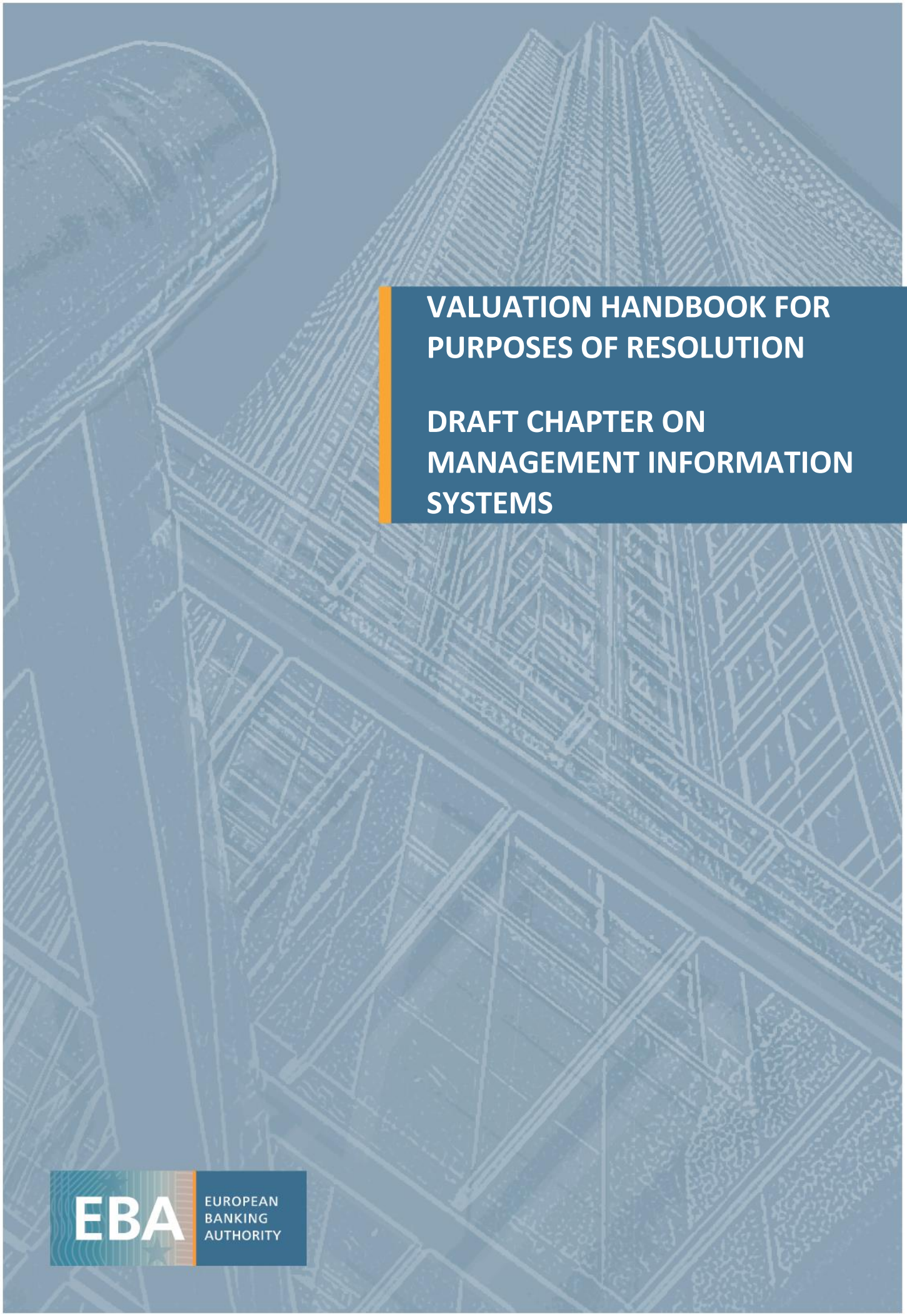

VALUATION HANDBOOK FOR PURPOSES OF RESOLUTION

DRAFT CHAPTER ON MANAGEMENT INFORMATION SYSTEMS

EBA EUROPEAN BANKING AUTHORITY

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Executive summary and background information

The present publication is part of and completes the EBA Handbook on Valuation for purposes of resolution ('Handbook') that was published on 22 February 2019[1], in particular it replaces Chapter 10 therein relating to Management Information Systems ('MIS'). Therefore, it has to be read as part of the Handbook and the same abbreviations and terminology used therein apply here.

This Chapter of the Handbook deals with the RAs' assessment, in the context of the resolvability assessment, of the institutions' capability to swiftly provide data and information to support a robust valuation in case of resolution. Enhancing institutions' preparedness in business as usual is of essence for a timely and robust valuation, which contributes to the soundness of the resolution decision, the effectiveness of resolution actions and the achievement of the resolution objectives.

This Chapter, like the whole Handbook, is based on Article 29(2) of the EBA Regulation and is addressed to RAs with a view to strengthening convergence of resolution practices across the EU to ensure a level playing field. It provides a common EU standard and support to the RAs in the interaction with those institutions destined to resolution for purposes of the development/adjustment of the Valuation MIS. Whilst this Handbook is not binding and not subject to comply/explain by the RAs, it is expected that RAs will follow the Handbook's approach when assessing institutions' Valuation MISs in the resolution planning phase.

Along with underscoring the importance of institutions' preparedness, this Handbook also acknowledges the importance of proportionality requirements and takes a broad but balanced approach to valuation preparedness. Rather than opting for the development of resolution specific valuation models as such, the Valuation MIS relies on institutions' internal capabilities as far as possible, as opposed to asking for resolution-specific submission of data or modelling capabilities in the first instance.

The Valuation MIS is a combination of the institutions' **internal valuation capabilities** and a **Data Dictionary for benchmarking purposes** and is supported by the institutions' **internal data aggregation capabilities**. Reliance on internal capabilities limits the imposition of specific data or information requirements by the RA to what is necessary to perform a robust valuation. Internal valuation models should be understood as the institution's internal systems able to support the estimation of accounting or economic values for specific on- and off-balance sheet positions[2]. The Data Dictionary covers assets and liabilities and off-balance sheet positions, and defines a benchmark of data and information expectations in the form of data fields that are expected to be useful by a valuer to perform a robust economic valuation before resolution (see Chapters 2 and 5). The Data Dictionary does not introduce any reporting obligation and is meant to be used by

[1] Available at https://eba.europa.eu/documents/10180/2613666/Valuation+Handbook.pdf/9f0772ea-a052-49e5-86ce-64c157adff10

[2] Institutions usually have in place internal valuation models and systems aimed at determining different values, namely: fair value of asset/liabilities for accounting purposes, risk metrics for risk management or compliance with capital requirements (e.g. Value-at-Risk, probabilities of default, etc), etc.

institutions to perform a self-assessment aimed at mapping the available data and information and comparing them with the Data Dictionary. The Data Dictionary is also meant to be used for benchmarking the input parameters used in an institution's internal valuation models where they are in place. The results of the self-assessment that should be required by the RA will be the basis of a dialogue between the RA and the institution where the RA would also take into account the specificities of the institution, including its business model, size and balance sheet materiality considerations. Where the RA's expectations are not met, it could consider taking actions proportionate to the nature and materiality of failure of such expectation, so to ensure the feasibility and credibility of the institution's resolvability.

10. Management Information Systems

10.1 Objective and legal basis of the Valuation MIS

10.1.1 Interaction between data/information, valuation and resolution

A robust valuation contributes to the effectiveness of resolution actions, including the legitimacy and soundness of the decision, and the achievement of the resolution objectives. To be robust, a valuation must rely on the **timely provision of high quality data and information to the valuer**. Completeness of the data will also be a central concern. Depending on e.g. the data cut-off date and the scope of consolidation, completeness may be checked by a comparison with accounting data. To ensure data availability and quality, there is the need to enhance institution's preparedness in the course of the resolution planning phase. As part of the resolvability assessment, the BRRD requires RAs to assess the institution's MIS. Relevant legal bases are points (9) and (10) of Section C of the Annex to the BRRD[3]. The Section on resolvability assessment of the Commission Delegated Regulation 2016/1075 further develops such requirements[4].

10.1.2 Sources of information under the Regulation on valuation before resolution

The interaction between valuation, information and preparedness is underscored in the Regulation on valuation before resolution. Article 4 sets out a **non-exhaustive list** of sources of information to perform the valuation in addition to the entity's financial statements, related audit reports and regulatory reporting as of a period ending as close as possible to the valuation date[5]. Such non-exhaustive list includes:

a) "the updated financial statements and regulatory reporting prepared by the entity as close as possible to the valuation date;
b) an explanation of the key methodologies, assumptions and judgements used by the entity in order to prepare the financial statements and regulatory reporting;
c) data contained in the records of the entity;
d) relevant market data;

[3] "When assessing the resolvability of an institution or group, the RA shall consider the following […]: (9) the "capacity of the management information systems to provide the information essential for the effective resolution of the institution at all times even under rapidly changing conditions"; (10) "the extent to which the institution has tested its management information systems under stress scenarios as defined by the RA".

[4] Article 22(3)(a) requires that a resolution plan contain at least "a description of the information, and processes for ensuring availability in an appropriate timescale of that information required for the purposes of valuation, in particular pursuant to Articles 36 and 49 of Directive 2014/59/EU […]". Article 29(2) of the same Regulation provides that in assessing the existence of potential impediments to resolution, the RA shall consider "the capability of the institution or group to provide information to carry out a valuation to determine the amount of write-down or recapitalization required".

[5] Article 4 of the Regulation on valuation before resolution clarifies that, in addition to the entity's financial statements, related audit reports and regulatory reporting as of a period ending as close as possible to the valuation date, relevant information may include those listed in that provision.

e) conclusions drawn by the valuer from discussion with management and auditors;
f) where available, supervisory assessments of the entity's financial condition, including information acquired pursuant to point (h) of Article 27(1) of Directive 2014/59/EU;
g) industry-wide assessments of asset quality, where relevant to the entity's assets, as well as stress test results;
h) valuations of peers, adequately adjusted to capture the entity's specific circumstances;
i) historical information, adequately adjusted to eliminate factors that are no longer relevant and to incorporate others that did not affect the historical information; or
j) trend analyses, adequately adjusted to reflect the entity's specific circumstances".

It is worth underscoring that in any case the valuation will be based on "any information pertinent to the valuation date which is deemed relevant by the valuer". This entails that the **valuer remains free to assess what information is relevant and what may be disregarded, whether it is complete or it needs to be integrated,** as well as the appropriateness of the use of an institution's **internal valuation models**.

Most data and information have to be provided by the institution to be valued. The use of further non-institution specific data and information, like market data or other kinds of information in the public domain, will conversely be within the valuer's remit. For purposes of developing macro-economic assumptions, the valuer may use economic forecasts elaborated by the public sector.

The Regulation on valuation before resolution expressly envisages the possibility for the valuation to rely on the institution's internal capabilities, by providing for the possibility for the valuer "to determine the most appropriate valuation methodologies that may rely on internal models, taking into account the entity's risk management framework and the quality of data and information available" (Article 7(2)). Overall the Regulation indicates that the ability of internal capabilities and systems to support resolution valuations should be assessed by the resolution authority as part of the resolvability assessment"[6], hence the need to prepare for resolution valuations in business as usual.

10.1.3 Development of the Valuation MIS

As a default indication, RAs should only require to develop the Valuation MIS to those **institutions that are assessed to go into resolution**. Institutions that are assessed to be destined to insolvency and for which the resolution plan does not envisage the institution to be put into resolution, should not be required to adapt their MIS for valuation purposes, since the institution will be liquidated. In order to ensure the **feasibility of the insolvency strategy**, however, the RA could request such institutions to develop a valuation MIS for the purposes strictly linked to the implementation of the normal insolvency proceedings having regard to the specificities of national insolvency law and practice, and in particular the execution timeline of insolvency actions.

10.2 Valuation MIS: general approach

[6] Recital (3) of the Regulation on valuation before resolution.

10.2.1 Overview and proportionality

There is no specific legal definition of MIS, however it can be broadly understood as a **mix of data, information and processes set-up and maintained by the institution for the organisation, aggregation and swift provision of high quality data and information that are necessary to support decisions within an institution**. With regard to the valuation for purposes of resolution, the MIS is expected to provide high quality data and information that are necessary to conduct robust valuations before resolution, including the ex ante NCWO valuation or, to the limited extent envisaged in Section 10.1.3 above, to implement insolvency decisions ('Valuation MIS').

The Valuation MIS is respectful of **proportionality** requirements and mindful of the potential costs that might be incurred by institutions to enhance preparedness for valuation purposes and aims at a balanced solution that is able to support a **robust valuation** and to meet the resolution objectives. In particular, it refrains from requiring institutions to build new valuation capabilities for resolution purposes in the first place. Instead, with a view to avoiding duplicative burdens, it relies to the extent possible on the institution's internal valuation models, including those used for e.g. pricing derivative positions or accounting related models, like those applied for calculating expected credit losses for IFRS 9 purposes. With regard to the Data Dictionary, this also includes for instance references to existing supervisory data and similar requirements. Proportionality requirements are also embedded in balance sheet materiality considerations to be determined by the RAs on a case by case basis.

To the extent possible, Valuation MIS should therefore be based on data and information already available to the institution, as well as the valuations produced by institution's '**internal valuation models**'. These should be understood as the institution's internal systems that analyse data and provide outputs that would support the estimation of accounting or economic value for specific on- and off-balance sheet items [7]. Reliance on internal capabilities makes the imposition of **additional/specific data or information requirements** limited for positions for which valuations need to be performed by the valuer. In order to uniformly determine a common EU reference for data and information for resolution valuation purposes, this Handbook develops a **data dictionary**, set out in **Annex II**, with common descriptions of each data field to serve as a single benchmark EU-wide ('Data Dictionary').

The **Data Dictionary for benchmarking purposes,** and does **not introduce any regular reporting requirements**, rather, in as much as a **benchmark,** it is intended to be used for conducting a **self-assessment to map the available data** and **information** within the institution and to **compare** such data and information with the Data Dictionary. The self-assessment, mapping and comparison with the Data Dictionary should also be performed for the input parameters used by the institution's internal valuation models and systems (see Sections 10.3 and 10.4 below). The results of such self-

[7] Recital (3) of the Regulation on valuation before resolution indicates that "the valuer should have access to any sources of relevant information and expertise, such as the internal records, systems, and models of the institution. The ability of internal capabilities and systems to support resolution valuations should be assessed by the RA as part of the resolvability assessment pursuant to Article 15 of Directive 2014/59/EU". See also Article 7(2) which reads "The valuer shall determine the most appropriate valuation methodologies which may rely on the entity's internal models where the valuer deems it appropriate taking into account the nature of the entity's risk management framework and the quality of data and information available".

assessment should then be used in the context of the **dialogue between the RA and the institution** in the resolution planning phase, having regard to the objective of supporting a robust valuation. In particular, RAs should be able to calibrate institution-specific requirements for the Valuation MIS in a proportionate manner, taking into account the specificities of the institution, including balance sheet materiality considerations, the types and features of the internal valuation models, the business model and activities, the size and complexity of the institution, etc ...

As part of the exercise, the RA should also assess the institution's ability to upload data and information into a **virtual data room ('VDR')**[8] in case needed.

The Valuation MIS approach therefore intends to be **broad**, **light and proportionate**. It is broad since it covers all asset and liability classes and off-balance sheet positions and sets out the Data Dictionary as a single common reference for the whole EU. At the same time, this approach is light and proportionate since it relies as much as possible on institutions' internal capabilities and does not introduce reporting requirements.

10.3 Internal valuation models

In many cases the valuation of the various asset and liability classes might rely on an institution's internal valuation models. This might in particular apply to (financial) assets and liabilities that are measured by an institution at their **fair value** in the financial statements (for instance listed shares or debt securities, as well as derivatives, valued in accordance e.g. with IFRS 9 and IFRS 13). For these positions, data needs might for instance depend on the accounting level of the fair value hierarchy (level 1, 2 and 3) according to which the respective valuation is categorised. In any case, it is necessary that the data provided (which can be supplemented with data obtained from external sources) enables the valuer to determine economic values for respective financial and / or other assets and liabilities and off balance sheet positions.

In case of **level 1 (financial) positions**, the valuer might need a proof that the assumption that an asset or liability is a level 1 instrument is correct and that the market price is really used by the institution. The institution should, for this purpose, provide the values, the source for these values and any further proof that the assets are level 1 through the VDR (reference date for all data as close as possible before the resolution decision date).

In case of **level 2 or level 3 (financial) positions**, i.e. mostly relating to more complex and / or partially or fully illiquid financial products, where valuation is actually based on specific institution's internal valuation models, the valuer should be provided with a description of the valuation model applied by the institution as well as the (key) assumptions and parameters – regardless of whether they are from institution's internal or from external sources – used in the institutions' models.

[8] Virtual data room it is generally intended to be an on-line facility where documents and information to perform a due diligence are uploaded.

In that case, as mentioned above, the Valuation MIS should ensure that the institution collects and makes available to the valuer through the VDR **an explanation of the key methodologies, assumptions, (input) parameters and judgements used by the entity in the processing of the data sets.**

To ensure that the valuer's independence is not affected, the **valuer should be able to review the building methodologies and replace the institution's assumptions**, in case an institution's valuation models / capabilities are applied, also with the purpose to make sure that ultimately economic values can be properly derived[9]. The valuer could also attempt to perform some additional tests (e.g. sample based and / or benchmarking against peer group) as appropriate to draw comfort around model outputs. In this respect institutions should be ready to provide data and information to support also this process. If the institution's valuation capabilities are considered by the valuer as inappropriate or not usable for deriving economic values, the valuer remains free to choose other approaches to calculate the economic values of the affected assets, liabilities or off balance sheet positions, for instance by applying the valuer's own valuation models and / or systems. For this purpose and depending on the circumstances, valuers would need to perform certain steps when using the institutions' internal valuation models. In order to provide RAs with an overview of the relevant process, the Textbox below illustrates a potential approache that could be applied by valuers for validation of the derivative internal valuation models.

Textbox: valuer's potential approach to derivative internal valuation model validation

A potential approach to derivative internal valuation model validation may be articulated in four steps.

First, an understanding of how the model is used should be achieved, which includes the range of the products priced by the model; hedging strategies or portfolio decisions made on the basis of model outputs; and the P&L process and exceptions.

Second, the model assumptions should be reviewed, which concerns the number and type of model components (stochastic differential equation, static distribution, parameterisation, etc.); the number of stochastic variables and complexity of modelled behaviour (distribution, mean reversion, drift, jumps, etc.); and model solution (e.g. closed-form solution, numerical method, Monte Carlo) and any techniques (e.g. accelerated Monte Carlo methods).

Third, the input data used should be assessed. This relates to similarity of market data to required instruments and use of proxies; interpolation/extrapolation; bid/ask, depth of market and other illiquidity considerations; as well as frequency of re-marking and availability of marks.

[9] Regulation on valuation before resolution, Article 7(1) reads "[…] Based on existing supervisory guidance or other generally recognised sources setting out criteria conducive to the fair and realistic measurement of different types of assets and liabilities, the valuer may challenge the assumptions, data, methodologies and judgements on which the entity based its valuations for financial reporting obligations or for the calculation of regulatory capital and capital requirements and disregard them for the purposes of the valuation".

Fourth, the model calibration should be reviewed. Model calibration refers to degrees of freedom and global/local considerations; calibration fit and number of different possible calibrations that give a good fit; economic intuition of parameter values; sensitivity to parameters; and frequency of recalibration.

In light of the description above, documents and information on the range of products covered by a valuation model, the model assumptions and its input data as well as the model calibration should be provided to the valuer.

10.4 Data dictionary for benchmarking purposes

10.4.1 Notion and purpose

The **Data Dictionary** covers assets and liabilities and off-balance sheet positions and defines a benchmark of **data and information** in the form of data fields that are expected to be useful to a valuer to perform an **economic valuation before resolution** (Chapters 2 and 5). As a general consideration, it may be assumed that data and information to perform Valuation 1 are already included within that provided to conduct a definitive Valuation 2. Data and information necessary to perform the ex ante NCWO valuation, in the context of Valuation 2, are also covered by the Data Dictionary. In addition, the Data Dictionary provides an indication of the **significance of each data field** for the performance of the valuation.

The Data Dictionary **does not create any reporting obligation**, but fulfils the purpose of a **common data benchmark applicable EU-wide**. It lays down common EU descriptions for each data field relevant for valuation purposes and the RA should make sure that there is a common understanding with the institutions of their actual meaning. In light of this, it should be considered a **harmonised benchmark** of the type of data that the institutions should collect, organise and provide to the RA / valuer and as part of the **validation and recalibration process** for those institutions whose valuation MIS includes internal valuation models.

As illustrated above, the primary use of the **Data Dictionary** should be for the purpose of a **self-assessment aimed at mapping the available data** and information within the institution and of **comparing the results of the self-assessment** with the Data Dictionary (i.e. benchmarking purpose). Such a self-assessment should be conducted for both those positions covered by an internal valuation model (in order to check if the model reflects commonly expected data input) and for those which are not covered by internal valuation models. Based on the results of such exercise, a **dialogue between the RA and the institution** would follow in the resolution planning phase, where RAs would also calibrate the assessment having regard to the specificities of the institution, including the identification of the material parts of the balance sheet, the features of the internal valuation models, the institution's business model, activities, size and complexity of the institution.

Save for those data fields where the Data Dictionary incorporates definitions enshrined in mandatory EU law applicable to the specific institution, this Handbook does not require RAs to assess the institution's ability to supply the data and information matching the exact description of

the specific data field set out in the Data Dictionary. This entails that when the Data Dictionary includes definitions set out for instance in FINREP or in AnaCredit, for those institutions subject to that reporting requirements, such definitions should exactly be matched and not be derogated by the institution. In all other cases, including those where the Data Dictionary refers to definitions embodied in EU law but not applicable to the specific institution, institutions should provide data and information that the RAs consider to satisfy the definitions. It will be part of the dialogue between the RA and the institution to determine a clear and common understanding of the definitions and the supplied data and whether it fulfils RA's expectations.

This approach about definition matching is consistent with the use of internal valuation models to perform the valuation before resolution. In line with this, the Data Dictionary does not always lay down detailed definitions, but rather descriptions for e.g. the different asset classes, collaterals or liabilities, as each individual case requires careful consideration, but rather data descriptions.

The Handbook does not impose a specific format to be used by institutions for the provision – via upload in the VDR - of the data and information to the valuer/RA, rather it allows institutions to use any format provided it is used in common valuation practice and allows valuers to apply common valuation models and methodologies.

The BRRD is silent about the exact timeline for the provision of data and information by the institution to the valuer/resolution authority. For purposes of this Handbook, the RA should assess the institutions' internal capability to provide and upload in the VDR high quality data and information, including the swiftness of such provision which should be timely in order to ensure a robust valuation.

10.4.2 Content of the Data Dictionary

To avoid double burden of institutions and to leverage as much as possible on internal capabilities, the Data Dictionary is based on the data fields used in the templates envisaged in the EU regulatory, supervisory and reporting framework – such as ECB AnaCredit, EBA NPL templates[10], ESMA securitisation templates[11] – which already incorporate common EU definitions. It therefore replicates from those existing templates the data fields that are relevant for valuation purposes and introduces new data fields when they are not covered by existing EU sources. Given that the Data Dictionary is for benchmarking purposes only, references to AnaCredit data fields do not impinge on non-Banking Union Member States and institutions.

For **liabilities**, the Data Dictionary is based in the first instance on the EBA Liability Data Structure template which is part of the EBA ITS on information for resolution planning reporting[12], and for

[10] The EBA NPL templates are available at the EBA's website (https://eba.europa.eu/risk-analysis-and-data/eba-work-on-npls). Although strictly speaking not part of EU law, such templates are an authoritative market and regulatory references for NPL valuation. To note that the proposal for Directive on credit servicers and credit purchasers mandates the EBA to transform such NPL templates into Implementing Technical Standards [reference to be updated].

[11] In accordance with the Regulation (EU) No. 2017/2402 laying down a general framework for securitisation and creating a specific framework for simple, transparent and standardised securitization

[12] See https://eba.europa.eu/regulation-and-policy/recovery-and-resolution/implementing-technical-standards-on-procedures-forms-and-templates-for-resolution-planning.

the data not contained therein that are relevant for valuation purposes, on the SRB Liability Data Template[13].

A section of the Data Dictionary also sets out some general data and information expectations to conduct a (financial) due diligence of a credit institution in order to support the valuation. However, data and information expectations related to an institution's equity valuation (see Chapter 6), that are relevant to determine the post conversion equity value in case of bail-in (see Chapter 7.2.3) are not covered by the Data Dictionary. Where the DCF methodology is used, such valuation might for instance require a business plan laying down the considerations described in Chapter 6.2 of the Handbook. These considerations include forecasts of an institution's profit and loss accounts, forecasted volumes, funding plans, risk weighted assets as well as capital plans.

10.5 Combination of internal valuation capabilities and Data Dictionary

The proposed approach of the interplay between institutions' internal valuation models and Data Dictionary for benchmarking purposes is summarised in **Annex III**, which, for sake of completeness, is based on FINREP positions. Annex III indicates for different groups of assets and liabilities – including loans, collateral, derivatives, debt securities issued – as well as of off-balance-sheet positions (e.g. loan commitments, financial guarantees) the data and information (data sources and/or potential additional data/information, including reference to the Data Dictionary) that are potentially relevant for the development or adjustment of the Valuation MIS. The FINREP basis of Annex III should not imply that the economic valuation would be related to balance sheet values or similar; it only aims to ensure that all assets, liabilities, on- and off- balance sheet positions, that are potentially relevant for the resolution valuation(s), are properly identified.

The table in Annex III pays attention also to **proportionality requirements** and indicates that potential simplifications of data/information needs might be considered on the basis of **materiality aspects of the balance sheet**. Proportionality requirements would also be captured and met by the less complex nature and the business models of smaller institutions, which might reduce the amount and type of data needs. It might similarly be reflected in the smaller number and lower complexity of the institution's internal valuation models. Furthermore, as already underscored, the indication of such data and information **should not be considered a minimum standard or an exhaustive list. It is not prescriptive and serves only for benchmarking purposes**.

10.6 Internal data aggregation capabilities

[13] See https://srb.europa.eu/en/content/liability-data-report.

To ensure the swift provision of data and information to the RA / valuer, the Valuation MIS leverages on the institution's ability to **aggregate data dispersed in various data sources within the institution**. Where, for instance, data related to one loan is extracted from different data sources, the institution should make sure that respective data can be easily linked to that loan through one unique identifier. If, for instance, the contractual data of a loan comes from one data source, and the data on the collateral provided for this loan from another data source, both data sets should have one **unique identifier**, so that the valuer / RA can link these two data sets to exactly this one loan.

This approach builds-up on supervisory efforts laid down in the BCBS *Principles for effective risk data aggregation and risk reporting (2013)*, '**BCBS 239**'[14]. BCBS 239 makes express reference to the improved effectiveness of the requirement in order to provide timely access to data as laid down in the FSB *Key Attributes of Effective Resolution Regimes for Financial Institutions* (notably FSB KA 4.12)[15].

Supervisory assessment of institution's data aggregation capabilities is envisaged in the EBA 2014 GL on common procedure and methodologies for the supervisory review and evaluation process (**SREP**)[16]. In addition, the EBA GL on institution's stress testing[17] envisage that institutions should endeavour to also refer to the extent appropriate to the principles for effective risk data aggregation and risk reporting of the Basel Committee on Banking Supervision principles for effective risk data aggregation and risk reporting.

10.7 Governance and assessment criteria of valuation MIS

10.7.1 Governance

[14] Available at: https://www.bis.org/publ/bcbs239.pdf. See also BCBS, Progress in adopting the Principles for effective risk data aggregation and risk reporting, March 2017, available at https://www.bis.org/bcbs/publ/d399.pdf It underscores that while some progress has been made, most G-SIBs have not fully implemented the Principles and the level of compliance with the Principles is unsatisfactory. In light of the Report's assessment and in order to promote further adoption of the Principles, the Committee has made additional recommendations in order to ensure full compliance by the banks.

[15] Paragraph 3 of the BCBS 239 document reads as follows: "Improving banks' ability to aggregate risk data will improve their resolvability. For global systemically important banks (G-SIBs) in particular, it is essential that resolution authorities have access to aggregate risk data that complies with the FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions4 as well as the principles set out below. For recovery, a robust data framework will help banks and supervisors anticipate problems ahead. It will also improve the prospects of finding alternative options to restore financial strength and viability when the firm comes under severe stress. For example, it could improve the prospects of finding a suitable merger partner."

[16] EBA GL/2014/13 of 19 December 2014 on common procedure and methodologies for the supervisory review and evaluation process (SREP), http://www.eba.europa.eu/documents/10180/935249/EBA-GL-2014-13+%28Guidelines+on+SREP+methodologies+and+processes%29.pdf/4b842c7e-3294-4947-94cd-ad7f94405d66

[17] See Section 4.3. of EBA/GL/2018/04 of 19 July 2018, https://www.eba.europa.eu/documents/10180/2282644/Guidelines+on+institutions+stress+testing+%28EBA-GL-2018-04%29.pdf

The Valuation MIS should be supported by institutions' adequate and effective **internal governance arrangements**, covering policies and **processes for data collection and aggregation** across the various areas of the institution and across the various group entities. This is in line with the institution's internal governance requirements, where it is acknowledged that the "reliability of financial and non-financial information reported both internally and externally"[18] as well as the **flow and consistency of data and information across the group** is part of the internal control framework under the responsibility of the management body and is primarily assessed by the competent authority in the context of the Supervisory Review and Evaluation Process ('SREP').

The RA should in particular assess that arrangements and processes address the need to ensure the availability of adequate Valuation MIS in the case of resolution. This could include for instance:

(a) The **preparedness and capacity of the institution** to collect and timely provide to the RA / valuer in manners other than manually, the information, data and data sources expected by the RA in accordance with this guidance. This includes the clear allocation of internal responsibilities within the institution as documented by internal policies and processes as well as the adoption of **adequate processes and systems** to perform the data collection and provision in compliance with the RA's requirements.

(b) The **execution of a mapping of the various data sources** collecting data and information relevant for valuation purposes and the comparison against the Data Dictionary for benchmarking purposes and as calibrated by the RA, having regard to the specificities of the institution (Section 10.4). As part of the exercise, the RA should ensure that the institution prepares and provides a description of the systems and of the purpose for which data is collected and processed by each mapped system as well as of the underlying assumptions.

(c) The **maintenance of a complete and updated manual and documentation**, covering in particular the description of the methodology, criteria, input parameters, underlying assumptions, procedures for assessing and ensuring the design and operational effectiveness for each relevant internal valuation model, where such models are in place within the institution. Such documentation should also cover the possibility to amend assumptions and input parameters, in order to enable the valuer do so in case a valuation needs to be performed.

(d) The adequacy of procedures for verifying and ensuring the **design and operational effectiveness** of relevant internal valuation models;

(e) The adequacy of procedures for **data verification, validation and remediation**, if necessary, in order to ensure the provision of **high quality data** to the valuer/RA.

[18] Paragraph 129(d) of the EBA Guidelines on internal governance under Directive 2013/36 (EBA/GL/2017/11 of 26 September 2017), available at https://www.eba.europa.eu/documents/10180/1972987/Final+Guidelines+on+Internal+Governance+%28EBA-GL-2017-11%29.pdf

(f) The **swift upload of data and information collected via the Valuation MIS in a VDR** in case needed, and the identification of a **person responsible** to be the contact with the RA / valuer for purposes of the valuation both in business as usual and in case of resolution. In particular, in respect of: (i) assets and liabilities valued by internal valuation capabilities, the documents and manuals maintained by the institution for each valuation capability, containing the description of the criteria, methodology, assumptions, internally and externally provided input parameters (including their sources) and scenarios; (ii) other assets and liabilities, the data provided by the institution through its internal capabilities, using the Data Dictionary as a benchmark.

10.7.2 Assessment

In accordance with the BRRD (Annex, Section C, points 9 and 10), the **RA is requested to assess as a minimum the following requirements**:

(a) the "**capacity** of the management information systems to provide the information essential for the effective resolution of the institution **at all times even under rapidly changing conditions**";

(b) "the extent to which the institution has tested its management information systems under **stress scenarios** as defined by the RA".

To assess the condition under (a), it is proposed that the RA assesses the systems and processes set-up by the institution referred to in the previous Section 10.7.1. on governance, also via on-site inspections if need be[19].

Where internal capabilities are assessed by the supervisor, in particular compliance with BCBS 239 and the quality of internal valuation models if relevant, the RA should coordinate with the supervisory authority and leverage as much as possible on the **reviews and assessments already conducted by the supervisor** in the context of SREP assessment[20] or other thematic reviews. Arrangements for the exchange of information between the supervisory and the resolution authority should be in place.

As regards the other **internal valuation models** that are not captured by the supervisory reviews or are assessed by the supervisory authority for purposes other than those relevant to the RA, the RAs' assessment should not aim at a 'model validation'. It should rather consist, for instance, in checking the internal valuation model governance, including whether the institution has adequate processes in place to ensure and verify, also by independent parties within the institution or by third parties, the accuracy and reliability of the methodologies and techniques, the relevant assumptions and input parameters, including respective sources of information, and in reviewing

[19] See Article 63(1)(a) BRRD as interpreted by Q&A n. 2017_3572 (http://www.eba.europa.eu/single-rule-book-qa/-/qna/search/publicId/2017_3556-2017_3572) and Article 36 SRM Regulation.

[20] To note that in accordance with the EBA Guidelines on Internal governance, the internal audit function "should verify in particular, the integrity of the processes ensuring the reliability of the institution's methods and techniques, and the assumptions and sources of information used in its internal models (e.g. risk modelling and accounting measurements)", paragraph 202.

model documentation indicated in letter d) of Section 10.7.1.As a further step and where appropriate, tests could also be run to gain a degree of assurance. In case of specific concerns, the RA could also require the institution to provide an expert report about one or more models of a specific institution. As a general remark, the assessment of the internal valuation capabilities could be based, as a starting point, on a report requested by the institution to an external auditor. This would be without prejudice to the RA's prerogative to request integrations and/or additional reviews to such assessment and to the RA's ultimate decision as to the overall adequacy of the Valuation MIS.

To assess the conditions under (b), institutions' internal stress scenarios should be designed, for instance to test the simultaneous use of internal capabilities to provide multiple data under time pressure, for instance relating to deposit outflows, liquidity management, tracking of mark-to-market valuations and similar. The idea of developing such scenarios would be to assess the capacity and effectiveness of Valuation MISs to provide high quality and updated data in stress conditions. These scenarios might for instance include assumed stress of processes, people and IT systems. The result of such stress scenarios might also show which areas of data extraction and collection might be particularly vulnerable.

Where the RA considers that the assessment conditions are not met, it should consider requiring the institution to adopt **measures to** ensure consistency with the RA's expectations that are proportionate to the nature and materiality of the obstacle to the credibility and feasibility of the institution's resolvability.

Annexes

Annex IV: Valuation of derivatives

Credit institutions conduct derivative transactions for risk management and trading purposes. Derivative transactions may be traded over-the-counter ('OTC') or exchange-traded, non-centrally or centrally cleared, they can be basic ('plain vanilla') or more complex transactions.

Valuation techniques for plain vanilla derivatives are rooted in the no-arbitrage principle, which means that the changes in the price of the derivative financial instrument can be replicated by a combination of the underlying security and lending or borrowing at the risk-free rate. Therefore, the derivative should not be priced differently than the replicating portfolio. However, when it comes to the valuation of exotic instruments or instruments, simulation techniques may be required.

In general, there are two alternatives to perform the valuation of the bank's derivative portfolio. To the extent possible, it may be expected that the valuer will try to use its own independent model/framework for valuation. However, there may be situations when it is not possible to develop an independent model due to various constraints (e.g., time, level of complexity, availability of required information, etc.) where the valuer would fall back on the institution's own internal valuation models.

In order to assess which alternative to follow, a good understanding of the institution's derivative portfolio and the valuation models applied by the institution would need to be developed. Institutions maintain documentation ('manuals') with respect to the methodologies, IT systems, software, processes and input data used in derivative valuations. The institution's manuals should provide the valuer with an overview of the institution's derivative portfolio and its valuation approach. It is expected that the valuer would review the manual to assess the complexity of the derivatives portfolio and the appropriate strategy to value it. In this connection, it is plausible that the valuer would already identify potential issues in the institution's valuation approach.

The complete dataset on derivatives that is available in the Valuation MIS would likely be requested when the valuer decides to use their own models, in order to allow for a timely performance of the valuation. It may be expected that the valuer would organize the data for valuation purposes rather than requesting the institution to do so. The data should be checked for completeness and correctness. In the case of complex derivatives, reference may also be made to the written contracts pertaining to the respective derivative financial instrument.

The availability of the complete dataset from the Valuation MIS in the VDR would make it possible for the valuer to load the data into their own models. The valuer will have to perform a mapping of the data to make the data fit the models used by the valuer. During this process, erroneous or missing data will become evident. Should it is not possible for the institution to provide the correct

data, it is expected that fall-back solutions would need to be worked out by the valuer in cooperation with the institution. It can be assumed that if the valuer decides to rely partially or fully on the institution's valuation model, they should validate the model used by the institution. It is noted, however, that model validation could be time consuming and ill-suited under time constraint. In order to provide RAs with an overview of the relevant process, description below provides a conceptual illustration of the approach for validation of the derivative internal valuation models.

Model validation comprises two major steps: review and testing.

First, the the setup of the model should be reviewed.

Second, a rigorous testing of the institution's internal valuation model to draw comfort around model output should be performed. For each class of derivative financial instrument, the valuer should perform their own valuation given the inputs of the institution. These inputs comprise both data on the derivative contracts and market data used by the institution. Furthermore, the institution will be asked to perform the calculations with inputs provided by the valuer. The results from the institution's internal model would then be compared to the results from the valuer's own model. Appropriate sampling techniques should be applied to validate results. The output from the institution's internal valuation models can be used if no methodological issues and material differences between the institution's and the valuer's own results arise from the review. Methodological issues can stem from, for example, the choice of market data, e.g. interest rates used to construct yield curves, and methods to derive input parameters, e.g. bootstrapping of yield curves.

It is also possible to use partial results and amend the output provided by the institution as necessary. These can be, for example, cash flows produced by the internal model which the valuer then discounts with their own discount rates or, no-default values from the internal model that are adjusted for counterparty's risk by the valuer. The treatment of counterparty credit risk requires special consideration when the valuer performs their own valuation or validates the institution's internal valuation model. Conventional derivative valuation models (e.g., no-arbitrage forward price formula, Black-Merton-Scholes) yield 'no-default values' that do not capture the counterparty credit risk inherent in the derivative transaction. In general, counterparty credit risk is accounted for in a separate calculation. The valuation adjustment that reflects risk of counterparty default is referred to as Credit Valuation Adjustment ('CVA'). The CVA represents the present value of the cost associated with counterparty default. It is the probability-weighted expected loss in case of counterparty default. To determine the CVA, the valuer may divide the term to maturity into smaller intervals in which default can occur and calculates the following:

(a) Probability of counterparty default in each interval

(b) Present value of the expected loss that the bank would have if the counterparty defaults in the middle of the interval

Different approaches exist to determine the probability of default. In principle, default probabilities should be estimated based on market data rather than based on historical data. Market implied default probabilities derived from credit default swaps or other instruments are preferred. To calculate the CVA, it is not relevant whether the counterparty is another financial institution or not.

The CVA as calculated for regulatory purposes may be considered.

The application of a debit value adjustment, which is the expected gain from the bank's own default, is expected for the same reasons to be discussed in the valuation of funding liabilities.

In case collateral is pledged, the expected loss must be adjusted accordingly.

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