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Highlighting differences between TRIM & ECB Guide to Internal Model

Hot topic

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Highlights

In September 2018, ECB published the ECB Guide to internal Model which ensures that high supervisory standards are applied consistently for directly supervised institutions.

It aims at making sure that the rules regarding the use of internal models are understood in a consistent manner.

ECB guide brings clarity to the CRR on three risk types explained already in TRIM guidelines: Credit, Market and Counterparty Credit Risk. This paper aims at giving an overview of the main differences along with its the impact.

Final Version of the ECB guidelines is expected to be published in 2019.

In September 2018, ECB published the *ECB guide to internal model* which is a refinement of the TRIM guide that was made available for early industry feedback back in 2017. ECB guide to internal models aims to achieve two major objectives of the European Banking Supervision: i) ensuring that high supervisory standards are applied consistently for directly supervised institutions ii) the rules regarding the use of internal models, laid down in the Capital Requirements Regulation[1], are understood in a consistent manner.

The TRIM guideline focused mainly on three risk types which are Credit Risk, Market Risk and Counterparty Credit Risk (CCR). The new guide is a revised version of TRIM incorporating the comments received from the industry but also takes into account the experience gained in the on-site supervisory investigations conducted in 2017 and 2018. The ECB guide has been made available for public consultation from 7 September to 7 November. The final version, expected to be published in 2019, should incorporate all the relevant feedback received during this consultation period. Future updates of the ECB guide to internal models may be released without being put out to further public consultation.

Earlier in the year, in May, the ECB had published the revisions to the general governance topics. It covered principles for non-model-specific, particularly the internal ratings-based (IRB) approach, including overarching principles for internal models, implementation of the IRB approach, internal model governance, internal validation, internal audit, model use, model change management, and third-party involvement.

The ECB guide brings further clarity to the CRR. The new Credit Risk guidelines emphasise the importance of regulatory expectations with respect to **Data Infrastructure** and **Data Quality Management** in support of an institutions' rating system, but also shed light on some of the specific modelling aspects driven by the new EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures. From a Market Risk perspective, it encourages the use of specific methodology which is in line with its larger objective of insuring standard implementation of the CRR across the industry. It also tries to further align back office models with the front office counterparts by encouraging the incorporation of more risk factors in pricing models and a stringent framework for risks not in the VaR model. For CCR, it encourages the use of full simulations for exposure calculations and details the modelling aspects of IMM transactions. The guideline is more stringent than TRIM in terms of an alpha increase due to deficiencies in the IMM framework.

In this paper we try to highlight the major changes in the risk type specific chapters that the ECB's latest paper makes over the earlier published version of TRIM guidelines.

1. CRR - Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (OJ L 176, 27.6.2013, p. 1).

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Three specific risk types

The three risk-type-specific chapters of the ECB guide to internal models (i.e. the chapters on credit risk, market risk and counterparty credit risk) are intended to inform institutions in a transparent way about the ECB's understanding of various quantitative and qualitative aspects of the applicable regulations.

The content of each chapter of the ECB guide is based on the requirements of the CRR. However it does not aim to cover exhaustively all the topics related to the CRR requirements on the use of internal models for regulatory purposes. The areas covered in the different chapters are mainly based on the initial topics selected for the targeted review of internal models (TRIM) project. Some topics covered under each risk type are as below:

Credit risk

Internal ratings-based approach for calculating own funds requirements.

Initial section covering data maintenance for this approach.

Specific modelling aspects relating to estimation of probability of default (PD), loss given default (LGD) and conversion factor (CCF).

Market risk

Modelling aspects relating to back-testing of value-at-risk (VaR) models.

VaR and stressed VaR methodologies.

Incremental risk charge methodology.

Framework for risks not captured in the model engines(known as RNIME).

Counterparty credit risk

Guidance on the main qualitative and quantitative aspects of the Internal Model Method (IMM).

Note that the advanced method for credit valuation adjustment capital requirements is not in the scope of the ECB guide to internal models at present.

Major differences between the two guidelines

The structure of the two guidelines has not changed much. Both the papers cover three risk types. The focus is on achieving consistency in interpretation and application of the Internal models in accordance with the Capital Requirement regulations amongst the banks. The main difference concerns the section on data quality, which was included in the general topics chapter of the TRIM guide (under Section 9) and has now been moved to the credit risk chapter of the ECB guide to internal models. The data quality section has been further updated, but the changes mainly relate to minor amendments to provide further clarification as well as some editorial changes (e.g. order of the sub-sections).

Credit risk

The guidelines suggest to maintain a sound and robust Data management system that will improve the quality of Data, to be used in developing Internal Ratings Based (IRB) models.

On PD and LGD modelling, the new guidelines shed light on some of the specific modelling aspects related to risk differentiation for small and medium-sized enterprise portfolios and also incorporate new areas developed to cater for the specificities of low-default portfolios (including medium-size and large corporates, financial institutions and specialised lending). Most of the changes introduced are however driven by the new EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures (11/2017). In addition, the guidelines have focussed on identifying model drivers that reflect institutions policies and strategies while performing CCF calculations.

Data Infrastructure and data quality

1. The revised ECB guide further instructs banks to deploy robust, well-documented and adequately tested Information Technology (IT) systems, together with sound Data management practices. It sets out three detailed elements for the management of IRB data:
   a. IT systems: Infrastructure & Implementation testing;
   b. Policies, roles & responsibilities in data processing and data quality management; and
   c. Increased robustness in the Data quality management framework.
2. The guide clearly states that a sound and robust IT infrastructure plays an essential role in supporting an institution's rating systems. The text emphasises expectations on documentation of data flow, sources, functional detail and audit trail. Organisation wide policies and procedures should define IT testing approaches to ensuring integrity and robustness of data.
3. The revised text builds on the Data Quality Framework (previously in the General Topics chapter) incorporating a discussion on data quality dimensions such as completeness, accuracy, consistency, timelines, uniqueness, validity, availability/accessibility and traceability. Institutions should have in place a set of Data Quality Controls and a reporting framework to facilitate management oversight of risk data.

Probability of Default (PD)

1. The revised guide includes a discussion on 'Grade Assignment Dynamics' placing a stronger onus on institutions to ensure that PD models anticipate risk over a longer time horizon.
2. Long Run Average (LRA) default rates are discussed in the revised guide with reference to the EBA Guidelines on PD and LGD estimation – institutions should take into consideration the representativeness of the data period analysed in establishing LRA PDs.

3. As per the new guidelines, the expectation is that PD models achieve a meaningful risk differentiation taking into account:
    a. The different levels of risk across obligors or facilities assigned to different grades or pools to which a different PD is applied;
    b. The distribution of obligors or facilities – e.g. avoiding excessive concentration (or sparsity) in a given grades or pools; and
    c. The risk differentiation for different pools should provide homogeneity amongst the same risk groups, making the segmentation and models robust.
4. The revised guide includes a discussion on expectations for institutions using:
    a. Ratings of Third Parties (i.e. using a rating of a third party with a relationship to the obligor);
    b. Shadow Ratings systems that selects and weights the risk drivers to be used for risk differentiation;
    c. Mappings to external grades, which should be consistent and provide an adequate level of predictive ability; and

Consistency between the score-inferred PDs and the observed default rates.

Loss Given Default (LGD)

1. The new guidelines incorporate a more detailed discussion on the Reference Dataset (RDS) and the calculation of realised LGD; for example institutions can calculate realised LGD at a more aggregated level than individual facility level.
2. Realised LGD is discussed in the context of 'Economic Loss' - excluding fees and interest after default but including drawings, costs and discounting effects, in particular those relating to payment delays and the 'artificial cash flow' for those accounts that return to non-defaulted status.
3. In the case of multiple defaults, the new guidelines have added that institutions should either substantiate the independence of both (or more) default events or extend the period considered for identification of multiple defaults. This could mean providing sufficient evidence that the second default is unconnected to first default, which includes the curing process.
4. As per the guidelines, the number of grades and pools must be adequate for meaningful risk differentiation and for the quantification of LGD at the grade or pool level. Also, Institutions 'rating systems' must provide for a meaningful differentiation of risk, plus accurate and consistent quantitative estimates of risk.
5. The new guidelines lists some additional observations for calculating Long run Average LGD:
    a. To ensure that the estimates are accurate, institutions are not expected to cap realised LGD values; and
    b. Pools or facility grades having near to zero LGD should be carefully monitored and scrutinised with assurance that these have a sufficient number of observations.

Credit Conversion Factor (CCF)

The new guide outlines some requirements that institutions need to follow when considering the structure of CCF models and risk drivers Institutions should:

a. Analyse the risk drivers, not only at 12 months prior to default, but also within the year before default. Also, when choosing the appropriate reference date for a risk driver, institutions should take into account its volatility over time;
b. Ensure that the models reflect the institution's current policies and strategies regarding account monitoring, including limit monitoring and payment processing; and
c. Demonstrate the impact on CCF estimates of the change in customer product mix or characteristics that take place between the reference point and default date, plus assess the materiality of the impact.

Review of estimates

1. As per the new guidelines, for reviewing PD model estimates;
    a. The analysis should be performed at a grade level and for institutions using direct PD estimates, it should be performed at a sufficient level of granularity; and
    b. Institutions should also use a range of metrics to assess predictive ability, including statistical tests and graphical analysis of the evolution of default rates and PD.
2. In case of low defaults, the new guidelines state that institutions should perform a complimentary analysis of examining individual defaults separately from the overall portfolio.

PwC's Opinion – Credit Risk

While there has not been a significant change regarding the fundamentals of the IRB framework, there are increased expectations on institutions to make their approach more robust. The new guidelines place particular importance on areas such as, a robust IT maintenance system, Data Infrastructure & Quality, Small & Medium sized enterprise portfolios risk differentiation, specifics of the low-default portfolios, Long run (or Downturn) estimate calculations and several other modelling aspects driven by the new EBA Guidelines.

Overall, institutions need to focus on the following:

- Institutions should have robust supporting governance and control frameworks in place, around Data quality and infrastructure, to ensure the accuracy of their internal data;
- The effectiveness of PD, LGD and CCF models to adequately differentiate exposures into homogenous groups continues to be of critical importance – with particular onus on institutions to ensure adequate review and oversight during model development and ongoing monitoring; and
- When establishing Long Run (and Downturn) Estimates, institutions are expected to scrutinise their datasets from the perspectives of adequacy and representativeness of their current exposures, to ensure that estimates are not overly optimistic.

Further enhancements of the Guidelines are expected in the future, following the new RTS on the Specification of an Economic Downturn (11/2018) and the future EBA GL on the Downturn LGD estimation. The ECB IRB Regulatory landscape has been enriched in the meantime by the Regulation on the NPL Backstop addendum (11/2017) and the materiality threshold for credit obligations past due (11/2018).

Market Risk

From a market risk perspective the new guide to internal models is a step towards scheduled FRTB implementation in 2022. The key themes of TRIM are brought forward with some changes to make it coherent with FRTB implementation. Topics such as TB/BB Boundary & Banking book FX & Commodity positions to be treated as trading book are introduced along with prescribing a detailed framework for Risks not captured in the VaR Model. Below is the highlight of the major updates.

Trading Book – Banking Book Boundary

1. The ECB guide further instructs banks to document internal hedges and maintain proper documentation to distinguish between:
   a. hedges of a banking book exposure using an internal risk transfer with the regulatory trading book for:
      - Credit & Counterparty Risk
      - Interest Rate Risk
      - FX Risk
      - Commodity Risk
   b. hedges of a banking book equity risk exposure using a hedging instrument purchased from the market through the regulatory trading book
2. Back to back transactions may be excluded from calculation of own funds requirement as far as appropriate documentation is maintained and it can be demonstrated that there are no residual market risks stemming from them.

Treatment of Banking Book Positions

While TRIM allowed banks to exclude all banking book FX positions from the internal model, the new guide prescribes that FX & Commodity banking book positions be capitalised via internal models using the same treatment as trading books.

Methodology for VaR & Stressed VaR

ECB's new guidelines clarifies and provides details on various items relating to VaR calculations. Some new guidelines are:

1. Providing recommendations of best methodology to calculate returns for each asset class.

Risk factor category	Returns Methodology
Interest rate curves	Absolute or mixed approach
Bond spread	Absolute or mixed approach
CDS spread	Absolute or mixed approach
Foreign exchange rate	Relative approach
Equities spot	Relative approach
Commodities	Relative approach

2. Maintaining documentation which defines minimum data standards that risk factor time series should meet and provide justification for using poor quality time series. Given this the new guideline gets rid of the quarterly requirement to provide the percentage of time series of risk factors that are proxied.
3. Banks need to justify using a risk factor in the institution's pricing model but omitting it in the risk measurement. This would mean that FO pricing models would have to be more in line with BO risk models.

IRC Methodology

1. Under the new guidelines the ECB can ask an institution to use one particular approach between either constant risk over 1 year horizon or one year constant position under special circumstances.
2. The new guidelines introduce regulations for recognising hedging and diversification benefits between long and short positions in accordance with Article 375 (1) of the CRR. In particular it asks banks not to overestimate the effects of diversification and hedging that might arise from maturity mismatch between long and short positions occurring within the liquidity horizon or within the one-year risk modelling horizon.
3. In addition to this it asks banks, as part of the annual independent review and the initial and periodic validation of their IRC models, to assess quantitatively how maturity mismatches – that may lead to imbalanced positions within the modelling horizon – impact the IRC and the default risk in the IRC amounts.
4. The new guide removes the cap of 100% RR but asks banks to demonstrate that any such assumption made is conservative.

Risks Not In The Model Engine (RNIME or RNIV under PRA)

1. The new guidelines have provided further details over and above the TRIM guidelines for governance of Risks not in the VaR Model.
2. It explicitly recognises that Risk Not in Model Engine (RNIME or RNIV under PRA) add ons are not part of model engines and therefore will not be a part of the regulatory back testing VaR.
3. It asks banks to have validation policy for RNIME's in line with the policy for IMA models.
4. The new guidelines provide a range of situations that may give rise to RNIME's including but not limited to:
   a. Risk factors that are taken into account in the economic P&L, but not in the risk measurement model
   b. Weaknesses and limitations in the stochastic modelling of risk factors in the risk engines that are not linked to the valuation produced by the end-of-day valuation process
5. The guidelines highlight that institutions should be able to explain how each RNIME is identified and defined and strive to identify RNIMEs on an ongoing basis and as early as possible.
6. RNIME's should be capitalised in line with internal models, i.e. 99% confidence interval and 10 day LH. The Impact of each additional RNIME should be estimated as the incremental risk number.
7. Any RNIME that has an impact of reducing regulatory is not allowed to do so until it has been incorporated in the internal model.
8. It sets the threshold of 10% to the component of the risk number that can be attributed to RNIMEs.

PwC's Opinion – Market Risk

The new guidelines place particular importance on two essential factors – Alignment of the FO pricing models with the BO risk models & the treatment of Non Modellable Risk factors.

Both are interconnected and there is a conscious effort from regulators to try and force banks to model as many risk factors as possible. This is a move that is in line with the upcoming FRTB implementation and introduction of the PLA test. Diversification benefit for RNIMEs have been restricted along with requirements for justifications for RNIME identification and definition.

Overall, banks will have to look at modelling RNIMEs that were currently being left out of models on basis of materiality. We believe the stress on modelling as many risk factors as possible will only increase in the future and banks will benefit from starting early.

Counterparty Credit Risk (CCR)

The revised guideline explains in depth, how ECB interprets the articles in CRR and the way in which they should be implemented to maintain uniformity in the industry. It covers the same topics which were covered in TRIM guideline however with some changes and much detailed explanation of the articles in CRR. The main change relates to "alternative exposure calculations" (previously labelled fall-back solution in TRIM). "Alternative exposure calculations" are used for IMM transactions for which the related exposure is not fully simulated. The resulting exposure is then netted with simulated exposure in the same netting set. It proposes two alternative proposals for the treatment of these exposures. The industry is expected to comment on both proposals and to express a preference on one of them. Only one of the two proposals will be included in the final guideline.

- **Proposal 1:** The modelling of exposure values should be based on a forecasting distribution of joint changes in market variables. If any exposure is not based on forecasting distribution of simultaneous changes in market variables then ECB considers that it is not compliant with the CRR guidelines.

- **Proposal 2:** For calculation of alternate exposure, risk factor simulations should take into account the correlation with other risk factors simulated in the model and exposure time dependency. The reason for choice of alternate exposure should be pricing performance and the current exposure should be calculated using the T0 market value of the transactions in the IMM. In detail, ECB would consider alternative exposure calculation as compliant with CRR if the following have been adhered to:
  - Institution should demonstrate that the reason for an alternative exposure calculation is only pricing performance, or a performance issue related to calibrating certain transaction-specific risk factors;
  - Correlations with other risk factors simulated in the exposure model and joint changes of market variables should be taken into account
  - The risk factor simulation should take the exposure time dependency into account, in particular regarding the time grid point to which the margin period of risk is attached for margined trading;
  - For the purpose of calculating the current exposure of affected transactions, a pricing function should be implemented in the IMM or accessible from the IMM using t0 market values as available in the IMM.

The guideline encourages a full simulations for Internal Model Method (IMM) transactions and mentions criteria based on which transactions are not eligible for IMM. It also explains the modelling features of IMM like the Margin Period of Risk (MPOR), maturity and granularity along with collateral modelling. Both the guidelines TRIM and revised, clarifies an important aspect of the modelling of Effective expected positive exposure, where it mentions that in the calculation of EEPE, the sum of the weights should be equal to 1. If the longest maturity of the netting set is less than 1 year then the weights need to be rescaled such that the sum is 1.

Other differences between the two guidelines in CCR chapter wise are:

Trade Coverage

Synthetic Netting Sets: These netting sets are created when there is carve-out of transactions. Carve out means that the exposure of IMM transactions are calculated using non - IMM methods. Synthetic netting set is formed by splitting of contractual netting agreements.

1. The revised guide mentions that there would be one synthetic netting set for IMM transactions and separate synthetic netting sets for each of the Non- IMM Method. This is different from TRIM where all transactions under non-IMM Method were under a single netting set. This would mean a loss of netting due to multiple netting sets in case of revised guide.
2. Under ECB Guide there is change in one method of identifying pricing model deficiencies to carve out transactions from IMM. Revised guide mentions that to carve out a transaction, absolute value of the difference between the IMM transaction's T0 value and the respective benchmarking value should exceed 5% of abs value of benchmarking system as opposed to a 10% in TRIM. Another reason to carve out is that the difference exceeds 0.5% of notional as opposed to TRIM guide where carve out happens if abs value of price is above 10% of notional.

Margin Period of Risk

1. Regarding modelling of margin call and trade-related cash flows (CFs) within the MPOR, ECB's guide mentions that any non-payment of trade-related CFs to the defaulting counterparty, along with the previously mentioned DMP in TRIM, should also conform to the grace period and close out requirements as below:
   a. Default Management Process (DMP) which refers to all legal and operational actions performed by the institution upon counterparty default before the institution stops paying margin call and trade related CFs to the defaulted counterparty.
   b. The grace period and close-out requirements specified in the netting agreement, and in particular how the close-out is affected by paid or non-paid CFs.

   If there is no defined DMP, all trade-related CFs due by the institution should be assumed to be paid to the counterparty during the whole MPOR.
2. TRIM mentions that if margin call or trade related cash flows are ignored in effective expected positive exposure (Effective EPE) which is not justified by DMP, then based on the estimated impact the alpha multiplier might be increased. Increase in alpha multiplier would result in a higher exposure at default (EAD) & risk weighted assets (RWA) for the netting set.

   The revised guide mentions the method to calculate this alpha increase based on expected exposure add ons. The expected exposure add on per margin netting set is equal to the average of the CF spikes.

Collateral Modelling

ECB has mentioned in the revised guideline that the best practice to model collateral is to use the same model and perform joint modelling of the collateral value changes and transactions' value changes. The use of the same model refers in particular to the IMM's general modelling features applying the same generated scenarios.

If an institution is not able to model collateral jointly with the exposure, institution may use volatility adjustments to recognise the effects of margining on exposure.

Granularity – Time grid and scenarios

The threshold for deviation in EEPE due to the choice of time grid and number of scenarios has reduced from 10% to 5% in the revised guideline. Deviation beyond the threshold results in an alpha increase.

Revised guideline mentions that if EEPE calculated with a very dense time grid is more than 5% above the EEPE as calculated using its standard set of grid points for the whole portfolio or representative portfolio, then ECB can increase the alpha parameter.

The number of scenarios determine the numerical accuracy of the calculations and thus statistical error of expected exposure. If the numerical error is more than 5% of the EEPE for the whole portfolio or representative portfolio then ECB can increase the alpha parameter.

Alpha is a multiplier which can be increased to address general deficiencies in the IMM framework. By default alpha is set at 1.4. Exposure is calculated as a product of alpha and EEPE.

In the revised guideline, ECB considers that the increase in alpha multiplier should be in multiples of half a decimal point rather than 1 decimal point which was observed in TRIM.

PwC's Opinion – Counterparty Credit Risk

As per PwC, the revised guideline explains in depth and with much clarity, how ECB interprets the articles in CRR and the way in which they should be implemented to maintain uniformity in the industry. The new guideline encourages the adoption of the full simulations method to calculate exposure for IMM transactions.

In cases where an exposure for IMM transactions cannot be based on full simulations, banks would adopt "alternative exposure calculation". The final guide will have only one of the two proposals. PwC thinks that Proposal 1 would be preferred by banks with system efficiency of forecasting distributions with simultaneous changes in market variables. For the banks which do not have such system efficiency, Proposal 2 would be preferred.

The guideline mentions criteria based on which transactions are carved out from IMM to non-IMM Method. Synthetic netting sets are created for calculating exposure of each of the Non- IMM Methods which are then netted with the exposure from IMM Method in the same contractual agreement. PwC believes this would result in loss of netting benefits among transactions from different netting sets thus increasing the Exposure at default (EAD).

Overall, it mentions in detail the modelling aspects of IMM transactions. PwC also believes that the guide covers implications of not adopting the regulations appropriately which would result in an increase in EAD and thus RWA. Not adopting to the guide increases the alpha multiplier however PwC believes that the revised guideline is more stringent as compared to TRIM in respect of an increase in alpha multiplier. It is so because, in the revised guide the alpha multiplier increases by 0.5 decimal points for every 5% of difference rather than 1 decimal point for every 10% difference as was the case in TRIM.

How PwC can help you understand the implications for your business

- Conduct high level impact analysis to help you understand potential changes due to the ECB Guide to Internal Model.
- Help with the feedback on the ECB guide to Internal Model so that the feedback is incorporated in the final guidelines.
- Review your existing internal models and compare them to the requirements outlined by ECB for Internal Models.

Stand out for the right reasons

Financial services risk and regulation is an opportunity

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At PwC we work with you to embrace change in a way that delivers value to your customers, and long-term growth and profits for your business. With our help, you won't just avoid potential problems, you'll also get ahead.

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What do firms need to do?

- Firms should familiarise themselves with the new ECB guide to internal model, focusing on the key changes compared to the 2017 TRIM guidelines.
- Firms should take into account the ECB's expectations on credit risk, particularly those with respect to Data Infrastructure and Data Quality Management. They should start implementing the updated data infrastructure and data quality principles by deploying robust, well-documented and adequately tested IT systems, together with sound data management practices.
- Firms should pay attention to the ECB's expectations on documentation of data flow, sources, functional detail and audit trail, as well as on data quality dimensions.
- Firms should ensure adequate review and oversight during model development and ongoing monitoring. In particular, firms will need to implement the specific modelling aspects driven by the new EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures.
- Firms should ensure their back office risk models are aligned with their front office pricing models, while focusing on the treatment of Non Modellable Risk factors, particularly given this is also a requirement by the forthcoming FRTB regime.
- Firm should consider which Counterparty Credit Risk alternative exposure calculation to adopt based on a comprehensive review of whether they have system efficiency of forecasting distributions with simultaneous changes in market variables.
- Firms should remain attentive to the final version of the ECB guide internal models which is expected to be published in 2019. They should expect further enhancements of the Guidelines while bearing in mind that the ECB may release any future updates without any further public consultation.

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