possible, and would make good sense, to specify and thus harmonise quantitative validation requirements further. This could include

- setting statistical tests for monitoring the accuracy and calibration status of rating

⁴² Cf. EBA (2012), pp. 15f.

⁴³ Cf. Bongers (2013), pp. 38-49.

⁴⁴ Cf. Articles 174 and 185 of the CRR.

⁴⁵ Cf. Articles 174(d) and 185 of the CRR.

- systems, such as a significance level which should not be exceeded,
- setting statistical tests for the validation of EAD and LGD parameters, such as a significance level which should not be exceeded,
- requiring analyses to ensure the volume-weighted calibration status of systems (to avoid arbitrage between unit-weighted and volume-weighted parameter estimation when calculating RWAs),
- more detailed specification of the frequency and intensity of validation.

5.5 Reducing the variation in model results by means of standardisation

5.5.1 Dangers of excessive standardisation

It is important to begin by highlighting the dangers of excessive model standardisation:

- Standardised models can pose a threat to financial stability because they encourage all banks to react in the same way (herd behaviour). Model diversity is a desirable phenomenon from a prudential point of view since it generates less cyclicity in capital requirements.
- Standardised models would frequently be unsuitable for internal use at larger banks, which would consequently need to develop alternative models for internal risk management purposes. As a result, the regulatory model would be maintained purely for prudential purposes (in violation of the use test; see below). This would encourage strategies aimed at reducing capital requirements since the results of this model would not have to, and could not, be used internally.
- It is in the nature of models that a certain amount of variation will inevitably exist (Ingves, Basel Committee).

The Basel Committee is already trying to find a balance between the objectives of “risk sensitivity”, “complexity” and “comparability”.⁴⁶ Standardisation has the potential to reduce the complexity of internal models and increase their comparability. Against that, increasing the complexity of standardised approaches to improve risk sensitivity often improves comparability as well. This is because risk measurement methods need to have an adequate degree of risk sensitivity to enable meaningful comparisons to be made between banks.⁴⁷

⁴⁶ See Basel Committee on Banking Supervision (2013c) and the German Banking Industry Committee (2013) on the balancing debate.

⁴⁷ This is why it would not serve a useful purpose to compare banks on the basis of the leverage ratio or the standardised approach to credit risk, for example.

5.5.2 Market risk models

Despite the dangers outlined above, it is most certainly possible to standardise models in a way which will reduce their complexity and improve the comparability of their results but will not compromise their suitability for internal use. Here are a few suggestions:⁴⁸

- The rules and modalities surrounding the granting and withdrawal of supervisory approval for models differ significantly from one jurisdiction to another (e.g. in terms of multipliers, add-ons, bans on using models for certain portfolios). The trading book review should therefore be used as an opportunity to harmonise the approval process worldwide, including those elements where supervisors have discretion in determining how capital requirements are calculated. A consistent and more standardised approach would naturally also be preferable from a level playing field perspective.
- Greater flexibility in the use of historical data should not be permitted. Supervisors could prohibit the application of weighting systems, for instance. All historical scenarios would then have the same weight.
- We have grave reservations about the use of so-called overlapping 10-day periods owing to the serious statistical problems involved and would be open to the idea of a ban. The simple square-root-of-time scaling method should not automatically be used for scaling up one-day VaR estimates. Individual scaling methods are needed to be able to estimate risk appropriately. Since portfolio structures do not always meet the specific prerequisites for applying the square-root-of-time rule, this method of scaling can lead to underestimating or overestimating risk.
- A market standard for IDRC models should be developed to avoid variation as a result of differences in the choice of model. The trading book review is already tending towards the standardisation of these models.
- There should be less flexibility in how historical data are used under Basel 2.5. For the standard VaR, one year should be not just the minimum but both the minimum and maximum period allowed. This may well affect different banks in different ways, sometimes increasing capital requirements and sometimes reducing them.
- The stress period for stressed expected shortfall under Basel 3.5 should be standardised and set by supervisors instead of being selected by banks. True, this means the stress period would no longer be optimally suited to the individual portfolio in question. But as the study by the Basel Committee's SIG-TB has shown, similar periods may, as a result of the financial crisis, be considered relevant at the highest portfolio level – namely the second half of 2008 (including the Lehman insolvency) and the first half of 2009.⁴⁹

⁴⁸ Cf. German Banking Industry Committee (2013).

⁴⁹ Cf. Basel Committee on Banking supervision (2013a), p. 50.

5.5.3 IRB models

Below are a few suggestions for standardising IRB models. They relate mainly to rules set by supervisors (cf. section 3.2.2).⁵⁰

- Steps should be taken at international level to further harmonise the definition of default (days past due: 90 days without exception; standardisation of capital charges for defaulted loans in the value adjustment offset; standard requirements concerning the curing of defaulted borrowers in terms of the cure period and the PD to be assigned after reclassification).
- The RTS mandate under Article 178(6) of the CRR should be used to standardise the treatment of immaterial exposures in Europe in terms of counting the “days past due”. Standardisation should also be pursued at Basel level.
- The treatment of restructuring involving some loss should be standardised (has a default occurred or not?).
- There should be a standard approach to the application of cyclical adjustments to PD estimates. Adjustments of this kind are not used in Germany at present.
- There should be standard rules for margins of conservatism for model risk both in PD and LGD estimation.
- The 10% LGD floor should be applied in a consistent manner.
- There should be standard rules for when downturn conditions are deemed to exist/when downturn LGD estimation should be used (an RTS on this issue is in the pipeline).
- There should be standard rules for the treatment of low default portfolios (including a standard definition).

We would have serious reservations, by contrast, about quantitative restrictions on estimating IRB parameters. Restrictions of this kind risk reducing risk sensitivity. Limits on estimation parameters could, moreover, easily be misconstrued as a minimum capital requirement or “prudentially validated” estimate. The capital relief achieved by using the IRB approach is already being significantly reduced by the “Basel I floor” and the minimum LGD. On top of that, supervisors can already impose capital add-ons if they think risk is being understated. The above measures would make supervisory law even more complicated and we therefore oppose them.

⁵⁰ Cf. also EBA (2013), pp. 30f. for further proposals, some of which coincide with our own.

5.6 Highlighting the positive developments to come out of the trading book review

The Basel Committee is currently working on a fundamental review of how capital requirements should be calculated for trading book exposures.⁵¹ It has taken criticism of the existing regime on board and proposes to reduce the leeway granted to banks in the design of their internal models. Without going into the Committee's extensive analysis in detail, here are some key elements of relevance to the questions examined in this paper:

- The rules for assigning instruments to the trading book will be clearer.
- Expected shortfall is to be introduced as a new risk metric calibrated to a period of market stress. The intention is to switch to a coherent measure of risk which can take better account of tail risk.⁵² The reference to a stress period is intended to address the issue of "fair-weather models" (the problem facing the turkey in Taleb's *The Black Swan*).
- A so-called desk approach is to be introduced for granting and withdrawing approval for models. In the future, model approval is to be decided on a case-by-case basis at trading desk level. This will enable portfolios which are illiquid and/or cannot easily be modelled to be excluded from the model's scope.
- Model validation will take place at desk level and become even more stringent through backtesting of sub-portfolios and a new P&L attribution process. This will significantly improve the validation process. Backtesting problems at a lower portfolio level may not always be detected at a higher (overall) portfolio level. This can only be achieved by backtesting sub-portfolios.
- All banks using models will also have to calculate requirements using the standardised approach. Supervisors take the view that the standardised approach can serve as a floor, or even a benchmark, for internal models. This could provide a further safety mechanism to avoid underestimating risk, though it should be borne in mind that the standardised approach does not always produce sound results (see above). Banks should therefore have an opportunity to explain why their internal model is correct in estimating a lower level of risk than that calculated under the standardised approach. Benchmarking is preferable to a floor approach, in our view.
- We assume that implementation of the Basel Committee's proposals will reduce the divergence of model results (e.g. through additional rules for modelling in the IDRC area).

⁵¹ Cf. Basel Committee on Banking Supervision (2012) and Basel Committee on Banking Supervision (2013d).

⁵² Cf. Artzner/Delbaen/Eber/Heath (1999), p. 203 on the term "coherence".

5.7 Strengthening the use test concept

Up to now, approval of internal models has been dependent, among other things, on supervisors being convinced that the model is really used for internal risk management purposes. Banks consequently have to demonstrate that the model they have submitted for supervisory approval is their main internal risk management tool.

Basically, they have to prove that the internal model used to manage risk is largely identical to the model used to calculate capital charges (use test). The rationale behind this sensible supervisory requirement is that the quality of these risk measurement systems can best be ensured over time if the internal use of the model results is an absolute prerequisite of supervisory approval. As a result of the use test, the bank's own interests are linked to the quality of the model. The design of the model should on no account be driven purely by prudential requirements. Moreover, the reply to the question of how model results are used for internal risk management purposes shows what shape the bank's "risk culture" is in.

The use test concept has been undermined, however, by a development towards more prudentially driven models. This began under Basel 2.5 and is even more pronounced under Basel 3.5. The trend should be reversed. At a minimum, the core of the model should be usable internally – that is to say be consistent with the bank's strategies for measuring risk. Conservative adjustments can then be made outside the core.

There is no evidence as things stand of a watering down of the use test for IRB models.

5.8 Consideration of model risk

A further approach, in addition to the add-ons for model weaknesses and risks mentioned earlier, might be to quantify and capitalise model risk either in the form of a capital surcharge on model results under pillar 1 or as a dedicated risk category under pillar 2.

It would be worthwhile discussing the idea of using the diverging result interval of the hypothetical portfolio exercise (see sections 3.1.2 and 3.2.2) as a quantitative basis for individual capital surcharges. The portfolios tested in this exercise do not, however, correspond to banks' real individual portfolios, which makes them a questionable basis for individual capital surcharges. As explained above in sections 3.1.2 and 3.2.2, moreover, it cannot be concluded that the differences are largely due to model weaknesses. The question of how to derive the differences actually due to model risk from the observed "gross" differences is yet to be clarified and will probably be fraught with difficulties. What is more, model risk is not reflected solely in the differences in model results (see below on the nature of model risk, which also covers the inappropriate use of model results, for example, which can result in flawed management decisions).

This raises the question as to whether it may be better to address model risk under pillar 2. If model risk is assumed to arise, first, when statistical models are not used

properly and, second, from an inevitable uncertainty surrounding key features of models, then it is likely to be encountered above all in the areas of

- design (model assumptions concerning the distribution of market risk parameters or portfolio losses, for example),
- implementation (e.g. the approximation assumptions necessary for IT purposes),
- internal processes (e.g. complete and accurate coverage of positions, capture of market data, valuation models at instrument level [see below]) and IT systems used by banks to estimate risk, and
- model use.⁵³

How to quantify model risk for the purpose of calculating capital charges is a question which cannot be solved, in our view. As in other areas, risk-sensitive capital requirements should be sought; one-size-fits-all approaches, like that called for by the Liikanen Group, should not be pursued because they usually end up setting perverse incentives. In summary, we are opposed to the idea of capitalising model risk under pillar 2 since it would serve no useful purpose.

This point notwithstanding, there are already rigid capital requirements for trading activities under pillar 1 which address model risk, namely in the area of prudent valuation. These require valuation adjustments to be calculated on accounting measurements of fair value instruments (additional valuation adjustments, AVAs) and deducted from CET1 capital. This creates a capital buffer to cover model risk associated with valuation models at instrument level (see above).⁵⁴ Valuation risk arising from the existence of competing valuation models and from model calibration is addressed by the EBA standard. Deductions for market price uncertainty (Article 8 of the EBA RTS) can also be interpreted as charges for model risk, even if the EBA does not itself use the term.

Under the IRB approach, too, there are already clear pillar 1 requirements targeting model risk in the form of expected estimation errors stemming from less than satisfactory data or methods. In such cases, banks have to add a “margin of conservatism” to their estimates (in the form of add-ons). A number of national supervisors require these add-ons for PD estimates for so-called low default portfolios, for instance. Conservative adjustments are also frequently required if there is little available data on which to base LGD estimates. These are de facto capital charges for model risk.⁵⁵

⁵³ Cf. Quell, P (2013), pp. 20-23.

⁵⁴ Cf. EBA (2014a), p. 20, Article 11.

⁵⁵ Cf. Article 179(f) of the CRR.

5.9 Voluntary commitment by banks to a code of “model ethics”

A commitment could be made to refrain from aggressive or inappropriate modelling with the sole aim of minimising capital requirements. Banks would refrain voluntarily from using models on portfolios if questionable results tend to be generated. This might apply to certain (though by no means all) complex securitisation portfolios in the trading book, for example. In some respects, this is a sub-item of the modelling validation issue. The desk approach under Basle 3.5 will help to put this new culture into practice. Since capital requirements will have to be calculated using the standardised approach as well as the IMA, any aggressive modelling should be exposed. At a minimum, banks will have to demonstrate that the standardised approach overstates risk in the portfolio in question. If this cannot be demonstrated, a case of excessively aggressive modelling may be assumed to exist.

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