Discussion Document:

Uncleared Initial Margin Calculations and Processes Related to the ISDA WGMR SIMM Initiative[*]

15 June 2015

Table of Contents

I. OVERVIEW OF IMPLEMENTATION PROCESSES: CONTEXT, TIMING, AND COORDINATION

A. Context

Outlined in this paper are current implementation challenges surrounding risk-based uncleared margin, focusing on the adoption of ISDA's Standard Initial Margin Methodology ("SIMM").

The benefits of having a standardized risk based margining approach have been presented in previous documents and discussions and include:

- Aim to reduce systemic risk while maintaining a functional market.
- Margin levels which better reflect the risk and which decrease liquidity drain compared to notional based grids
- Lower dispute burdens by using a common approach for reconciliation
- Clearer margin processes
- Clarity in forecasting and controlling liquidity demands from margin
- Transparency of margin impacts in times of stress; ability to assess the impact of novations
- Common language and data interchange format for quickly assessing risk between counterparties

Margin models are different in nature from capital models. Risk based margin models need to provide results which run in time for morning margin call processes. They need to be transparent and amenable to dispute reconciliation. They need to run quickly so that users can understand liquidity implications of potential trades and so that dispute causes can be promptly analyzed and resolved.

The ISDA SIMM^{TM} is part of the broader implementation which is represented by the following diagram. Each of these elements needs to be analyzed and standardized to implement a global risk based margining approach.

Illustration 1

Documentation

- Consistency in trade population designation by asset
- Trade feed timing to match margin calculation process needs

- Common product definition
- Common bundling rules
- Common agreement rule handling

- Transparent, predictable and replicatable methodology
- Readily available and common inputs
- Batch timings, processing times consistent with margin needs
- Reruns in case of errors or disputes
- Scale and speed

- Definition of monitoring criteria
- Exception and override handling
- Recalculation needs
- Exception escalation and supervision rules

- Clearly defined process and data sharing protocols

Trades → **Trade Bundling** → **Calculator** → **Margin Results** → **Margin Calls & Dispute Management**

Risk inputs: Sensitivities, Time Series, etc. → **Risk Mapping, or other data logic**

Margin Analysis and Explanation

- Timing and availability of risk data
- Data quality
- Standardized risk definitions

- Common risk factors
- Number of risk factors consistent with aims of transparency and reconciliation concerns
- Common mapping logic

- Ease in identifying margin result drivers
- Analysis and results conducive to dispute resolution

Industry participants and regulators alike must appreciate that the implementation of uncleared initial margin rules implies a broad re-engineering of industry risk processes, operational processes, legal platforms, and participant interaction infrastructure. To date, risk calculations have been for the consumption of internal constituents and regulators. Going forward, to support risk based margining, several changes will need to take place:

- Risk calculations must be consistent across the industry
- Operational functions must incorporate risk-based analysis and reconciliation
- New skill sets and resources must be allocated to support these tasks

B. Timing

The time available to agree, define, create specifications, implement and test these new processes is very limited. The industry needs to first agree standards including standards on risks and sensitivities, trade mapping and grouping, dispute resolution, and documentation, and then format these standards into specifications to be disseminated to industry participants and vendors. Formatting proper specifications will take several months. Industry participants and vendors will need to use these

specifications to plan, and then build required infrastructure – this may take 12 months. Subsequent inter-participant testing and calibration will likely require an additional five to six months.

C. Coordination

A critical element for success is global regulatory coordination. Divergent rules defining the margin calculation and processes across jurisdictions will make implementation extremely difficult, if not impossible, to achieve. In addition, the scope and depth of issues for implementation are significant; close and frequent discussion between the industry and regulators is necessary.

II. TRADE POPULATIONS AND PORTFOLIOS

A. In-scope and out-of-scope trades

A portfolio of trades between counterparties will need to be grouped into various buckets, those that are in-scope, out-of-scope, or exempt under the relevant rules.

1. Legacy trades

The current assumption is that legacy trades are not subject to new uncleared margin rules and that they cannot be moved into the SIMM calculated portfolio (the group of trades where risk based margin is applied) unless the entire set of legacy trades is to be moved (no "cherry picking"). Counterparties may decide to keep legacy collateral terms in place with regard to variation margin thresholds, collateral types, etc. Any legacy initial margin terms may remain in place.
Where multiple CSAs are used, legacy trades may exist under legacy CSA for variation margin and initial margin purposes.

2. New trades

New trades subject to uncleared initial and variation rules will be subject to new CSA terms for margin. Regulatory variation margin rules will govern haircuts, collateral, etc. Initial margin rules require that these transactions are margined through regulatory "grid-based" margin or a risk based margin approach like SIMM.

3. Exempt trades

This set of trades includes all trades not subject to new uncleared margin rules. In the US, examples may include equity options, physically settled FX forwards, etc. European proposals suggest

physically settled FX forwards may be exempt from the rules.

B. Agreements and documentation

Trade populations and groupings need to be based upon documentation agreed by counterparties. A standardized approach to documentation and trade population definition is crucial to smooth margining.

1. Single ISDA Master Agreement

ISDA Master Agreement level relationships will be consistent with current status. In particular, both legacy and new trades may be covered by a single ISDA MA. ISDA MA language will need to be analyzed and revised as necessary for this use. Proposed regulations in some jurisdictions call for multiple ISDAs; one for legacy trades and one for new trades (after bilateral margin requirements come into effect). This would prevent positions between legacy and new trades from being offset for netting or closeout purposes. If this requirement is finalized, some global industry participants may face different standards from a capital and daily operations perspective depending on their jurisdiction. It is also unclear how cross-default terms would be implemented across multiple ISDAs.

2. Multiple CSAs

The industry is preparing for the possibility that multiple CSAs may be required to cover the trade groupings and related collateral terms discussed above. Consider the following example which illustrates the complexity and interplay between CSA terms, trade date, legacy portfolios, new trades, and regulatory rules:

Illustration 2

A firm is subject to BCBS IOSCO phase-in with variation margin 1 March 2017, and initial margin on 1 September 2018. (Section 8.6 in BCBS IOSCO 317).

"Phase 1" is defined as the application of variation margin and "Phase 2" as the application of initial margin. The relationship between CSA terms and trade populations are shown in the following table:

	Trade dates	Variation Margin	Initial Margin
Legacy trades	Trades entered into before 1 March 2017	Subject to legacy CSA terms	Subject to legacy CSA terms
"Phase 1" trades	Trades entered into between 1 March 2017 and 31 August 2018	Subject to uncleared margin rules	Subject to legacy CSA terms
"Phase 2" trades	Trades entered into on or after 1 September 2018	Subject to uncleared margin rules	Subject to uncleared margin rules

ISDA and the industry are currently discussing how CSA structures will be standardized to handle the relationship between subsets of bilateral portfolios and CSA terms.

a. Pricing and collateral, threshold and haircut terms:

Collateral, threshold, and haircut terms may differ between legacy and regulatory portfolios for both initial and variation margin. Where these differences exist, pricing considerations may come into effect to account for FVA, CVA, and/or capital related effects. This implies that derivative portfolios between counterparties may need to be valued under multiple pricing assumptions to reflect such issues. In the table above, legacy trades, "Phase 1" and "Phase 2" trades may all be valued differently for similar products.

b. Operational impact

It is possible that a standardized CSA structure may cause multiple cash flows for each CSA term (legacy, regulatory variation margin CSA, regulatory initial margin CSA). These operational implications are being considered by the industry.

c. On-boarding and negotiation of new CSA structures

Prior to the implementation date, current ISDA relationships will need to be re-documented. The number of relationships which need to be re-documented is expected to be substantial; some larger firms may each need to re-document thousands of bilateral relationships.

As new CSAs are created for "Phase 1" and "Phase 2" transactions, new agreements will need to be signed, new databases will need to be set up to hold legal documentation terms, and data will need to flow smoothly from legal databases to margin calculators, margin operations, and to capital systems and models which will all be affected by new trade sets. Moving existing legacy trades into "Phase 1/Phase 2" CSAs and netting sets may simplify operational and documentation issues. Unless collateral, threshold and haircut terms between legacy and regulatory margin terms are similar, however, many existing (legacy) portfolios may require re-pricing or negotiation of fees for FVA. The industry is currently assessing the implications and mitigating strategies around on-boarding and CSA negotiation.

3. Capital and operational impacts

As discussed above, documentation structure and the resulting netting sets may have an impact on capital calculation netting sets.

4. Initial margin threshold tracking

Initial margin thresholds (EUR50mm under BCBS IOSCO) will be allocated to various subsidiary portfolios under a "parent" company. Tracking of notional thresholds will be based on two assumptions: (1) that parent thresholds are allocated to subsidiary entities in a static manner; and (2) that counterparties may agree to change their thresholds. The industry may need to define a streamlined process for changing and agreeing threshold allocation changes.

III. MANAGING TRADE POPULATIONS

The current volume of variation margin disputes is not representative of potential issues with regard to risk based initial margin. The complexities and impacts are far greater for initial margin issues. Care must be taken to ensure that trade populations are consistent between the two counterparties, especially with regard to:

A. Global difficulties around consistent population snapshots

Firms may traditionally close books at different times according to region (e.g. NY close vs. London close vs. Tokyo close) potentially creating differences in trade populations which the industry will need to address.   Under current variation margin scenarios, differences in population resulting from new trades do not cause major issues, since new trades usually have a zero mark-to-market. New trades, however, have non-zero risk characteristics which may substantially affect the risk-based margin of a portfolio. Processes are being developed to support portfolio reconciliation. The industry and vendors are assessing how these existing processes can be enhanced and integrated to address initial margin reconciliation issues. Potential approaches include:

1. Calling for initial margin on T+2

2. Weekly initial margin calls, which, in effect, sidesteps   the issue since closes are consistent over weekends.

B. Trade legs vs. deals

For purposes of implementation, trades are defined at the "deal" level, an important assumption since counterparties may book trades in different ways. For instance, counterparty A may book one year WTI

swaps in twelve legs (one for each month) where counterparty B may book all months into one single trade. It is important that trades and their associated risks are handled at the "deal" level when reconciling trades and risk allocations. Forcing all firms to use the same booking convention may be difficult due to system differences; however, trade population and risk comparisons should be standardized to facilitate dispute resolution processes.

C. In-scope v. out-of-scope trades and global consistency

Differences in counterparty populations may occur as a result of the inconsistent definitions of in-scope products across national level rules. For instance, equity options are subject under European proposals but excluded under US ones. ISDA urges regulators to align coverage rules as consistently as possible and, where differences occur, the industry may choose to use a product set that is broader than the minimum product set required by the particular national rule. For instance, if a US and European entity face each other, they may elect to place the US counterparty's equity options into the "subject" grouping of trades. In this example, US and European firms could both include equity options in their equity portfolio SIMM calculations. This makes reconciliation easier since both parties include equity options in their equity groupings. From a variation margin viewpoint, these trades would be subject to new uncleared margin rules governing thresholds, potential currency haircuts, and collateral requirements. These terms may differ from legacy CSAs and therefore may require a new variation margin CSA.

D. Trade life cycle events

Counterparties must handle life cycle events consistently. For instance, where a trade between counterparties A and B is novated from counterparty B to C, the remaining A-C transaction needs to be amended to reflect whether it is a new or legacy trade in a similar manner across participants. The industry is working to reach consensus on how trades are treated for life cycle events.

IV. MAPPING TRADES TO EITHER RISK FACTORS OR ASSET CLASSES

A. Asset class vs. risk based bucketing

The current ESA proposal requires that portfolios be separated into the following asset classes (Article 4 MRM): interest rates, currency, and gold; equity; credit; commodity and other. Each trade is assigned to an underlying asset class based upon its "primary risk factor" defined "in terms of sensitivity of the value of the contract to the market risk drivers." This is broadly in line with the BCBS IOSCO language (BCBS IOSCO 3.4). The intent of regulators is to provide for diversification, hedging, and risk offset within asset class netting sets but not across categories.

The proposed rules' asset class-based mapping scheme presents challenges that the industry needs to consider:

1. Trade level asset class bucketing

Under trade level asset class bucketing, each derivative trade (all legs) is assigned to a unique asset class category as a complete trade which includes all risk factors. For instance, a credit derivative with credit CS01 and interest rate DV01 is mapped, along with all of its credit and interest rate risks, to the "credit category." Convertible bond risk (equity delta, credit CS01, and interest rate DV01) with equity risk as a primary driver is mapped to the equity asset class.   There are several issues with this approach:

a. Identifying primary risk

Participants must ascertain the primary risk for each trade. This is not a trivial task, since a trade may embody several types of risk. It may be most expedient to make broad assumptions to deal with the scale of the problem; assign all CDS to credit, assign all convertible bonds to equity. At times this may lead to arbitrary category assignments, especially for hybrid products. There is currently no industry wide product taxonomy to identify primary risks for each trade.

b. Primary risk changes

Primary risk may change for a given product or issue and risk drivers may change frequently over time. Depending on the market situation, a particular convertible bond risk which was primarily driven by equity delta may become more sensitive to credit. Keeping track of changes at the individual trade level is currently extremely difficult and incorporating such changes adds to operational and reconciliation burdens.

c.   Flexibility in dealing with new derivatives

New derivatives may not fall neatly within pre-defined buckets. A bespoke equity/rates transaction may not fit neatly within either category.

The industry will need to formulate some basic standards to operationalize and implement the current requirement. It is likely, however, that the issues listed will persist given the nature of derivatives.

2.   Risk based bucketing across trades

ISDA is currently discussing the use of an alternative risk based bucketing approach. Under this approach, in the CDS example, the credit CS01 is allocated to the credit category and the rate DV01 is attributed to the rates category. Convertible bond CS01, equity delta, and interest rate DV01 are mapped, respectively, to credit, equity and interest rates. The risk based bucketing approach has three primary attributes:

a.   Operational simplicity

The risk based approach avoids many of the operational objections to the trade level asset class bucketing approach. There is no reason to arbitrarily map a hybrid risk derivative into one of many risk buckets. Risk is decomposed and allocated appropriately. As primary risk factors (or the relative weight of one risk factor to another) change, risk sensitivities and their allocations are automatically adjusted. Similarly, new derivatives with new risk factors are automatically mapped appropriately.

b.   Appropriate margin

Margin levels reflect the actual risk in multi risk factor portfolios. For example, where FX or interest rate in an equity asset class category offset FX or interest rate risk in the FX/rate category, these dynamics are correctly reflected in margin levels.

c.   Incentives to hedge risk

Since economic risk offsets within a portfolio are reflected properly, traders and desks are encouraged to hedge exposures and decrease risk between firms.

d.   Reflection of actual close out processes

Actual close out dynamics are reflected properly. Derivatives are not replaced individually in a portfolio during a close out situation. Rather, portfolios are hedged and stabilized, and then traded as portfolios of risks rather than being closed out as individual trades. Hence, credit

portfolios with significant interest rate are hedged out and traded as a package of risks rather than broken out individually as credit portfolios and separate interest rate portfolios. ISDA continues to discuss the risk based approach with regulators.

V. CALCULATION METHODOLOGY

ISDA's proposed margin methodology is based upon the "Sensitivity Based Approach" described in the Basel Committee's "Instructions for Basel III monitoring" (Bank for International Settlements, Basel Committee on Banking Supervision, Instructions for Basel III monitoring, July 2014, p. 146). This paper does not present details of the SIMM methodology as these have been documented previously in other documents (SIMM Methodology, ISDA). At a high level, the SIMM methodology applies a set of risk weights and correlation tables for each asset class. For more detail, please refer to the proposed SIMM methodology in Appendix 1 (SIMM Methodology).

The primary objective in designing a calculation methodology was to develop a methodology that:

A. Is simple and transparent

    A simpler and transparent approach allows easier reconciliation, is easier to implement and "debug".

B. Yields intuitive results

    Intuitive results aid the reconciliation process and in determining the cause of errors and disputes.

C. Is easy to replicate

    Ease of replication allows counterparties to more easily check calculations and resolve disputes. It also allows smaller counterparties to integrate calculations in their processes.

D. Offers predictability of margin levels

    Predictability allows firms to plan for future liquidity needs.

E. Is extendable

    The methodology is extendable so that it is easy to incorporate additional risk factors and features as appropriate or required.

F. Is approvable and easy to defend

    Methodologies must be approvable by regulators, based on sound and generally acceptable approaches, and easy to defend given practical considerations on their day-to-day operational use.

G. Is quick to run and to re-run

Allows recalculation as corrections are made in the daily process for smooth dispute resolution, allows what-if analysis for use in novation exercises, etc.

H. Affords manageable ongoing costs of maintenance for industry

Methodologies and data requirements need to be relatively easy to maintain. Costs of implementation, inputs, monitoring, and data need to be considered. Approaches should not discriminate against use or adoption by any group of participants.

VI. MODEL IMPLEMENTATION

Consistent implementation of the SIMM calculation across firms requires that sensitivities are calculated and mapped along well-defined parameters.

A. Risk sensitivity calculations

1. Consistency of risk sensitivity calculations

Currently, firms may use their existing trading or risk management systems to perform sensitivity calculations. Typically these calculators are built upon each individual firm's model library, using their own curves, vol surfaces, or market data as inputs. These parameters are not consistent across the industry. Sensitivity calculation standards for SIMM may not match approaches used in each firm's risk systems or capital models as sensitivity calculations for SIMM need to be relatively simple, quick to calculate, and readily implementable for all industry participants. While firms have developed models according to high and well developed standards, differences in risk sensitivities for the same portfolio or trade when calculated by various counterparties are unavoidable and there is no central calculation authority placed to determine sensitivities for all market trades across all participants. Some vendors or services are able to perform analytic calculations on some transactions, usually more liquid ones. However, we are not aware of any services able to handle the full scope of product. Therefore, in order to avoid margin disputes resulting from differing sensitivity inputs into SIMM, the industry will continue to work toward reconciling sensitivity calculations.

a. "Best practice" standards

In order to align calculations as much as possible, ISDA and the industry are defining "best practice" standards for SIMM margin purposes. Calculation standards need to be consistent across firms in order to normalize SIMM inputs across participant data flows and reconciliation, as shown in Illustration 1.

Standards must address:

(1) Calculation method

(2) Unit standardization

(3) Signs and direction

(4) Bucketing methodology and logic

b. Allowance for differences between participants

While industry participants are urged to adopt "best practice" standards whenever possible, practical considerations (e.g. firm infrastructure, time to delivery, etc.) will require firms to address and manage different approaches for the foreseeable future. Accordingly, the industry needs to have the flexibility to allow for reasonable differences between sensitivities forming inputs into risk-based margin.

2. Operational and calculation constraints around calculating curvature

Ideally, firms would calculate curvature by pricing trades at various underlying levels. The industry has analyzed this approach and has expressed concerns that multiple repricing for each derivative (or portfolio) is computationally burdensome and risks jeopardizing the ability to issue margin calls on a timely basis each morning. Regulators have responded to industry concerns about coverage of curvature in the SIMM methodology.

a. Margin calculation process

To understand issues around calculation time in risk based margin, outlined below is the process context around margining. Margin needs to be exchanged each day between firms, early each morning. Typical margin calculations involve a chain of processes including the following steps (not necessarily in order and differing according to firm):

(1) Trading books are closed at the end of each day. Since books need to be closed to determine trade populations, populations are determined relatively late in the day on day t.

(2) Trade level information is aggregated across multiple books. For some firms, this may take some time.

(3) Sensitivities are calculated across thousands of potential risk factors for each trade, across each leg. Calculation times can be substantial if each trade must be priced repeatedly at different underlying values.

(4) Sensitivity calculation results are aggregated in common databases

(5) Sensitivity calculations are matched to trades in each netting set and CSA relationship pulled from legal system databases

(6) Each sensitivity is mapped to risk factors

(7) Each risk factor and sensitivity is allocated to asset or risk category

(8) Calculate margin. Margin calculations may be done in batch across thousands or tens of thousands of netting sets (CSA level netting sets x each asset class).

(9) Scrub results and inputs, recalculate if needed

b. Calculation load

As can be seen above, the time for sensitivity calculations often creates a significant bottleneck in the margin calculation flow. Given the compressed daily timeframe for data preparation and calculation and the significant calculation burden required for the volume of trades, it is important to keep the calculation burden down to a manageable level. From this perspective, margin methodologies which require full or multiple recalculations for different scenarios are especially problematic. To address these calculation load and calculation timing issues, ISDA proposes estimating curvature using vega. Vega is easier to calculate then multiple-calculation-generated gamma. While the current SIMM methodology aims to use fairly simple sensitivity calculation inputs, firms will still need to tune their infrastructures for speed given the amount of data which needs to be processed.

B. Risk factor granularity and impact on daily margining

1. Risk factor list

The list of risk factors and calculation assumptions for use in SIMM are indicated in Appendix 2 (SIMM Methodology: Risk Data Standards).

2. Granularity

The scope and granularity of risk factors takes into account several factors, including:

a. Risk coverage

Risk factors need to have enough breadth in coverage to capture a substantial portion of the risk in firm portfolios. A complete set of risk factors may theoretically cover every single type of risk, each tenor, each traded equity, each credit, each basis risk, etc. However, such an exhaustive approach is impractical for daily margining where counterparties need to complete data preparation and calculations within compressed daily timeframes. Additionally, firms need to quickly identify and correct the causes of disputes.

b. Mapping

Rules for mapping risk factors, and the infrastructure to implement these rules, needs to be clear and robust. Risks may not be mapped to the lowest level of granularity, however. For instance, stocks and credit underlyings are mapped to broad industry sectors under SIMM. Equity indices are not broken down into their constituent sectors but are allocated to a risk factor sector meant to contain broad based equity risk. There are several reasons for this. One, a high number of risk factors makes reconciliation more difficult. Second, certain participants may lack the ability to decompose products such as indices down to their sub-components; this is a very data-intensive exercise, and the data may have costs which may penalize smaller firms.

c. Ease of reconciliation

Generally, the ease of reconciliation is expected to decrease as the number of risk factors increases.

d. Systemic risk

While no model can capture all risks for all portfolios, SIMM has been designed to capture major systemic risks while dealing with practical issues involved in generating and reconciling daily margin calls. ISDA expects the SIMM will be enhanced by adding or refining risk factors in the future. The addition of risk factors must be balanced against operational considerations, times required for calculation of sensitivities, and a focus on ensuring coverage of systemic risk.

C. Consistent mapping of risk sensitivities to risk factors

Consistent mapping of risk factors across firm processes is crucial to having comparable and reconcilable margin calculations.

The SIMM margin calculation requires that various risk sensitivities in a portfolio (e.g. interest rate or equity deltas, interest rate or equity vegas) be mapped to pre-defined risk buckets.

1. Rates, FX

   Mapping rules for rates and FX products are relatively simple. Risk sensitivities are typically mapped to currencies, curve identifiers, and tenors. Some rules have been created to encourage consistency. For instance, interest rate risk at the 4 yr tenor may be split and attributed to 3yr and 5yr buckets.

2. Credit and equity

   Credit and equity product mappings may create disputes when there are conflicting views on how risk should be classified. For instance risk on TWX (Time Warner), a cable operator stock, may be allocated to either the Consumer Discretionary sector or to the Telecommunications sector. Similarly, firms may differ on whether an issuer risk is "investment grade" or "non-investment grade." ISDA and the industry are working on platforms to mitigate these inconsistencies.

VII. CALIBRATION OF INPUTS

Risk weights and correlation tables are inputs into SIMM. These factors are calculated based on historical data. To maintain compliance with regulatory proposals, risk weights are calibrated to 99% 10-day risk, taking into account a stress period for respective asset classes. The inclusion of the stress period ensures that sufficient margin will be available when it is most needed and limits the extent of to which the margin amount may be procyclical. Calibration of model inputs, however, will be an ongoing process. The industry is currently proposing an annual recalibration of risk weights. The calibration load will increase: as the number of risk factors grows the need for additional calibrations will grow accordingly. This paper does not present details of the calibration process as they have been or will be addressed in detail elsewhere.

VIII. MODEL GOVERNANCE

A. Product coverage

   1. New products covered / not covered

      It is possible that SIMM will not be approved or designed for use on all products, or that certain traded products will require treatment other than SIMM risk-based margin. A central body, working across the industry (e.g. ISDA), will need to distribute a list of products which are not covered and

specify the manner in which they are handled for margin purposes (e.g. use of regulatory notional grids).

2. New risk factors

As mentioned previously, new risk factors may be added (or some risk factors deleted) as the SIMM develops. A central body or committee (ISDA) will need to:

a. Assess the need for new risk factors

(1) Through periodic backtesting analysis

Participants or regulators may find, in the periodic backtesting process, that new risk factors are required to cover risks.

(2) From demand in the industry

Industry participants may ask that new products are handled by SIMM. These new products may require that new risks or risk factors are handled.

(3) From regulatory direction

Regulators may require that certain risk factors are covered where they had not been covered in previous SIMM versions.

b. Verify the need for and define the structure of new risk factors

New risk factors need to be verified for relevance and sensitivity calculation best practice terms defined.

c. Time needed for implementation

Sufficient lead time is required before new risk factors or changes to SIMM are required to be implemented by the industry. Time will be required to:

(1) Build at participant firms

Firms may need to enhance their risk calculation processes to handle new risk factors in a manner consistent with best practice.

(2) Define of sensitivity calculations

Sensitivity calculations need to be defined consistently across the industry.

(3) Calibrate

Risk factors need to be calibrated by ISDA and/or a third party source.

(4) Backtest

Calibrated risk weights and methodologies need to be demonstrated to be sufficient and appropriate through backtesting.

B. Recalibration of risk weights and correlations

As mentioned above, risk weights and correlations will need to be reassessed and recalibrated periodically in order to ensure that they are still applicable and that they meet regulatory standards. Issues for discussion include:

1. Periodicity of recalibrations

ISDA proposes a one year interval between recalibrations to allow sufficient time to analyze historical results, gather time series for analysis, and test performance through backtesting.

2. Agent

Calibrations would be performed by ISDA (or its agent) in order to ensure unbiased results and anonymity of contributed data where multiple firms contribute data for calibration purposes.

3. Notice of calibration changes

After calibration results are determined, formal notice and distribution of risk weights and correlations will need to be disseminated to participant firms.

4. Implementation

a. Implementation waiting period

A waiting period (e.g. 90 days) is necessary in order to allow participant firms to ready their infrastructure and make funding plans.

(1) Implementation readiness

Firms will need to update their data input tables and test outputs in their risk-based margin infrastructure.

(2) Impact on funding

Participants may need to run pro-forma SIMM calculations using new risk weights to determine the impact on funding and liquidity. They may need to make additional liquidity plans in the case of significant changes in margin.

(3) Potential for phase-in

It is possible that a phase-in period may be appropriate, especially in the case of significant risk weight changes, to avoid sudden liquidity shocks due to increased margin requirements.

b. Universal application to all counterparties

Risk weight changes need to be applicable to all participants to maintain the integrity of SIMM and to retain transparency with regard to calculations and call amounts. It is recognized that SIMM may be a margin floor (vs. "house" risk based margins) for some counterparties.

C. Monitoring and backtesting

Regulators and the industry may require ongoing monitoring of SIMM performance. There are multiple approaches to monitoring; these approaches will need to be discussed and agreed within the industry and with regulators.

1. Periodic backtesting

Periodic backtesting is defined as any approach which assesses performance of the SIMM model up to a certain point in time at defined intervals (e.g. yearly backtesting). Currently, the ISDA WGMR Risk Classification and Methodology Committee is backtesting SIMM against representative portfolios between firms who expect to be subject to new uncleared margin rules in September 2016.

Some basic approaches to backtesting as discussed include:

a. Actual portfolio backtesting

Backtesting is conducted on actual portfolios of representative bilateral counterparty relationships. This approach was chosen to begin initial testing SIMM performance for several reasons:

(1) There was a desire to assess whether SIMM worked in the "real world" on actual portfolios.

(2) It was difficult to identify representative hypothetical portfolios for firms initially subject to uncleared margin. These firms are amongst the largest derivatives market participants with massive portfolios.

(3) No central calculation service is available which could calculate risk measures or historical performance of the broad range of product in large bank portfolios.

(4) It is important to address systemic risk in portfolios among the largest participants.

While there were concrete reasons for choosing actual portfolios for backtesting, there may be drawbacks in this approach as the number of market participants subject to SIMM increases. In the current scheme, each bank calculates SIMM results against past portfolio performance and reconciles its data against other counterparty results. This approach was

needed as no vendor or central authority is able to perform calculations on the scale and product breath required for full testing. However, the process is time intensive, highly laborious and will become especially burdensome as the number of counterparties grows. In addition, some smaller counterparties may lack resources to perform full historical performance testing on their derivatives portfolios.

b. Hypothetical portfolio testing

An alternative approach would be to assess SIMM against historical performance on hypothetical portfolios reflecting specified risk types or investment styles. A set of representative portfolios would need to be determined by the industry, regulators, or a central authority and benchmarking could be performed by either firms or by a central agent or vendor (e.g. ISDA). If a central agent or vendor were to analyze performance, trades in the portfolio may need to be limited to relatively vanilla instruments which embody the risk being assessed. Identifying the portfolios to be assessed may be a point of considerable discussion. Portfolios could be created to reflect a myriad of risks, or could be designed to address any number of risk factors. Rather than attempt to identify all possible risks or portfolio styles, it is important to focus on large systemic risks which threaten overall financial stability.

2. "Current" backtesting

"Current" backtesting refers to testing the performance of portfolios close to real time, by testing the performance of SIMM each day. The mark to market change of a portfolio is compared to the SIMM value 10 days prior. Portfolios change each day as trades are added or subtracted, so that tracking SIMM numbers from day 1 against the PV changes on the same portfolio at day 10 is a significant issue and presents significant practical challenges. There are some significant issues around implementing "current" backtesting, especially on a large scale throughout the industry.

a. Scope

Regulators may ask that all bilateral portfolios are monitored for SIMM performance vs. realized value changes. Practically, this will be difficult due to the effort and cost of monitoring performance. The process required to track performance is outlined in high level below.

b. Tracking process

A firm tracking portfolio performance compared to SIMM would need to go through roughly the following steps:

(1) Each day, a firm must save all trades and all risk for a portfolio.

(2) At time t, the firm must look identify the trades which are to be tested against SIMM. If there are eight trades but three of them did not exist at time t-10, tracking is only to be performed on the remaining five trades.

(3) For trades subject to testing, calculate SIMM as of t-10 by using the risk sensitivities stored previously.

(4) Compare SIMM at time t-10 to changes in portfolio values from t-10 to t.

c. Cost

The process of saving all risks, portfolio values, calculating SIMM, and defining constant 10-day portfolios for each bilateral relationship will be very expensive. Dealers have tens of thousands of bilateral relationships. Buy-side clients will have difficulties in building and maintaining the required infrastructure.

d. Smaller participants may not be able to support "current" backtesting

(1) Costs of tracking subject portfolios (over t-10 to t)

Smaller participants will have difficulty in tracking subject portfolios over consecutive 10-day periods. Costs arise from storing and maintaining data, tracking relevant trades, and performing pro forma SIMM calculations.

(2) SIMM calculations by vendors

Many daily operational SIMM calculations are expected to be executed by vendors. Smaller participants will not have the resources to maintain their own SIMM calculators or perform current backtesting on each bilateral portfolio.

(3) Result verification

Backtesting results from all firms would need to be checked and verified (by at least their bilateral counterparties) before they could be relied upon for model governance.

3. Recommended Backtesting Approach

Due to complexities around "current" backtesting, ISDA proposes to use periodic backtesting. As the number of counterparties grows, industry and regulators should develop hypothetical portfolios to either replace or augment backtesting on actual portfolios. In developing hypothetical portfolios, it is important that participants focus on systemic risk. If regulators require backtesting on actual portfolios to assess systemic risk coverage on the largest portfolios in the financial industry, it should be done through periodic backtesting.

The ISDA SIMM is not intended to capture perfectly the risks of every trade since it has to be based on common industry sensitivities and meet speed and complexity goals. Nevertheless the ISDA SIMM model will apply to all eligible trades and will capture the systemically important risks that exist between major participants so that the systemic risk reduction objective is met. Backtesting and supporting analysis will concentrate on showing that material factors are taken into consideration and that the 10-day 99% confidence standard holds over the chosen backtesting period.

IX. RESULTS, CALLS AND RECONCILIATION OF INITIAL MARGIN

This section will examine the margin call and reconciliation process focusing primarily on initial margin issues. Note that this outline is presented to provide conceptual context only; actual operational consideration details are currently being discussed in ISDA WGMR Implementation Initiative working groups.

Separately, variation margin calls and reconciliation are expected to closely mirror existing variation margin processes. It should be noted, however, that new rules covering collateral, currency mismatch between derivative underlying and collateral, concentration, etc. may significantly affect variation margin processes. These variation margin issues are not discussed here.

A. Showing and comparing results – assumptions and considerations
1. Calculations from both counterparty perspectives
Participants may elect to calculate margin from two perspectives: from the point of view of calling for IM, and from the perspective of their counterparty calling them for margin. While many participants will elect to calculate only the former (calling for collateral), some may want to confirm the appropriateness of the call on them from the other party's perspective. Both calculations would need to be done for a party to dispute the margin call.
2. Application of thresholds
Recent regulatory proposals suggest that thresholds will be applied at a parent company level (e.g. EUR 50 million), the implication being that if the parent company has several subsidiary entities, the parent threshold will need to be split across the subsidiary entities. The assumption made here is

that the allocation of the overall parent threshold across its subsidiary entities will be static. In other words, for a EUR 50mm threshold, the threshold may be split three ways for three subsidiaries (30MM for X, 18MM for Y and 2MM for Z). The allocated thresholds would be designated in agreements for X, Y and Z.

3. Margin approach

    a. Legacy trade portfolios

    Legacy trade portfolios would presumably be margined as under current processes. Operations would remain the same. We assume that parent level thresholds cannot be allocated to legacy portfolios. However, existing thresholds on legacy portfolios are unchanged, and no operational adjustments need to be made.

    b. Trades exempt from regulatory initial margin

    For initial margin call purposes, processing trades not subject to regulatory margin will follow processes similar to that for legacy trades. Margins may be calculated on a per-trade basis.

    c. Trades subject to regulatory initial margin

    To aid in understanding and reconciling SIMM margin, portfolios and trades need to broken into component risks, these components mapped to risk factors, and then run through the SIMM calculation. A calculation report would need to show:

    (1) Common trade identifier (covering all trade legs), component risk factors

    Each trade should have an associated trade number and a breakdown of component risks.

    (2) Mapping for each trade

    The mapping of risk factor at a tenor (or similar detailed) level would be shown for each trade. Each trade may be mapped to multiple risk factors (e.g. CDS to 5yr USD CS01 and 5yr USD swap curve

    (3) Sensitivity for each risk factor

    The sensitivity calculated by the participant for each risk factor would be shown (e.g. USD 48,000 CS01).

B. Calling for margin

1. Timing of calls

Margin call timings may need to be examined. It was noted earlier that trade population snapshot times need to be coordinated across industry participants.

2. Timing differences between initial and variation margin

Variation margin processes (settling of mark-to-market differences) are likely to remain the same, even for trades and portfolios subject to risk-based calculations. In contrast, initial margin preparation requires a new, more complicated process as laid out in this paper. It is possible that processes for defining portfolios for initial margin, marshaling data and risk factors, mapping risks and calculating portfolio margins may take longer than current margin processes. Until the industry develops experience in preparing risk-based initial margin, it may be appropriate to separate margin calls into two components where variation margin is called in the morning (10am EST) and the initial margin may be called later in the day or at a later date.

C. Reconciliation and exception processing

Defining preferred processes for reconciling disputes is a complex. While ISDA and its members are currently working on these issues, some high level issues are outlined here.

1. Reconciliation difficulties unique to risk-based portfolio margining

Risk based margin reconciliation as applied to IM presents a new set of issues from a reconciliation standpoint. Current variation margin reconciliation and dispute processes are not applicable.
It is relatively easy to identify which trades in a portfolio are causing disputes in the case of variation margin. Each mark-to-market valuation (present value) is tied to a unique trade within a portfolio. Counterparties can compare their valuations per trade and quickly ascertain the trades in question, and look into their respective valuation systems and procedures to settle disputes. In addition, new trades are less likely to cause disputes as their valuations are likely to be close to zero (assuming markets have not changed materially since booking). The implication is that minor trade population discrepancies resulting from newly entered trades are not likely to materially affect variation margin.
In risk-based initial margin regimes, initial margins are no longer uniquely tied to trades. Rather, the margins are a reflection of the risks in a portfolio. New trades with zero mark-to-market may have a substantial impact on the risk of a portfolio and on the resulting initial margin. Views of trade populations between counterparties need to exactly match, creating pressure from a trade

reconciliation perspective. Even if trade populations and calculation methodologies match, counterparties may have disputes if risk mappings or sensitivities are inconsistent. Finally, determining the causes of disputes are much more difficult, since untangling the inter-mingled effects of trades, sensitivities, risk mappings, etc. is much more arduous than simply looking at unique mark-to-markets on each trade.

2. Materiality of disputes

   To decrease the dispute management load on the industry a materiality threshold should apply to all disputes, for example 20% and/or a fixed value difference. Consider the case of two counterparties, A and B. A calls B for $100, and calculates that an appropriate margin call from B should also be $100. B, on the other hand, calls A for $100 but believes that an appropriate margin call from A should be $94. Since the difference between the two calls on the disputed portion are below 20% (using the higher number as the denominator), both parties should agree that the lower number be posted from B ($94). Whether the minimum is the appropriate number for an industry standard, or a "higher of" or "average of" or another standard be applied, should be discussed within the industry and with regulators.

3. Time limits for dispute resolution

   A dispute time limit should be applied, beyond which time disputes are not accepted and the called number posted.

4. Reconciliation process

   a. Reconcile trade populations

      Reconcile the general trade population across all trades, but most importantly within the population of trades in the "new SIMM-subject trade" grouping. While the omission of some trades, especially new trades, may not greatly affect the variation margin, any discrepancy within trade population may greatly affect risk offsets and consequent risk-based initial margins.

   b. Reconcile trade mappings

      Once the trade population is reconciled, the next area of focus should be trade mappings. Mappings of each trade to its appropriate risk factors, and the application of mapping logic to the correct (or defined) tenor, shock, or time series should be checked. The industry and ISDA are working on measures to minimize disputes with regard to mapping of credit and equity risk to standard SIMM input sectors.

   c. Reconcile sensitivities

The next step in the reconciliation process should be to compare risk sensitivities. In contrast to the previous two reconciliations, a degree of difference between counterparty sensitivity numbers is expected, and this is where most legitimate issues are likely to be rooted.

d. File formats or third party vendors to aid in reconciliation

Well defined file formats will streamline reconciliation process, especially those issues surrounding population and mapping. Comparing trade populations, mapping assumptions, and the closeness of associated sensitivity numbers will be much easier given standard formats which can be easily updated into participant systems. Definition of file format elements or standards will also make it easier for vendors to create value-added services.

D. Dispute and exception cure processes

Regulatory requirements mandate the need for robust dispute resolution procedures. These procedures require definition with regard to risk-based margining. As disputes causes are identified, firms may need to take action to cure them by changing portfolio or calculator inputs.

1. Changing or correcting sensitivities

It is possible that sensitivities could be inappropriate or stale. Large firms often source their risk data from multiple systems across thousands of books. In some cases upstream risk or calculation processes may have been incomplete within some of these systems leading to erroneous sensitivities for that day. Typically these issues are corrected during the day, but corrections may not in time to make margin calls in the morning. The sensitivities may need to be recalculated, or possibly sensitivities from the previous day may need to be used if deemed appropriate.

2. Changing or correcting risk mapping

Risk mappings may need to be updated if counterparties agree that they need to be changed. In addition, if an asset class based categorization of trades is applied (as per present regulatory proposals), trades may need to be remapped as primary risk drivers change. This would be a significant operational burden; the industry needs to consider the costs of updating these categorizations against keeping static asset category mappings.

3. Adding or subtracting trades from a portfolio

Reconciliation may require adding or subtracting trades from a portfolio. For instance, a trade incorrectly attributed to an exempt trade category (e.g. if a FX trade is incorrectly labeled as physical settle) would need to be moved over and labeled as subject under uncleared margin rules.

Counterparties may need to adjust portfolios when one firm sees a particular trade while its counterparty does not due to different global book closes.

4. Re-running portfolio calculations

Adjustments to portfolios need to be made promptly so that portfolio calculations can be re-run to cure disputes. Firms may need to have the ability to issue updated margin calls based upon these new calculations.

5. Maintaining data and monitoring changes

Firms should consider their requirements around maintaining their data (e.g. being able to roll back to previous days risk for certain trades) and monitoring of cures or overrides. Controls need to be placed to track changes but controls should not impede daily processes.

E. Other margin process considerations

1. Potential organization changes within each firm

Adoption of risk-based margin approaches, whether standardized or not, may require changes in how participant firms' margin processes and operations are handled. While variation margin dispute processes have been proven or improved over time, portfolio risk-based margins present a great number of complexities which may require the incorporation of additional skill sets into the margin workflow

2. Skill set requirements

The margin process typically falls rests with collateral management departments in most participant firms. These groups typically make or vary collateral calls, form the first point of contact in variation market disputes, and move collateral. SIMM, or any risk-based IM, requires workflow considerations that go beyond the traditional scope of collateral management team responsibilities. Assessment of risk factors and sensitivities may need to be handled by risk, front office or middle office personnel.

3. Disputes and capital charges

Longstanding disputes may cause capital charges to be assessed. The impact of any capital charges and applicability should be clarified

X. APPLICATION OF CONCEPTS TO NON-SIMM RISK BASED MARGIN APPROACHES

This paper primarily focused on implementation of SIMM into industry and firm processes and technology platforms. It is possible that other risk-based margin methodologies or platforms will develop now or in the future. Development of other models, however, will leave the majority of points in this document intact. Many, if not most, of the issues surrounding any margining scheme share the same basic issues:

- Trade portfolio netting set definition
- Legal infrastructure and interaction with trade sets
- Sensitivity calculation
- Risk mapping
- Backtesting and performance measurement
- Process governance within and between firms