Committee on Payments and Market Infrastructures

Board of the International Organization of Securities Commissions

Governance Arrangements for critical OTC derivatives data elements (other than UTI and UPI)

October 2019
Executive summary

In 2009, the G20 Leaders agreed that all over-the-counter (OTC) derivatives transactions should be reported to trade repositories (TRs) to improve transparency, mitigate systemic risk and prevent market abuse. Aggregation of the data being reported across TRs will help Authorities to obtain a comprehensive view of the OTC derivatives market and activity. Such aggregation is feasible only if standardisation and harmonisation of important data elements is completed.

The Committee on Payments and Market infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) have developed global guidance on harmonisation of the Unique Transaction Identifier (UTI), Unique Product Identifier (UPI) and other critical OTC derivatives data elements (CDE) that may be reported to TRs. In this document, the CPMI and IOSCO set out the arrangements that govern the maintenance, oversight and global implementation of CDE (CDE Governance Arrangements).

The CPMI and IOSCO believe that:

- the CDE Governance Arrangements should meet nine key criteria;
- the CDE governance functions cover three broad areas: maintenance, oversight, and implementation;
- the effective execution of the CDE governance functions requires three different bodies, with different expertise and playing different roles: a Maintenance Body, an International Governance Body and Authorities;
- the execution of several maintenance functions should be assigned to the Maintenance Body and that the International Organization for Standardization (ISO) should take up this role;
- CDE should be included in the ISO 20022 data dictionary rather than adopting each of the CDE data elements as a separate ISO standard and that ISO 20022-compliant message(s) for CDE should be developed;
- the jurisdiction-level implementation of CDE across all jurisdictions should be completed within three years from when this report is published. In light of the varying scope of changes required in different jurisdictions, the CPMI and IOSCO do not believe that Authorities should seek to coordinate CDE implementation timelines across jurisdictions.

Furthermore, in coordination with the Financial Stability Board (FSB) in its capacity as the international body in charge of defining the Governance Arrangements for the UTI and the UPI, the CPMI and IOSCO conclude that the Regulatory Oversight Committee of the Global Legal Entity Identifier System (LEI ROC) is, subject to some necessary adaptations to its existing governance to make it fit for purpose for CDE governance, best positioned to take on the role of the International Governance Body for CDE by mid-2020, and, in the interim, the FSB will take on the functions that are allocated to the International Governance Body.
1. Introduction

1.1 Background

In 2009, the G20 Leaders agreed that all over-the-counter (OTC) derivatives transactions should be reported to trade repositories (TRs) to improve transparency, mitigate systemic risk and prevent market abuse. Aggregation of the data being reported across TRs will help Authorities to obtain a comprehensive view of the OTC derivatives market and activity. Such aggregation is feasible if “the work on standardisation and harmonisation of important data elements [is] completed”.

The CPMI and IOSCO have developed global guidance regarding the definition, format and allowable values of critical OTC derivatives data elements that may be reported to TRs, including the UTI, the UPI and other critical data elements (CDE). The Technical Guidance on the Harmonisation of the Unique Transaction Identifier (UTI) was published in February 2017, the Technical Guidance on the Harmonisation of the Unique Product Identifier (UPI) in September 2017, and the Technical Guidance on the Harmonisation of critical OTC derivatives data elements (other than UTI and UPI) in April 2018.

In this report, the CPMI and IOSCO set out Governance Arrangements for the critical data elements other than the UTI and UPI (CDE Governance Arrangements). The CPMI and IOSCO acknowledge that CDE need to be implemented globally but also that the definitions, allowable values and possibly also the formats of CDE will need maintenance and governance in order to ensure that they remain up-to-date and evolve to reflect and support market practices and Authorities’ needs. The CDE Governance Arrangements set out below address both implementation and maintenance of CDE, together with their oversight. The FSB has published conclusions on Governance Arrangements and implementation plan for the UTI in December 2017 and for the UPI in October 2019.

1.2 CDE Governance Arrangements

This document discusses the key criteria for the CDE Governance Arrangements (Section 2), the different areas of the CDE governance functions (Section 3) and the allocation of those governance functions to different bodies, ie the Maintenance Body, the International Governance Body and Authorities (Section 4).

The document then sets out the Governance Arrangements for the execution of some maintenance functions by the Maintenance Body (Section 5) and identifies the International Governance Body for CDE (Section 6). Finally, Section 7 illustrates the implementation timeline.

In developing this document, the CPMI and IOSCO have taken into account the responses to the public consultation that took place in August–September 2018. Each section provides a brief summary and analysis of the comments received.

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1 TRs are also known as swap data repositories (SDRs) in the United States.
3 See www.bis.org/cpmi/publ/d158.pdf.
4 See www.bis.org/cpmi/publ/d169.pdf.
5 See www.bis.org/cpmi/publ/d175.pdf.
6 The CPMI and IOSCO will not address other issues that are already or planned to be covered by other international workstreams.
8 www.bis.org/cpmi/publ/d182.pdf.
2 Key criteria for CDE Governance Arrangements

In order to identify the most appropriate CDE Governance Arrangements, there is a need to set out key criteria for evaluating different possible options. The CPMI and IOSCO have defined nine key criteria that the CDE Governance Arrangements should meet. The list is based on the experience of the CPMI and IOSCO technical harmonisation work, and taking into account the FSB’s conclusions on Governance Arrangements for the UTI, FSB’s consultations on the Governance for the UPI, as well as comments received during the public consultation.

2.1 Summary of responses received during the public consultation

Respondents welcomed the key criteria proposed in the consultative report, none of which was considered irrelevant. In some cases, stakeholders suggested to introduce further criteria, such as “Internationally recognisable” – hinting that CDE Governance Arrangements should enable the CDE to be recognised globally – and “Responsiveness” – suggesting that CDE Governance Arrangements should contribute to efficient decision-making by the International Governance Body. These suggestions were not incorporated. “Responsiveness” is effectively already covered by the “Fit-for-purpose” criterion. The suggested introduction of “Internationally recognisable” as a criterion is also unnecessary as the CDE Technical Guidance was designed to serve as global guidance.

Further, one respondent suggested to include in the criterion “Public interest” a reference to the criterion “Change only as needed”. The CPMI and IOSCO consider, however, that the two criteria should remain independent as they relate to two separate aspects of CDE Governance Arrangements: its broad purpose (“Public interest”) and the need to minimise the impact of changes on stakeholders (“Change only as needed”).

2.2 Key criteria

(1) Consultative change process

Stakeholders should be appropriately involved, so that they can provide insight into any new market development affecting the harmonisation of CDE and provide expertise on market practices as appropriate.

(2) Public interest

Revisions to CDE should be driven by public and regulatory interest.

The G20 summit in Pittsburgh agreed to improve transparency, mitigate systemic risk, and protect against market abuse by having all OTC derivatives transactions reported to TRs. Harmonised CDE and effective CDE Governance Arrangements will support these goals by facilitating the consistent aggregation of OTC derivatives data reported to TRs at a global level.

(3) Fit for purpose

Bodies to whom CDE governance functions are assigned should be able to perform their respective functions in a timely and efficient manner and should have reasonable access to the necessary resources and information to do so. Further, the CDE Governance Arrangements should ensure that the CDE Technical Guidance and CDE Data Standards remain well adapted to Authorities’ needs.
(4) Change only as needed

Change requests for CDE should be approved on a need-only basis (e.g., Authorities’ needs or developments in market practices) and consider the benefits and costs of such changes, to minimise any impact on relevant stakeholders.

(5) Open access

Access to and use of CDE (including definitions, formats and allowable values) should be unrestricted and available free of charge. In particular, the CDE Technical Guidance and CDE Data Standards should remain open source and freely available, to ensure a level playing field for all stakeholders and users of the OTC derivatives data.

(6) Intellectual property

Use of the CDE (including their definitions, formats and allowable values) should not be subject to any intellectual property restriction.

(7) Lean

The CDE Governance Arrangements should not be unduly costly or complex.

(8) Compatibility

CDE Data Standards should be agnostic to existing communication protocols and should be implementable in any existing syntax.

(9) Consideration of other arrangements

The CDE Governance Arrangements should take into account arrangements for other data elements, such as the LEI, UTI and UPI.

3 Areas of CDE governance functions

The CPMI and IOSCO believe that the CDE governance functions should cover three broad areas: (1) maintenance; (2) oversight; and (3) implementation.

3.1 Summary of responses received during the public consultation

Overall, respondents to the public consultation generally agreed with the proposed areas of CDE governance functions. In particular, there was a general consensus that, in the case of material changes to definitions, formats or allowable values of the data elements covered in the CDE Data Standards, the CDE Technical Guidance should be updated in line with the changes.

3.2 CDE areas of governance functions

AREA 1: Maintenance functions

CDE maintenance encompasses the following functions:

1.1 Updating definitions, formats and allowable values of data elements covered in the CDE Data Standards consistently with the Authorities’ needs and purposes for which the CDE Technical Guidance was developed.
1.2 Updating (adding/removing) the list of data elements covered in the CDE Data Standards consistently with the Authorities’ needs.

1.3 Updating of the CDE Technical Guidance. Such updates should take into account the evolution in market practices, Authorities’ needs and purposes for which the CDE Technical Guidance was developed. In addition, the maintenance process is expected to tackle the harmonisation of certain data elements and allowable values that were not included in the CDE Technical Guidance (e.g., data elements related to events, allowable values for the following data elements: Price unit of measure, Quantity unit of measure and Custom basket constituents’ unit of measure).

AREA 2: Oversight functions

CDE oversight encompasses the following functions:

2.1 Monitoring, analysing and resolving issues and requests related to the maintenance of the CDE Data Standards in a timely manner.

2.2 Decision-making among Authorities participating in the CDE Governance Arrangements and for matters that are of international and common relevance.

2.3 Liaising with the body that executes the maintenance functions.

AREA 3: Implementation functions

CDE implementation encompasses the following functions:

3.1 Processing requests for information (related to the CDE Technical Guidance) and providing clarifications.

3.2 Disseminating the CDE Technical Guidance, as addressed to Authorities, to facilitate its broad implementation.9

3.3 Communicating with relevant stakeholders about the CDE Technical Guidance for educational purposes.

3.4 Recommending how the CDE Technical Guidance should be implemented by Authorities, including possible levels of coordination.

3.5 Monitoring the implementation of the CDE Technical Guidance at the global level and identifying implementation issues that may hinder a harmonised approach to OTC derivatives data reporting.

3.6 Assessing the extent to which the reporting of CDE to TRs conforms to the jurisdictional implementation of the CDE Technical Guidance.

4 Allocation of CDE governance functions to different bodies

The CPMI and IOSCO believe that the effective execution of the CDE governance functions requires three different bodies, with different expertise and playing different roles: the Maintenance Body, the

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9 The CPMI and IOSCO have allocated a number of governance functions to three different bodies, as described in section 4.4 and elsewhere in this report. The maintenance, oversight, and implementation of CDE, and related governance functions performed by such bodies regarding the CDE Technical Guidance do not have any bearing for the way that guidance issued by CPMI and IOSCO in areas other than CDE is used or treated by CPMI and IOSCO.
4.1 Summary of responses received during the public consultation

Overall, respondents to the public consultation generally agreed with the proposed allocation of CDE governance functions.

One respondent advocated the need for industry participants to have direct access to the International Governance Body to request changes to the CDE Data Standards. There was a general consensus among other respondents that the current framework used by CPMI and IOSCO to consult the industry is an effective way for Authorities to receive input from the industry. The CPMI and IOSCO conclude that the International Governance Body should consider consulting the industry in the case of maintenance requests that could result in updates to the CDE Data Standards, taking into account, in particular, the “consultative change process” and “change only as needed” criteria set out in Section 2.2. The CPMI and IOSCO also believe that stakeholders should be able to engage directly with the Maintenance Body. The CPMI and IOSCO believe that the International Governance Body’s consultation mechanism and stakeholders’ direct access to the Maintenance Body are an appropriate way for industry’s input to be taken into account as part of the CDE maintenance process.

One respondent called for the International Governance Body to audit the Maintenance Body. The CPMI and IOSCO agree that monitoring and overseeing of the Maintenance Body will be part of the International Governance Body’s remit but a formal audit of the Maintenance Body will not be necessary given the Maintenance Body’s technical role.

4.2 Governance Arrangements for Area 1, Execution of maintenance functions

4.2.1. Updating definitions, formats and allowable values of data elements covered in the CDE Data Standards consistently with the Authorities’ needs and purposes for which the CDE Technical Guidance was developed. The CPMI and IOSCO allocate this function to the Maintenance Body.13

This function refers to technical updates of the CDE Data Standards that the Maintenance Body executes as directed by the International Governance Body. Should a significant number of stakeholders request updates to definitions, formats or allowable values of CDE Data Standards as well as clarity on dependencies between data elements, the Maintenance Body could advise the International Governance Body on the necessity of an update of definitions, formats and allowable values. There may be some updates that the International Governance Body may consider delegating to the Maintenance Body to routinely implement, while other updates would need to be consulted on with the International Governance Body. Any policy considerations related to the CDE Data Standards will necessarily remain

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10 The glossary in Annex 1 provides an explanation of how these terms are used in this report.

11 In this report, the CPMI and IOSCO have allocated a number of governance functions to three different bodies, as described in the sections below. Any actions performed or decisions made by these bodies to execute the allocated functions reflect the views of the relevant body and its applicable governance arrangements, and not the views or authority of the CPMI or IOSCO.

12 This section relies on the assessment of CDE against other OTC derivatives data elements (UTI, UPI, LEI) included in the Consultative report.

13 Any future updates to the CDE Data Standards should be attributable to the Maintenance Body and not the CPMI or IOSCO.
outside the realm of this Area 1 governance function and form part of any governance structure described for Area 2 (Section 4.3).

4.2.2. Updating (adding/removing) the list of data elements covered in the CDE Data Standards consistently with the Authorities’ needs. The CPMI and IOSCO allocate this function to the Maintenance Body.\(^\text{14}\)

This function refers to the technical update of the list of data elements covered in the CDE Data Standards that the Maintenance Body executes as directed by the International Governance Body. The Maintenance Body could advise the International Governance Body on the necessity of an update of the CDE list. Any policy considerations related to the CDE Data Standards will necessarily remain outside the realm of this Area 1 governance function and form part of any governance structure described below for Area 2.

4.2.3. Updating of the CDE Technical Guidance. The CPMI and IOSCO allocate this function to the International Governance Body.\(^\text{15}\)

The International Governance Body may consider updating the CDE Technical Guidance in response to evolution in market practices, as well as Authorities’ needs and purposes for which the CDE Technical Guidance was developed.\(^\text{16}\)

If updates to the CDE Data Standards are substantial (eg adding or removing data elements), the International Governance Body is expected to update the CDE Technical Guidance. If the updates to the CDE Data Standards are minor (eg corrections of errors, technical improvements, clarifications such as the one mentioned under Section 4.2.1 above), the International Governance Body may decide not to update the CDE Technical Guidance, or not update it immediately. When assessing potential updates to the CDE Technical Guidance, the International Governance Body will follow the criteria specified in Section 2.2, in particular “consultative change process” and “change only as needed”.

As the CDE Technical Guidance is global guidance addressed to all Authorities, updates to the CDE Technical Guidance will need to be agreed by the Authorities in the International Governance Body.

4.3 Governance Arrangements for Area 2, Oversight functions

4.3.1 Monitoring, analysing and resolving issues and requests related to the maintenance of the CDE Data Standards in a timely manner. The CPMI and IOSCO allocate this function to the International Governance Body or to the Maintenance Body as follows.

The Maintenance Body will monitor and analyse issues related to maintenance of the CDE Data Standards as well as maintenance requests raised by stakeholders. Based on this analysis, the Maintenance Body will inform the International Governance Body of a maintenance request, if the Maintenance Body sees a case for making changes to the CDE Data Standards.

The International Governance Body will analyse maintenance requests (either raised by Authorities or escalated by the Maintenance Body) related to the CDE Data Standards. In the case of

\(^{14}\) Any future updates to the list of data elements in the CDE Data Standards should be attributable to the Maintenance Body and not the CPMI or IOSCO.

\(^{15}\) Any future updates to the CDE Technical Guidance should be attributable to the International Governance Body and not the CPMI or IOSCO.

\(^{16}\) Authorities could in the future determine that the purposes for which the CDE Technical Guidance was developed should change and therefore submit a request to update the CDE Data Standards to the International Governance Body.
maintenance requests that could result in an update to the CDE Data Standards, the International Governance Body should consider consulting stakeholders and gathering feedback from it as appropriate in line with the “consultative change process” criterion set out in Section 2.2.

The International Governance Body may consider monitoring and analysing issues related to the execution of the maintenance functions by the Maintenance Body, and liaise with the Maintenance Body to ensure their timely resolution. Furthermore, the International Governance Body may decide, with sufficient cause and where necessary in the public interest, to review the designation of the identified Maintenance Body as the entity allocated to carry out maintenance of CDE Data Standards, and to reconsider such a designation.

4.3.2 Decision-making among Authorities that are taking part in the CDE Governance Arrangements and for matters that are of international and common relevance. The CPMI and IOSCO allocate this function to the International Governance Body. Details of the decision-making mechanism among Authorities are provided in Section 6.

4.3.3 Liaising with the body that executes maintenance functions. The CPMI and IOSCO allocate this function to the International Governance Body. Details of the liaison mechanism are provided in Section 5.

4.4 Governance Arrangements for Area 3, Implementation functions

4.4.1 Processing requests for information (related to the CDE Technical Guidance) and providing clarifications. The CPMI and IOSCO allocate this function to the International Governance Body and to Authorities as follows.

The International Governance Body will address matters related to the CDE Technical Guidance that are of international or common relevance.

Authorities may wish to address matters regarding binding legal obligations stemming from Authorities’ implementations of the CDE Technical Guidance, because rules issued by Authorities in their respective jurisdictions will be the sole basis for any legal compliance obligation.

Authorities and the International Governance Body should, consistent with Authorities’ jurisdictions and the International Governance Body’s mandate and subject to its consensus procedures, coordinate the analysis and response to any requests for information that are of international or common relevance.

4.4.2 Disseminating the CDE Technical Guidance, as addressed to Authorities, to facilitate its broad implementation. 17 The CPMI and IOSCO allocate this function to the International Governance Body or Authorities as follows.

The CPMI and IOSCO have already published the CDE Technical Guidance and continue to disseminate it online.

The International Governance Body could also disseminate the CDE Technical Guidance upon request and, on an ad hoc basis, serve as the ongoing repository for it.

The Maintenance Body will disseminate the CDE Data Standards.

As the CDE Technical Guidance is relevant to (local and national) stakeholders only through the enactment of rules by Authorities, Authorities may wish to consider disseminating the CDE Technical Guidance to such stakeholders and provide additional explanations when relevant to the local implementation of the CDE Technical Guidance.

17 See footnote 9.
4.4.3 Communicating with relevant stakeholders about the CDE Technical Guidance for educational purposes. The CPMI and IOSCO allocate this function to the International Governance Body or to Authorities as follows.

There should be no significant need to promote the CDE Technical Guidance to its target audience – Authorities – beyond what has already been done by the CPMI and IOSCO. To the extent there is a need to be educated about the CDE Technical Guidance, Authorities could turn to each other or to the International Governance Body.

Authorities may wish to consider communicating with their stakeholders about the CDE Technical Guidance for educational purposes.

4.4.4 Recommending how the CDE Technical Guidance should be implemented by Authorities, including possible levels of coordination. The CPMI and IOSCO allocate this function to the International Governance Body as follows.

The International Governance Body may provide recommendations on the preferred timing of Authorities’ implementation of rules consistent with the CDE Technical Guidance.

4.4.5 Monitoring the implementation of the CDE Technical Guidance at the global level and identifying implementation issues that may hinder a harmonised approach to OTC derivatives data reporting. The CPMI and IOSCO allocate this function to the International Governance Body.

The CPMI and IOSCO believe that the International Governance Body will be best placed to facilitate the sharing across Authorities of their experience with the implementation of the CDE Technical Guidance in their own jurisdictions and to undertake such monitoring. In the case that issues are identified at the international level, the International Governance Body could make recommendations to Authorities.

4.4.6 Assessing the extent to which the reporting of CDE to TRs conforms to the jurisdictional implementation of the CDE Technical Guidance. The CPMI and IOSCO allocate this function to Authorities.

Authorities will perform this function because it relates to the jurisdictional implementation of the CDE Technical Guidance.

In some jurisdictions, the relevant authority for implementing the CDE Technical Guidance may not coincide with the authority for the above-noted conformity assessment. In some jurisdictions, the latter authority may assign the conformity assessment activities to TRs.

5 CDE Governance Arrangements for the execution of governance functions 1.1 and 1.2

5.1 Adoption of CDE within ISO 20022 data dictionary maintained by an International Standardisation Body

The CPMI and IOSCO believe that CDE should be included within ISO 20022 data dictionary and maintained by an International Standardisation Body that takes on the role of the Maintenance Body for the execution of the maintenance functions 1.1 and 1.2.

After having consulted the industry, the CPMI and IOSCO conclude that this is the best way to ensure that any updates to the CDE are made available to stakeholders and can be consistently implemented worldwide for the following reasons.
First, the CDE Data Standards are more likely to be disseminated and accepted than without the assistance of an International Standardisation Body.

Second, adopting CDE within ISO 20022 data dictionary will facilitate their inclusion into standardised messages (see Section 5.3.3), thus helping industry participants to program the CDE into electronic messaging systems. This practice will encourage broad CDE implementation and enhance data quality.

Furthermore, the execution of maintenance functions 1.1 and 1.2 is entirely technical in nature and will benefit from the experience and skills of an International Standardisation Body.

Finally, many of the CDE are tied to an existing standard from an International Standardisation Body. Consistency with such standards will make generation and sharing of the CDE more efficient.

Currently, there is no International Standardisation Body over which an International Governance Body would be able to have full control for data standards work. Nevertheless, participation by the International Governance Body in the appropriate decision-making processes of the Maintenance Body must ensure the execution of the maintenance functions such that the CDE Data Standards are and remain consistent with the purposes for which the CDE Technical Guidance was developed. The assumption that such an arrangement can be worked out with the preferred International Standardisation Body is important to the CPMI and IOSCO’s recommendation.

5.2 Allocation of the execution of the CDE maintenance functions 1.1 and 1.2 to the ISO

5.2.1 Summary of responses received during the public consultation

There was broad support for utilising the International Organization for Standardization (ISO) as the Maintenance Body for the execution of the CDE maintenance functions 1.1 and 1.2. Some respondents raised issues regarding the availability of experts and an efficient process to develop and enhance the ISO standards for CDE as well as a misalignment of mission of this International Standardisation Body. Also they questioned how the ISO would be able to engage with a broad set of stakeholders. The CPMI and IOSCO are of the opinion that the ISO offers a robust process that allows stakeholders to participate (see Section 5.2.2 for more details).

Where respondents asked for a public consultation process for proposed changes to CDE Data Standards to be introduced, the CPMI and IOSCO clarify that a public consultation mechanism is not included in the ISO 20022 governance, as explained in Section 5.3.1. However, in the case of maintenance requests that could result in an update to the CDE Data Standards, the International Governance Body should consider consulting the industry and gathering feedback from it.

Some other respondents argued that the potential use of CDE for purposes other than OTC derivatives would be outside the CPMI and IOSCO mandate. The CPMI and IOSCO clarify that, although CDE have been developed for OTC derivatives data reporting as the primary use case, they should not be considered to be in conflict with the International Governance Body mandate if a user of the ISO 20022 business dictionary should decide to use CDE in messages developed for purposes other than OTC derivatives data reporting.

Finally, some respondents mentioned that other bodies such as the Institute of Electrical and Electronics Engineers (IEEE) and the World Wide Web Consortium (W3C) could be considered as candidates for the Maintenance Body. However, they did not provide any rationale on what the advantages of such solutions would be compared with the ISO. All in all, these respondents seem to support the ISO as Maintenance Body. Nevertheless, in the next section, the CPMI and IOSCO briefly elaborate on those alternatives.
5.2.2 Allocation of the execution of the CDE maintenance functions

The CPMI and IOSCO believe that the execution of the maintenance functions 1.1 and 1.2 should be assigned to a single Maintenance Body, in order to ensure that all the more than 100 CDE are consistently maintained.

The CPMI and IOSCO also believe that the ISO should take up the role of the CDE Maintenance Body for the following reasons, with which most of the respondents largely agreed:

- Almost half of the CDE are already tied to an existing ISO standard.\(^{19}\) Thus, the ISO would be best placed to ensure consistency between the CDE Data Standards and other ISO standards.
- The ISO has long experience in maintaining data standards and has historically been flexible in permitting financial regulators to be involved in regulatory governance work as the registration agent for financial data standards.
- The ISO has experience in actively managing the technical aspects of data standards maintenance for regulatory standards, including technical specification work to translate a regulatory standard into a data standard.
- The ISO maintains a significant presence within the financial services community. The ISO International Data Standards are developed by groups of experts from all over the world that are part of larger groups called ISO Technical Committees. These experts negotiate all aspects of these standards, including their scope, key definitions and content. Although the CPMI and IOSCO have already specified the definitions, formats and allowable values of CDE via the CDE Technical Guidance, this financial services expertise would be valuable in developing technical specifications and International Data Standards for the CDE.

For all the reasons mentioned above, the CPMI and IOSCO believe that the ISO will be able to perform the role of the Maintenance Body such that the CDE Data Standards are, and will remain, consistent with the purposes for which the CDE Technical Guidance was developed.\(^{20}\) The specific tasks required to perform the CDE governance functions allocated to the Maintenance Body will be performed by the respective registration bodies within the ISO’s governance.\(^{21}\)

Alternatives to the ISO exist, such as the Object Management Group (OMG). The OMG is an international, open membership, not-for-profit standards consortium. The OMG’s focus is on the development of enterprise integration modelling standards. Relevant financial standardisation activities promoted under the OMG include the Financial Industry Business Ontology (FIBO) and the Financial Instrument Global Identifier (FIGI). Both of these standards are maintained by the OMG Finance Domain Task Force. The Institute of Electrical and Electronics Engineers (IEEE) and the World Wide Web Consortium (W3C) were also mentioned by some respondents as possible alternatives. IEEE is an organisation that develops global standards in a broad range of industries, including power and energy as well as information technology. W3C is the main international standards organisation for the World Wide Web.

However, it is the CPMI and IOSCO’s understanding that the ISO has greater depth in the financial services industry. The OMG, IEEE and W3C do maintain liaison relationships with the ISO, allowing the promulgation of each body’s standards to be recognised as International Data Standards.

\(^{19}\) Forty-one out of 101 data elements have allowable values that explicitly refer to ISO standards or are dates or timestamps in line with ISO 8601.

\(^{20}\) It is understood that the Maintenance Body could nevertheless still create a further version of the data elements’ allowable value list that market participants may use for purposes other than meeting jurisdictional regulatory reporting requirements. For example, the ISO 20022 Data Dictionary allows for different versions of the same data elements, for example, with different lists of allowable values.

\(^{21}\) More information on the ISO 20022 governance can be found in the rules for ISO 20022 registration bodies Governance at www.iso20022.org/sites/default/files/documents/general/ISO20022Governance.pdf.
5.3 Inclusion of CDE in the ISO 20022 Data Dictionary and development of ISO message(s) for CDE

5.3.1 Summary of responses received during the public consultation

Respondents to the public consultation widely supported the proposal to include the CDE into the ISO 20022 Data Dictionary. A few respondents requested further clarity on International Governance Body’s role in the development of reporting messages which includes the scope of the role and timing. And a few respondents highlighted the importance of aligning the CDE definitions and the Business Concepts within ISO 20022. The CPMI and IOSCO believe the work with the respective registration bodies within the ISO’s Governance in developing an ISO 20022 message for CDE will help with the alignment (Section 5.3.3). Some respondents also argued that exceptions to ISO standards should be considered, e.g., when it comes to offshore currencies that are not included in the ISO 4217 standard and for the usage of ISDA/FpML. One respondent called for formal guidance over data dependencies specific to CDE, beyond the relationships between data elements already included in the CDE Technical Guidance. Incorporating exceptions to the ISO standards and data dependencies specific to the CDE Technical Guidance should be handled in the creation of an ISO 20022 CDE message.

No respondent expressed concern that the potential significant involvement of market participants in the maintenance of CDE, should the CDE be included in ISO 20022, might negatively affect the function and efficacy of CDE as part of the harmonisation standards for OTC derivative transaction reporting. Some respondents indicated that a strong private/public partnership, especially consulting cross-industry experts, would improve the efficacy and applicability of CDE Data Standards in line with market evolution. And some respondents suggested that the input from market participants should always be sought before the International Governance Body directs the Maintenance Body to make any changes to the CDE Data Standards. As indicated in Section 5.2, the CPMI and IOSCO clarify that a public consultation mechanism is not included in the ISO 20022 governance (the standard is instead reviewed by the Standards Evaluation Group) but that, in the case of maintenance requests that could result in an update to the CDE Data Standards, the International Governance Body should consider consulting the industry.

5.3.2 Inclusion of CDE in the ISO 20022 Data Dictionary

The CPMI and IOSCO believe that the CDE should be included in ISO 20022 rather than adopting each of the CDE as a separate ISO standard. This is consistent with the view of respondents. The following reasons support this conclusion:

- Access by the public to ISO 20022 Data Dictionary items is free, whereas ISO standards are subject to a fee.
- Most CDE rely on Business Concepts that are already in the ISO 20022 Data Dictionary or could become Business Concepts without major obstacles. 

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22 Work with the respective registration bodies within the ISO’s Governance will clarify whether there is the need for one or multiple ISO 20022 CDE messages.

23 Some of the CDE are tied to existing ISO standards, e.g., some make reference to the ISO 4217 standard on currencies (e.g., Notional currency, Settlement currency, Option premium currency). While the format and allowable values for these data elements are determined in the ISO 4217 standard, they would still have to be included in the ISO 20022 Data Dictionary with their respective definitions and allowable values, as set out in the CDE Technical Guidance. More information can be found in the ISO 20022 Registration Procedures at www.iso20022.org/sites/default/files/documents/general/ISO20022RegistrationProcedures.pdf.
The process for including new data elements in the ISO 20022 Data Dictionary is simpler than the process for creating a separate standard for each new data element. Since the CDE are more than 100 data elements, this would support a timely adoption of the CDE as International Data Standards as well as timely updates to the CDE Data Standards in the face of changing market dynamics.

The inclusion of CDE in ISO 20022 would make the CDE Data Standards generally available for purposes other than OTC derivatives transaction reporting. This too would enhance their acceptance and use by industry, an important goal in ensuring reliable and widespread use of CDE Data Standards as a global standard.

ISO 20022 governance ensures a wide representation of industry experts in the respective bodies, with a change management process that takes one to two years and a fast-track process that could be completed within 12 weeks.

- The inclusion of CDE in the ISO 20022 Data Dictionary would also allow stakeholders to actively engage in the maintenance of CDE by submitting a change request to registered Business Concepts and (or) by taking part in the maintenance process of existing Business Concepts as a member of one or more ISO 20022 registration bodies.

The scope of the Maintenance Body’s work is clearly limited to the operational execution of the maintenance functions 1.1 and 1.2 (Sections 4.2.1 and 4.2.2).

### 5.3.3 Development of ISO 20022-compliant message(s) for CDE

The CPMI and IOSCO believe that ISO 20022-compliant message(s) for CDE should be developed (hereafter referred to as “ISO 20022 CDE Message”), for the following reasons.

- The scope of the ISO 20022 Data Dictionary is much wider than the OTC derivatives domain: the ISO 20022 Data Dictionary often contain many more elements that are not relevant for OTC derivatives. This could create the risk of misinterpreting how to correctly identify the CDE Data Standards within the ISO 20022 Data Dictionary, potentially resulting in implementation differences by Authorities and the CDE Technical Guidance not being harmonised.

- Moreover, the extensive use of ISO 20022 Data Dictionary elements by market participants for uses other than OTC derivatives trade reporting could potentially lead to multiple versions of the CDE Data Standards that respond to needs different from Authorities’ ones.

The creation of an ISO 20022 message for CDE will provide the International Governance Body with adequate control over how the ISO 20022 elements are utilised in OTC derivatives transaction reporting. The ISO 20022 CDE Message will clarify the version of the CDE Data Standards that allows harmonisation of OTC derivatives transaction reporting (ie that address Authorities’ needs). At the same time, stakeholders can create other versions of the CDE data elements within the ISO 20022 Data Dictionary to flexibly meet other needs. The ISO 20022 CDE Message will be agnostic to the communication protocol chosen in a given jurisdiction (ISO 20022 XML syntax or alternative transmission protocols, eg FIX, FPML).

The development of the ISO 20022 CDE Message, any future updates to the message and potential updates to the ISO 20022 Data Dictionary will follow the registration process as established by ISO. The International Governance Body will launch the registration process of the ISO 20022 CDE Message.

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24 More information can be found in the ISO 20022 Registration Procedures at www.iso20022.org/sites/default/files/documents/general/ISO20022RegistrationProcedures.pdf.
6. The International Governance Body for CDE (governance function 1.3 and governance areas 2 and 3)

6.1. Summary of responses received during the public consultation

There was a broad consensus around leveraging an existing body such as the International Governance Body, governing not just CDE but also UTI and UPI (given the interdependencies across CDE, UTI and UPI) and in order to minimise cost. At the same time, a few respondents also stated that the way the International Governance Body engages with the Maintenance Body with respect to CDE should be CDE-specific rather than necessarily the same way the International Governance Body governs the execution of the maintenance of UTI and UPI.

Some respondents thought that having a body with deep experience relevant to CDE was more important than a track record of governance per se. A few respondents identified a specific body; CPMI-IOSCO, the FSB and the LEI ROC were the bodies mentioned by those respondents.

6.2. International Governance Body for CDE

In coordination with the FSB tasked to develop Governance Arrangements for the UTI and the UPI, the CPMI and IOSCO identify the LEI ROC as best positioned to be the International Governance Body (IGB), provided that the LEI ROC makes appropriate adjustments to its existing governance to make it fit for purpose for UTI, UPI and CDE governance. This identification is made for the following reasons:

- The key driver for establishing UTI, UPI, CDE and LEI was the need to increase transparency in financial markets, mitigate systemic risk, and protect against market abuse following the 2008 financial crisis. The development of standards for these data elements was in response to a request from the G20 to achieve these objectives.
- Most of the principles and recommendations in the LEI ROC charter are equivalent to the ones defined in the CDE governance consultations.
- The LEI ROC already has many members that have the skills and expertise necessary to carry out the oversight functions of the CDE on top of the oversight functions for the LEI. These members of the LEI ROC already have experience with developing data infrastructure as a public good.
- The type of governance functions that the LEI ROC currently performs vis-à-vis the LEI are of the same nature as the ones that an International Governance Body would need to carry out for other data elements such as UTI, UPI and CDE
- The various data elements are interdependent. For example, the UTI code embeds the LEI code of the emitting entity; the LEI is used for the identification of the underlying entity of some OTC derivatives products, for which the UPI is used; and the LEI is referenced by several CDE...
- The public consultation suggests that industry would favour common and lean governance over CDE (and UTI and UPI). Adapting the LEI ROC so it is fit for purpose for governance of these data element standards in a single body further supports the goal of leanness, avoiding the proliferation of governance structures.

25 www.fsb.org/2019/10/governance-arrangements-for-the-upi/

26 www.leiroc.org/. There are similarities between CDE, UPI, UTI and LEI as well as differences which have a bearing for the role of the International Governance Body for each of these data standards. This is discussed in the CPMI and IOSCO consultative report on governance arrangements for the CDE, Annex 1 of which provides a summary view of these differences and similarities.
- Modifying the LEI ROC will have the advantage of minimising the amount of time needed to set up the permanent governance structure for the UPI, UTI and CDE.

In coordination with the FSB’s Working Group on UTI and UPI Governance (GUUG), CPMI and IOSCO conclude in particular that adjustments to the current LEI ROC Executive Committee are needed so that Authorities from jurisdictions that have mandated the use, or made specific steps to introduce the mandatory use, of CDE (and UTI and UPI) are sufficiently represented and empowered within the Executive Committee to be responsible for preparing proposals and recommendations related to CDE matters. The CPMI and IOSCO have, at this stage, left it to the LEI ROC to propose and implement the adjustments that are necessary to ensure that it is fit for purpose, and its governance is sufficiently reactive, to oversee the implementation and maintenance of CDE. These adaptations do not need to affect the membership or decision-making of the LEI ROC Plenary or the LEI ROC governance related to LEI matters.

In coordination with the FSB GUUG and the LEI ROC, the CPMI and IOSCO conclude in particular that adjustments to the current LEI ROC Executive Committee are needed so that Authorities from jurisdictions that have mandated the use, or made specific steps to introduce the mandatory use, of CDE (and UTI and UPI) are sufficiently represented and empowered within the Executive Committee to be responsible for preparing proposals and recommendations related to CDE matters. The CPMI and IOSCO have, at this stage, left it to the LEI ROC to propose and implement the adjustments that are necessary to ensure that it is fit for purpose, and its governance is sufficiently reactive, to oversee the implementation and maintenance of CDE. These adaptations do not need to affect the membership or decision-making of the LEI ROC Plenary or the LEI ROC governance related to LEI matters.

In coordination with the FSB GUUG and the LEI ROC, the CPMI and IOSCO believe that the LEI ROC should adopt and implement all necessary adjustments by mid-2020.

The CPMI and IOSCO concur that the transfer of the responsibilities of the governance function 1.3 and governance areas 2 and 3 to the LEI ROC will ultimately be made, after review by the FSB GUUG, upon an FSB decision that there has been a successful execution of the adjustments of the LEI ROC into the International Governance Body for CDE (as well as UTI and UPI).

On an interim and time-bound basis (ie. until the LEI ROC has finalised its adjustment process and the FSB has approved it as fit for purpose for CDE governance), the CPMI and IOSCO, in coordination with the FSB, have agreed that the FSB – through the FSB GUUG as augmented by some previous HG members – will take on the functions that are allocated to the International Governance Body, as set out in CDE governance function 1.3 and governance areas 2 and 3, overseeing the maintenance, implementation, and regulatory governance of CDE.

7 Implementation

7.1 Summary of responses received during the public consultation

Respondents asked for a clear implementation timeline for CDE to start as soon as possible and finish not later than a clearly specified point in time, and for the implementation plan to ensure a consistent adoption of the CDE Technical Guidance across jurisdictions. Some respondents also asked for increased transparency on the process dictating future changes to reporting requirements. However, there was no call for a fully synchronised implementation across jurisdictions and industries.

7.2 Implementation timeline

The CPMI and IOSCO agree with the industry that this final report on CDE governance should set out a clear and transparent implementation timeline and plan and believe that CDE implementation encompasses three distinct but interconnected processes:

(a) implementation of the CDE Governance Arrangements;
(b) implementation of the April 2018 CDE Technical Guidance by Authorities; and
(c) any potential updates to the April 2018 CDE Technical Guidance.

The key challenging aspects related to the implementation process (a) are (i) to have the International Governance Body in place together with an effective mechanism through which the International Governance Body can liaise with the ISO, and (ii) the inclusion of CDE in the ISO 20022 Data
Dictionary and the development of the ISO 20022 CDE Message. Further, the implementation of process (c) to update the CDE Technical Guidance also relies on the International Governance Body being in place.

As for the process (b), the jurisdiction-level implementation of CDE may entail legislative changes, regulatory rule-writing and public consultations by Authorities as well as system and technological changes to be made by TRs and reporting entities so that they can comply with the new regulatory rules. Depending on the scope of changes required in different jurisdictions, compliance with the new rules could be a lengthy process that occurs in one or more phases. Accordingly, the CPMI and IOSCO do not believe that Authorities should seek to coordinate CDE implementation timelines across jurisdictions. The jurisdiction-level implementation (legislative changes and regulatory rule-writing) could proceed in parallel with the work to include CDE in the ISO 20022 Data Dictionary and develop an ISO 20022 CDE Message, but the implementation by the industry is dependent on the dictionary/message work being largely finalised. The CPMI and IOSCO’s best judgment is that:

- The development of ISO 20022 CDE Message and inclusion of CDE within the ISO 20022 Data Dictionary can be finalised in approximately 12 months;
- the necessary legislative and regulatory changes in most jurisdictions may take one to two years to be adopted (although work can start in parallel with the development of the ISO 20022 CDE Message as mentioned above); and
- in many jurisdictions, the industry will need at least 12 months after the rules in those jurisdictions are adopted to implement and be ready to start complying (maybe in a phased-in fashion) with the new rules.

In the light of the assessment above, the CPMI and IOSCO believe that a target timeline for the jurisdiction-level implementation of CDE across all jurisdictions should be three years from when this report is published. Further, the CPMI and IOSCO do not believe that a fully synchronised CDE regulatory and technological implementation across jurisdictions and industry can be achieved.

This recommendation is subject to modification by the International Governance Body if convincing evidence indicates the need for modification. In particular, some synchronisation of this implementation with implementation of other regulatory requirements (eg the reporting of UTI and UPI), may be desirable and may influence this timeline.
## Annex 1: Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Authorities</td>
<td>National or regional relevant authorities.</td>
</tr>
<tr>
<td>CDE</td>
<td>Critical data elements other than UTI and UPI, including the definition, format and allowable values, as defined in the April 2018 CPMI-IOSCO Technical Guidance on the Harmonisation of critical OTC derivatives data elements (other than UTI and UPI).</td>
</tr>
<tr>
<td>Data Standard</td>
<td>A set of characteristics or qualities that describes the features of a Data Element. A Data Standard for a given Data Element includes or may include such things as a structural definition and format specifications. The use of the term “standard” is not intended to denote a particular level in a hierarchy, nor does it necessarily denote the output of the work of an International Standardisation Body or Standard-Setting Body.</td>
</tr>
<tr>
<td>CDE Data Standards</td>
<td>Data Standards relating to critical data elements other than UTI and UPI, including the definition, format and allowable values.</td>
</tr>
<tr>
<td>CDE Technical Guidance</td>
<td>The contents of the CPMI-IOSCO report Technical Guidance on the Harmonisation of critical OTC derivatives data elements (other than UTI and UPI) (April 2018), which sets out regulatory guidance on the definition, format and allowable values of the critical data elements other than UTI and UPI.</td>
</tr>
<tr>
<td>Data Element</td>
<td>A general term for each of the discrete categories of information that might be reported or processed pertaining to an OTC derivatives transaction.</td>
</tr>
<tr>
<td>CPMI</td>
<td>Committee on Payments and Market Infrastructures</td>
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<tr>
<td>FSB</td>
<td>Financial Stability Board</td>
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<tr>
<td>Governance Arrangements</td>
<td>Governance structures, procedures or protocols. The term encompasses only the arrangements as adopted or to be adopted by the CPMI and IOSCO, exclusive of the broader governance framework in which these arrangements will exist.</td>
</tr>
<tr>
<td>Governance Framework</td>
<td>The background setting, including legal structures, in which any Governance Arrangements may rest. This broader framework includes national regulatory authorities, international and national standard-setting bodies, national and international law, and guidance.</td>
</tr>
<tr>
<td>Harmonisation Group</td>
<td>CPMI and IOSCO working group for harmonisation of key OTC derivatives data elements</td>
</tr>
<tr>
<td>International Governance Body</td>
<td>Body allocated to carry out specified governance functions for the CDE, consistent with its mandate and subject to its consensus procedures.</td>
</tr>
<tr>
<td>International Data Standard</td>
<td>A Data Standard issued by an International Standardisation Body.</td>
</tr>
</tbody>
</table>

27 See www.bis.org/cpmi/publ/d175.pdf.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Standardisation Body (ISB)</td>
<td>An international body, other than a Standard-Setting Body, that promulgates standards, including data standard-setting bodies such as the ISO.</td>
</tr>
<tr>
<td>ISO 20022</td>
<td>ISO 20022 – Universal financial industry message scheme (previously also known as “UNIFI”) is the international standard that defines the ISO platform for the development of financial message standards. Its business modelling approach allows users and developers to represent financial business processes and underlying transactions in a formal but syntax-independent notation. These business transaction models are the “real business standards”. See response to FAQ on “What is ISO 20022?”, <a href="http://www.iso20022.org/faq.page">www.iso20022.org/faq.page</a>.</td>
</tr>
<tr>
<td>ISO 20022 CDE Message</td>
<td>The message (or, set of messages) that is created and maintained within the framework of ISO 20022 which encapsulates the definitions, formats and allowable values of the data elements that are addressed in the CDE Technical Guidance, as these definitions, formats and allowable values are reflected in the ISO 20022 Data Dictionary.</td>
</tr>
<tr>
<td>IOSCO</td>
<td>International Organization of Securities Commissions</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>LEI</td>
<td>Legal Entity Identifier</td>
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<tr>
<td>Maintenance</td>
<td>The ongoing process of updating the definitions, formats and allowable value and the list of critical data elements and of updating the CDE Technical Guidance.</td>
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<tr>
<td>Maintenance Body</td>
<td>Entity allocated to carry out several maintenance functions for the CDE Data Standards.</td>
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<tr>
<td>OTC</td>
<td>over-the-counter</td>
</tr>
<tr>
<td>Standard-Setting Body</td>
<td>A grouping or body of authorities (with or without observers that are not authorities), that is responsible for issuing standards or recommendations for the guidance of authorities, market participants and/or other addressees, for example, the CPMI or IOSCO.</td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Relevant market participants (including messaging standards bodies). This does not include Authorities. Examples of messaging standards bodies include FpML and FIX.</td>
</tr>
</tbody>
</table>
| Trade Repository (TR)    | (a) An entity that maintains a centralised electronic record (database) of transaction data and is authorised to receive reports about transactions and make this information available to authorities as appropriate; or  
                            | (b) an entity, facility, service, utility, government authority etc that is not established as an authorised trade repository but that maintains a centralised electronic record (database) of transaction data and is used by market participants to report transaction data, or provides TR-like services. |
UTI

Unique Transaction Identifier, as defined in the February 2017 CPMI-IOSCO Technical Guidance on the Harmonisation of the Unique Transaction Identifier.28

UPI

Unique Product Identifier, as defined in the September 2017 CPMI-IOSCO Technical Guidance on the Harmonisation of the Unique Product Identifier.29

28 See www.bis.org/cpmi/publ/d158.pdf.
29 See www.bis.org/cpmi/publ/d169.pdf.
Annex 2: Working group participants

This report was produced for the CPMI and IOSCO by the Working Group for the harmonisation of key OTC derivatives data elements (Harmonisation Group).

**Co-chairs:**
- Marc Bayle (until May 2019)
  European Central Bank
- Dan Bucsa
  US Commodity Futures Trading Commission

**Vice-chairs:**
- Markus Mayers (Acting co-chair from June 2019)
  European Central Bank
- Tom Guerin
  US Commodity Futures Trading Commission

**Members:**
- Canada
  - Eli Adzogan (from September 2017)
    Autorité des marchés financiers
  - Shaun Olson
    Ontario Securities Commission – Critical Data Element sub-stream co-lead
  - Yani Wu
    Ontario Securities Commission
- China
  - Jiang Xiaolu
    China Securities Regulatory Commission
- France
  - Franck Lasry
    Autorité des Marchés Financiers
- Germany
  - Olaf Kurpiers
    Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)
  - Dominik Zeitz
    Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin)
  - Christoph Fricke (from April 2018)
    Deutsche Bundesbank
- Hong Kong SAR
  - Polly Lee
    Hong Kong Monetary Authority
- Italy
  - Anna Maria Germano
    Bank of Italy
- Japan
  - Tomoyoshi Teramura
    Financial Services Agency
- Mexico
  - Roberto Toledo-Cuevas
    Bank of Mexico
Russia
Denis Grigorev
Central Bank of the Russian Federation

Singapore
Gael Soon
Monetary Authority of Singapore

United Kingdom
Sebastiano Daros
Bank of England – Critical Data Element sub-stream co-lead
Johnathan Wakefield
Bank of England

United States
William Treacy
Board of Governors of the Federal Reserve System
Scott Okrent
Board of Governors of the Federal Reserve System
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Commodity Futures Trading Commission
Esen Onur
Commodity Futures Trading Commission
Robert Stowsky
Commodity Futures Trading Commission
Michael Gaw
Securities and Exchange Commission
Yee Cheng Loon
Securities and Exchange Commission
Justin Pica
Securities and Exchange Commission
Carol McGee
Securities and Exchange Commission

European Central Bank
Christine Jozet
Grzegorz Skrzypczynski
Olgerd Unger
Francesco Vacirca

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Joanna Lednicka (until June 2018)
Olga Petrenko
Lukasz Popko (from August 2018)

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Office of Financial Research
Paul D’Amico
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European Insurance and Occupational Pensions Authority
Patrick Hoedjes
Alessandro Fontana

European Banking Authority
Giuseppe Cardi Gabriel

FSB Secretariat
Laurence White

Secretariats:
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International Organization of Securities Commissions
Tim Pinkowski