



Template for comments

Public consultation on the revised ECB guide to internal models

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General comments

Due to the wide scope of the consultation and to the specific deep experience of our company in the market risk area, we prefer to focus our comments on the IRC topic, namely the section 6 of the "Market Risk" chapter in the consultation paper. Furthermore, we point out that IRC poses several challenging issues, because of the measure definition (extreme quantile, i.e. difficult to backtest and to achieve convergence in the simulation process), the data availability, the relationships between the risk drivers and the issuers in the portfolio and so on.

Generally speaking, we find useful the improvements to the current version of the ECB guide (hereinafter, EGIM) and agree with them. Nevertheless, we feel that some technical points should be addressed in a more prescriptive way. Some statements that require "soundness" principles in the IRC parameters (PDs, correlations, simulations, etc) appear to be still too much generic.

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Please enter all your feedback in this list.

When entering feedback, please make sure that:

- each comment deals with a single issue only;
- you indicate the relevant chapter/section/paragraph, where appropriate
- you indicate whether your comment is a proposed amendment, clarification or deletion.

Deadline: 15 September 2023

ID	Chapter	Section	Paragraph	Page	Type of comment	Detailed comment	Concise statement as to why your comment should be incorporated	Name of commenter	Institution	Personal data
1	Market risk	6.1 Regulatory references		190	Amendment	No reference to the EBA/GL/2017/11 on internal governance	Referring to IRC, the "model use" requirement is quite often weak (or missing) in our experience with the validated banks. The same for the risk culture and the risk awareness. We deem that the reference to the EBA GL, along with some new articles in EGIM in section 6.2 on this topic (e.g. the role of IRC in RAF/RAS), could improve the situation	Bonollo, Michele	Iason Consulting Ltd	Publish

2	Market risk	6.2 General requirements	138	190	Amendment	Some more strict constraint about test/production environment are needed.	<p>The par.138 states: "In order to assess that the day of the week when the IRC numbers are calculated does not lead to material bias, the ECB can, on the basis of Article 10 of the SSM Regulation, require an institution to recalculate the IRC for 15 consecutive business days (including three reporting days). If it is not possible to perform this calculation in the production environment, it can be performed in a test environment replicating the calculation of the regulatory IRC". In our experience, even if in the test environment the algorithms and the ICT coding of the "core" calculations are the same, data from the source systems (position keeping, issuers reference data, time series, etc) are often extracted manually (by queries, manual filtering, etc). This does not guarantee that the perimeter for the IRC perfectly matches the right perimeter in scope for the validated model. Hence some constraints should be inserted for this fallback procedure. We suggest to reword the section as follows: "In order to assess that the day of the week when the IRC numbers are calculated does not lead to material bias, the ECB can, on the basis of Article 10 of the SSM Regulation, require an institution to recalculate the IRC for 15 consecutive business days (including three reporting days). If it is not possible to perform this calculation in the production environment, it can be performed in a test environment replicating the calculation of the regulatory IRC. The institution must be able to show that the positions in scope for the IRC process in the test environment exactly match the production environment".</p>	Bonollo, Michele	Iason Consulting Ltd	Publish
3	Market risk	6.2 General requirements	141	191	Amendment	More technical details (and/or parameters / thresholds) about the IRC estimation convergence	<p>It is well known that the monte Carlo estimation (i.e. by a simulation process) becomes more unstable for the quantile estimation as the confidence level becomes more extreme. IRC requires a 99.9% quantile then it is a challenging process. A general reference is (David H.A, 2001, <i>Order Statistics</i>, Wiley). Of course no fixed "magic" number of simulations can be assigned in the regulation, as the convergence rate depends on several factors, such as the portfolio names, the portfolio concentration, the correlation structure and so on. Ultimately, the convergence of the Monte Carlo depends on the volatility of the simulated (default and migration) P&Ls, that are linked to the previous elements we cited. The banks can face this problem with different strategies, not only by increasing the number of simulations, such as: 1) to smooth the quantile estimator, replacing the "empirical quantile" by <i>L-estimators</i>, or the Harrel-Davis estimator, or the Epanechnikov estimator and so on. See (F. E. Harrell, C. E. Davis, "A new distribution-free quantile estimator", <i>Biometrika</i>, Volume 69, Issue 3 (December 1982), pp. 635-640), and also (H. Mausser, "Calculating Quantile-based Risk Analytics with L-estimators", <i>Algo Research Quarterly</i>, Vol. 4, No. 4 (December 2001), pp. 33-48) ; 2) To monitor on an ongoing basis the IRC estimation uncertainty, by calculating in the regular periodic reporting a confidence level for the IRC, see Chen, E.J., 2001, "TWO-PHASE QUANTILE ESTIMATION", <i>Proceedings of the 2002 Winter Simulation Conference</i>, Formula (2)); 3) To improve the standard Monte Carlo approach with some more sophisticated techniques where the convergence is faster, given the same number of simulations/points. <u>Examples: low discrepancy sequences, quantization</u> approach, see (Pagès G., Pham H., Printemps J. (2004), "Optimal quantization methods and applications to numerical problems in finance", chapter in <i>Handbook of Computational and Numerical Methods in Finance</i>, Springer). The new EGIM draft, as the current version, nothing says about this critical point, just requiring that "...IRC model must be reasonably accurate in measuring risks" (Par.141). Being a very technical piece of the IRC puzzle, obviously it can not be covered by the first level regulation (CRR). We deem that the EGIM should (at least) give some sharp constraints about the IRC estimation uncertainty, linked to the RNIME topic. For example, the half-width of the 95% IRC confidence level, i.e. (Upper95%IRC - Lower95%IRC)/2, should be less than 2.5%, to avoid a systematic RNIME-type effect.</p>	Bonollo, Michele	Iason Consulting Ltd	Publish
4	Market risk	6.2 General requirements	142	192	Amendment	Methodological details needed	<p>Strictly related to the previous comments. Some indications could be inserted about how to get the 95% confidence level, in order that this tricky statistical inference is well performed. Analytical approach as in Chen or bootstrapping/empirical? Etc</p>	Bonollo, Michele	Iason Consulting Ltd	Publish

5	Market risk	6.4 Distribution and correlation assumptions	148, 149	193	Amendment	Correlations levels	Even if some issuers in the IRC portfolio are less liquid, the market correlations derived from market data (such as equity prices, spread, asset swaps spread), are more intuitive and objective than the correlations derived from calibrated multi-factor models. In this EGM draft version nothing has been changed with respect to the current one. We believe that some constraint could be set on the IRC issuers correlations, to avoid that they deviate too much from the market correlations. Just as an example, a relative threshold of +25% (related to the same time window) could easily prevent from a too large (unreliable) discrepancy.	Bonollo, Michele	Iason Consulting Ltd	Publish
6	Market risk	6.5 Ratings, probabilities of default and recovery rate assumptions	156	196	Amendment	More details needed about the rating assignment process / methodology	The par. 156 clarifies that <i>"If the ratings, PDs or RRs have been adjusted or have not been assigned using the usual automated process..."</i> . As well shown in the paper by the EU commission "Study on the Feasibility of Alternatives to Credit Ratings", Decembre 2015, there various techniques in the market to assign the rating. The most popular consists of taking (or averaging) the rating provided by the agencies, some IRC validated baks adopt the "market implied rating": briefly the rating (for the IRC model) in assigned depending on the magnitude of the spread of the issuer with respect to a large basket of liquid bonds. The paper of the EU Commission highlights strenghts and weakness of the market implied approach, see Section 3.3.1 and Table 9. Given that this part of the EGM draft is the same as the current version, and given that the rating starting allocation (along with the transition matrix) plays a relevant role in the IRC calculation, we think that some more prescriptive guidelines about the allowed approaches should be defined, to avoid a dangerous (too) heterogenous framework.	Bonollo, Michele	Iason Consulting Ltd	Publish
7	Market risk	6.5 Ratings, probabilities of default and recovery rate assumptions	158	197	Amendment	Difference between IRD PDs and (adjusted) market implied PDs	The (NEW) final part of the par.158 requires to the banks to compare and analyze the cited difference. We strongly agree with this requirement, but the outcome (reporting, limits breach, escalation) of this process should be stated in a more concrete way	Bonollo, Michele	Iason Consulting Ltd	Publish
8	Market risk	6.5 Ratings, probabilities of default and recovery rate assumptions	159, 160	198	Amendment	Consistency of the migration matrix. More requirements needed	The par.159 (NEW in the EGM draft) requires that <i>"...the statistical methodology used to derive PDs is conceptually sound and that PDs are accurate and consistent across all rating grades..."</i> . Furthermore, the new statement of par.160 (par.158 in the current EGM) requires that <i>"...in the ECB's understanding, "risk sensitive" implies that all annual PDs should increase strictly in line with the decreasing creditworthiness of the obligor. The ECB also considers that institutions should calculate the PD ratios between adjacent rating grades and should justify the ratios that can be considered outliers when compared with other ratios or the median of the ratios..."</i> . We agree with these principles. Nevertheless, we deem they are not enough to ensure the consistency of the migration matrices. To this purpose, we believe that a more systematic list of desirable properties for the migration matrices should be established. In the following just some examples: 1) for each row in the matrix, the <i>cumulative</i> distribution function of the matrix that one can derive from the values in the cells, say $F(x)$, should dominate any below distribution, say $G(x)$, i.e. $F(x) > G(x)$ for any x , where (x) are the ordered rating classes, from the best one to default "D". 2) the probability of extremis jumps (migrations), say k classes migrations (both up or down), should be smaller than the probability of j classes small migrations, for any $k > j$; 3) if the bank adopts a <i>rebalancing horizon</i> , say quarterly, the quarterly migration matrix obtained by anynumerical procedure having as an input the yearly original matrix should be very accurate, i.e. by compounding 4 times the quartely matrix we must get back a matrix very close to the original one.	Bonollo, Michele	Iason Consulting Ltd	Publish