FSB FINANCIAL STABILITY BOARD

Transforming Shadow Banking into Resilient Market-based Finance

Possible Measures of Non-Cash Collateral Re-Use

23 February 2016

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1.   Introduction

Non-cash collateral (hereafter collateral) is "re-used" when a market participant, such as a bank, receives securities[1] as collateral in one transaction and subsequently sells, pledges or transfers this collateral in a second transaction.[2] Collateral may be received by a market participant as a result of a variety of transactions, such as reverse repos, securities lending, margin lending and OTC derivatives. If this collateral is eligible for re-use, the collateral taker can use it as collateral for other transactions. Collateral received may also be sold, creating a short position.

The re-use of collateral plays an important role in the functioning of financial markets: it increases the availability of collateral, and consequently reduces transaction and liquidity/funding costs for many market participants, since a given pool of collateral assets can be re-used to support more than one transaction. This lowers the cost of trading, which is beneficial for market liquidity.[3] Similarly, this increase in the availability of collateral can reduce the costs associated with long and short positions, thereby facilitating price discovery and market efficiency. Furthermore, collateral re-use may facilitate the clearing and settlement processes by increasing the availability of securities that could be borrowed to complete the settlement process, potentially reducing the likelihood of settlement failures.

However, collateral re-use may also pose risks to the financial system. For example, it may:

- increase the interconnectedness of market participants, especially financial intermediaries, due to chains of transactions involving the re-use of collateral;

- contribute to the build-up of excessive leverage of individual entities and in the financial system as a whole;

- increase the sensitivity of market participants to counterparty credit risk, especially in stressed conditions, and hence, reduce their willingness to rollover secured transactions (or decide not to permit the re-use of their collateral), potentially raising cost or decreasing quantities of available short term credit;

- induce fire sales in stressed market conditions if entities liquidate assets to raise cash in order to repurchase recalled collateral; and

- amplify stress in the market, resulting from a distressed entity recalling its collateral.

The Financial Stability Board (FSB) has recently been working to improve its understanding of collateral re-use practices and their potential impact on financial stability.[4] The findings of this work will be prepared by March 2016.

As part of its global securities financing data collection initiative, the FSB has also been considering whether to identify data elements that are needed to monitor the re-use of collateral

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[1]   Securities will include shares of investment funds.

[2]   Meanwhile, re-hypothecation constitutes a subset of collateral re-use and is defined as "any use of client assets by a financial intermediary".

[3]   http://www.bis.org/publ/cgfs49.pdf

[4]   http://www.fsb.org/wp-content/uploads/shadow_banking_overview_of_progress_2015.pdf

and whether to develop a measure of collateral "velocity" (i.e. the number of times a piece of collateral is re-pledged in unrelated transactions). In November 2015, based on the findings of a public consultation,[5] the FSB decided to include in its global securities financing data standards a data element on "collateral re-use eligibility" (i.e. an indicator of the fraction of the collateral stock is eligible for re-use), to be collected for collateral posted or received as a result of securities financing transactions (SFTs).[6] It also asked its Data Experts Group (DEG) to continue developing possible measures of "collateral velocity" (including measures of collateral re-use) and identifying appropriate data elements for deriving these measures, with the aim of integrating these data elements into the global securities financing data standards. Such data collection would support authorities' identification of financial stability risks arising from the re-use of collateral (e.g. interconnectedness, leverage and procyclicality) and inform any policy responses to addressing these risks. DEG will develop recommendations on the potential measures of collateral velocity and related data elements by the end of 2016. Such recommendations may include a possible timeline for collecting additional data elements related to collateral re-use, which may differ from the timeline set out in the November 2015 global securities financing data standards.

This document describes possible measures of non-cash collateral re-use, and the related data elements, that could potentially be included in the FSB's global securities financing data standards and authorities would be asked to report national/regional aggregates of these measures to the FSB. The document is intended to provide a starting point for discussions with market participants and researchers concerning the derivation of a meaningful measure(s) of collateral re-use to be used to evaluate global trends and to assess risks to financial stability. The practical challenges in collecting the data necessary to create such a measure(s), such as the need to modify current business practices and IT systems, should also be considered in evaluating the alternatives.[7]

First, the scope of data collection related to collateral re-use is discussed (Section 2). This is followed by an explanation of: (i) possible methodologies to measure collateral re-use (Section 3); (ii) metrics of re-use for financial stability purposes (Section 4); (iii) additional data elements that national/regional authorities may deem it worthwhile to require (Section 5); and (iv) issues related to data architecture, including on data collection and transmission from the reporting entity to the national/regional authority (first tier) and from the national/regional to the global level (second tier) to ensure sufficient quality of the global aggregates (Section 6).

The FSB welcomes comments on the possible measures of non-cash collateral re-use and the data elements set out in this document. Comments and responses to questions should be submitted by **22 April 2016** by email to fsb@fsb.org or by post (Secretariat of the Financial Stability Board, c/o Bank for International Settlements, CH-4002, Basel, Switzerland). All comments will be published on the FSB website unless a commenter specifically requests confidential treatment.

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[5] See http://www.fsb.org/2014/11/standards-and-processes-for-global-securities-financing-data-collection-and-aggregation/

[6] See http://www.fsb.org/wp-content/uploads/FSB-Standards-for-Global-Securities-Financing-Data-Collection.pdf

[7] For example, some market participants may not have data/information to create a meaningful measure(s) of collateral re-use readily available because securities received as collateral may be treated as a pool of fungible assets together with the firm's own assets. In such case, these market participants do not differentiate or track whether a specific security used as collateral is their own asset purchased outright or is received collateral.

2. Scope of re-use measure

There are two different types of measures of collateral re-use that differ in scope: measures based on collateral posted or received in SFTs only (Scope A below), and measures based on collateral posted or received in all types of transactions in which a market participant engages (Scope B). The scope of collateral considered for data collection has implications on the potential methods adopted to measure collateral re-use. Two alternatives are presented below:

- **Scope restricted to SFTs (Scope A)**: In line with the scope of the global securities financing data standards, the scope is restricted to collateral posted or received and subsequently re-used in SFTs. Although collateral re-use may also occur with other types of transactions, the available evidence from the EU[8] for example suggests that a large proportion of collateral re-use is currently occurring via SFTs.[9]

- **Scope extended beyond SFTs (Scope B)**: To fully capture collateral re-use, other types of transactions (e.g. trading of OTC derivatives) beyond SFTs may be considered. Compared to Scope A, this approach may prove more complex and costly for entities involved, requiring a longer time to implement the reporting of additional data items.

Since the FSB's focus is on assessing global trends and risks in relation to SFTs by including the relevant data elements on collateral re-use in its global securities financing data collection, the FSB considers that the scope should be restricted to SFTs (i.e. Scope A).

Consultative questions (please provide any available evidence to support your response, including data, studies or other documentation as necessary)

Q1.   Does the proposed scope of transactions for data collection (Scope A) provide a practical basis for the meaningful measure of non-cash collateral re-use? If not, please explain how you think the scope should be broadened and the reasons why this alternative scope is more appropriate than the proposed scope.

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3. Collateral re-use measures at the national/regional level

Three alternative methodologies for estimating collateral re-use are presented below. The first method would provide for an exact measure of re-use of collateral while the second and third methods are approximate measures. According to the first method, market participants would report whether collateral they posted is in the form of "own assets" or in the form of assets that were received as collateral in a previous transaction. The second method requires market participants to report granular data on their own assets and to distinguish between collateral

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[8]   See, for example, https://www.esrb.europa.eu/pub/pdf/occasional/20140923_occasional_paper_6.pdf?263fab 825867415f9054177dac66d723.

[9]   The relative proportion of collateral re-use occurring as a result of SFTs may change as a result of the entry into force of the margin requirement for non-centrally cleared OTC derivatives starting from September 2016, which may lead to an increase in the re-use of collateral in derivatives transactions. However, the BCBS-IOSCO margin requirements may limit the possibility of re-use.

received that is eligible and ineligible for re-use.[10] Finally, the third method relies on data elements already included in the November 2015 global securities financing data standards, but it would result in more approximate measure of collateral re-use. The outcomes of the three methods are not directly comparable. None of these methods requires the tracking of individual assets through a chain of transactions. Each of the three measures is described below including a discussion of whether the measure depends on the national/regional data collection being based on an aggregation at the entity or transaction level.[11]

3.1   Exact measure

The direct measurement of collateral re-use would be the most accurate measure of collateral re-use. However, such a measure would require that all individual market participants be able to differentiate between whether the securities used stems from their own assets or were received as collateral from other transactions.

To implement this approach, jurisdictions that require firms to report data about securities financing at an aggregated entity level (i.e. not on a transaction basis) would need to ask entities to report the following data item in addition to the elements in the November 2015 global securities financing data standards:

$$collateral_{ij}^{reused}$$

that represents the market value of collateral re-used of asset type j by entity i.

As an alternative to asking entities to report collateral re-use, an exact measure can be calculated by requiring entities to report collateral posted [12] as well as the amount of own assets encumbered in collateralised transactions. The exact amount of collateral re-use of asset type j by entity i is calculated using the following formula:

$$collateral_{ij}^{reused} = collateral_{ij}^{posted} - assets_{ij}^{own,encumbered}$$

where $collateral_{ij}^{posted}$ represents the total market value of collateral posted and securities lent of asset type j by entity i and $assets_{ij}^{own,encumbered}$ is the market value of own encumbered assets that have been posted as collateral (including own assets in securities lending transactions). Own assets are defined as on-balance sheet assets owned outright by the reporting entity.

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[10]   For the purpose of this analysis, collateral posted and received include any type of collaterals that are used in transactions within the scope, irrespective of their legal structure.

[11]   The November 2015 global securities financing data standards defined the data elements for repos, securities lending and margin lending that national/regional authorities will be asked to report as aggregates to the FSB for financial stability purposes. National/regional authorities may however collect more granular data (e.g. by counterparty or transaction) or aggregate at position/portfolio/entity level.

[12]   With regard to collateral posted in SFTs, this is a data element already included in the global securities financing data standards.

For jurisdictions opting for transaction-level reporting, collateral re-use can be exactly captured by having entities report whether the underlying collateral of a specific transaction is collateral received from another transaction, under the assumption that this information is available. As with the entity-based approach, this may imply a cost of modifying business practices and updating IT systems if market participants do not have such information available. Once this information is captured at the transaction-level, authorities could then aggregate it to compute collateral re-use at the entity level.

3.2   Approximate measure

An approximate measure of collateral re-use by individual entities can be calculated using data on total own assets, collateral received that is re-use eligible, and collateral posted. Each of these data items would need to be reported to the national/regional authority. For a given asset type j, collateral re-use by entity i is then estimated as:

$$collateral_{ij}^{reused} = \left(\frac{collateral_{ij}^{received,eligible\_for\_reuse}}{collateral_{ij}^{received,eligible\_for\_reuse} + assets_{ij}^{own}} \right) \times \left(collateral_{ij}^{posted} \right)$$

where $collateral_{ij}^{received,eligible\_for\_reuse}$ represents the market value of collateral of type j received by entity i that is eligible for re-use, $assets_{ij}^{own}$ represents assets of the same type j owned by entity i, and $collateral_{ij}^{posted}$ stands for posted collateral by entity i, again of type j.[13] In other words, collateral re-use is proportional to collateral received in a previous transaction compared to all assets of a given type available for collateralisation. Note that this method assumes that the probability of a security being posted as collateral is independent of its source, this being either own securities or another collateralised transaction.[14] For institutions that do not track the source of the collateral posted (see Section 3.1) this approximation method will likely produce an unbiased estimate of collateral re-use. However, if entities systematically prefer one source to the other, this approximation will produce an estimate with a bias that depends on the entities' preferences.

3.3   Indirect approximation of re-use based on data elements

A less-precise indirect approximation of collateral re-use can be obtained by making use of data elements already suggested in the November 2015 global securities financing data standards. This approximate measure can be used both by jurisdictions opting for transaction-level reporting and those opting for entity-based reporting. For each reporting entity i and each asset type j, this measure defines collateral re-use as the minimum of collateral received in SFTs and collateral posted for other SFTs :

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[13]   Own assets are not included in the data elements required by the global securities financing data standards.

[14]   For example, if an entity: (i) purchases $100 of a given security outright and holds it as own assets; (ii) obtains a further $100 of the security, eligible for re-use, as a result of collateral pledges from its counterparties; and (iii) posts $50 of this security as collateral, then this measure will report that the entity has re-used $25 of collateral [i.e. ($100 / ($100+$100)) x ($50)]. If the entity re-used collateral received from collateral pledges, then this measure will underestimate the level of re-use; conversely if the entity used assets it purchased first before re-using collateral, then this measure will overestimate the level of re-use.

$$collateral_{ij}^{reused} = min(collateral_{ij}^{received}, collateral_{ij}^{posted})$$

where $collateral_{ij}^{received}$ represents collateral of type *j* received by entity *i*, $collateral_{ij}^{posted}$ stands for posted collateral by the same entity, for the same asset type.

Total collateral re-use for a given entity can then be approximated by the sum of re-use activity across all collateral types. Since the scope is restricted to SFTs only (Scope A), this information is already included in the data items defined in the global securities financing data standards and therefore readily available. This approximation would be feasible for both entity and transaction-based reporting.

This methodology will generally over-state the amount of collateral being re-used.[15] It is implicitly based on the strong assumption that an entity first posts all the collateral securities received in other transactions and then – only if this is insufficient to cover its collateral needs – it would employ securities purchased outright (its own assets) for posting as collateral. This assumption is different from the one underlying the alternative approximate re-use measure (in Section 3.2), where it is assumed that the probability of a given security being posted as collateral is independent of its source, whether purchased outright (own assets) or received as collateral.

> *Q2.* *Are there any practical issues (e.g. updating current business practices, IT systems) in relation to the three measures of collateral re-use that are set out in this Section? Are there any ways to improve these measures?*
>
> *Q3.* *For the first measure, are there any practical issues in reporting whether collateral you posted is in the form of "own assets" or in the form of assets that were received as collateral in a previous transaction?*
>
> *Q4.* *Are there other measures of collateral re-use that the FSB should consider for financial stability purposes?*

4.   Collateral re-use metrics

This section defines various alternative metrics related to re-use of collateral. Such measures, based on the collateral re-use measure defined in Section 3, could allow for a more in-depth assessment (than is possible using currently available data) of several market characteristics that have been linked to financial stability risks (e.g. interconnectedness, degree of concentration). In addition, these measures could be calculated for specific asset types typically used as collateral, subject to constraints on the quality of disaggregated data.

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[15] For example, if an entity: (i) purchases $100 of a given security outright; (ii) obtains a further $100 as a result of collateral pledges from its counterparties; and (iii) posts $50 of this security as collateral, then this measure will report that the entity has re-used $50 of collateral, regardless of whether the securities posted as collateral were purchased outright or obtained as a result of collateral pledges.

4.1 Collateral re-use at the jurisdiction and global level

An aggregated measure of collateral re-use at the national as well as at the global level could provide information about the potential magnitude of collateral re-use thereby providing insights into the contribution of re-use of collateral to the build-up of leverage in the financial system and the degree of interconnectedness in collateralised borrowing markets. . The time series of this measure could help in identifying the potential cyclical effects of collateral re-use and its contribution to market liquidity.

Total collateral re-use in a jurisdiction k is defined as the sum of re-use, over all entities i in that jurisdiction, for all types of assets j:

$$reuse_k = \sum_i \sum_j collateral_{ij}^{reused}$$

Global re-use is given by the sum of re-use across all jurisdictions k:

$$reuse = \sum_k reuse_k$$

4.2 Collateral re-use rate

The collateral re-use rate is defined as the proportion of total collateral received by financial institutions that is re-used at a point in time. The re-use rate is

$$reuse^{rate} = \frac{reuse}{collateral^{received}}$$

This measure could be calculated separately for every reporting jurisdiction k or at the global level. At the entity level, this measure may be informative on the ability to raise further liquidity through collateral re-use. In addition, it is an input in the estimation of the measure of the average length of collateral chains in Section 4.5.

4.3 Re-use reliance rate

Re-use reliance rate is the proportion of posted collateral made up of received collateral that was re-used. This metric could indicate to what extent market participants rely on collateral re-use to finance their clients' or their own activities. In addition, it could provide information on the degree to which entities are exposed to the risk of market participants becoming more sensitive to counterparty credit risk and not permitting re-use of their collateral. The re-use reliance rate is defined as

$$reuse^{reliance} = \frac{reuse}{collateral^{posted}}$$

Again, this metric could be calculated at the entity level, reporting jurisdiction level or at the global level.

4.4 Concentration of re-use activities

Concentration of collateral re-use is defined as the share of the top 5 (or top 10) entities in total re-use activities within a given jurisdiction k. This metric would provide insights into the degree of concentration of re-use activities among the largest entities in a given jurisdiction. For a given jurisdiction k, the concentration measure is given by

$$concentration_k = \frac{\sum_{i=1}^{5 \ (or \ 10)} collateral_i^{reused}}{collateral_k^{reused}}$$

4.5 Collateral circulation length

An approximate measure of the average length of collateral chains can be obtained as a function of the average collateral re-use rate (as set out in Section 4.2). Since the aggregation of collateral re-use rate is weighted by collateral received, this metric captures the average length of chains of collaterals in a jurisdiction or globally. Average length of collateral chains then represents a measure of interconnectedness arising from collateral re-use. For a given jurisdiction k, this metric is given by

$$length_k = \frac{1}{1 - reuse_k^{rate}}.$$

The global value would be obtained by replacing the national/regional collateral re-use rate with the global collateral re-use rate.

4.6 Collateral multiplier (at the global level only)

The collateral multiplier constitutes a measure of collateral velocity. This metric is defined as 1 plus the ratio of re-used collateral to total assets, where total assets are defined as the total value of global assets that typically serve as collateral. It could also be an indicator for the magnitude of the contribution of collateral re-use to the build-up of leverage in the global financial system.

$$multiplier = 1 + \frac{reuse}{assets^{total}}$$

In the case where no reliable data on outstanding amounts of assets in certain classes were available (e.g. corporate bonds), it would be advisable to calculate this metric for some asset classes only (e.g. government bonds).[16] That is, for asset class j

$$multiplier_j = 1 + \frac{reuse_j}{outstanding \ asset_j},$$

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[16] Differently from money circulation, there are frictions to collateral circulation, the most evident being the ineligibility to re-use.

where

$$reuse_j = \sum_i \sum_k collateral_{ij,k}^{reused}$$

captures the global re-use of asset j.

Q5.   **Do you have views on any of the six metrics related to collateral re-use that are set out in this Section? If so, please indicate the metric(s) and explain the views you have.**

Q6.   **Are there any other metrics related to collateral re-use that the FSB should consider for financial stability purposes? If so, please define the metric(s) and explain how the metric could be used for financial stability purposes.**

5.   Data elements to be submitted to the FSB

In order to calculate the measures (and/or appropriate related statistics) defined in Section 3, the following stock data elements could be reported as national/regional aggregates to the FSB. Where feasible, these data elements should be broken down by asset type of the collateral as well as type and location of the counterparty. Some of the required data elements are already included in the November 2015 global securities financing data standards. These aggregated stock data elements would help understand the drivers behind the changes in the calculated collateral re-use measures.

Table 1

Element	Definition	Cross Reference	Included in the Nov. 2015 global securities financing data standards
Collateral re-used	Total market value of collateral that has been re-used.	Section 3.1(Exact measure)	No
Own assets encumbered	Total market value of own encumbered assets that have been posted as collateral	Section 3.1 (Exact measure, alternative formula)	No
Total collateral posted	Total market value of collateral posted[17] by a	Section 3.1 (Exact measure, alternative formula)	Yes Element 4.15, 6.15, 9.11

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[17]   See footnote 10.

Element	Definition	Cross Reference	Included in the Nov. 2015 global securities financing data standards
	financial institution	Section 3.2 (Approximated measure)	
Total collateral received, eligible for re-use	Total market value of collateral received,[18] if eligible for re-use	Section 3.2 (Approximated measure) Section 3.3 (Indirect measure)	Yes Element 4.8, 6.8, 9.4
Own assets	Total market value of own assets that can be posted as collateral	Section 3.2 (Approximated measure)	No
Re-use concentration	Fraction of re-use reported by the Top 5 and Top 10 entities in a jurisdiction	Section 4.4 (Concentration of re-use activities)	No

> *Q7.* *In your view, are the data elements set out in Table 1 appropriate for calculating the collateral re-use measures in Section 3? Are there alternative data elements that the FSB should consider? If so, please explain the data elements and the reasons.*
>
> *Q8.* *Are there any practical issues on the data elements for calculating the collateral re-use measures that are set out in Table 1?*
>
> *Q9.* *In your view, should the collateral types for measuring collateral re-use align with those set out in the November 2015 global securities financing data standards as set out in Table 1? If not, please explain which collateral types you think are appropriate for the collateral re-use measure(s).*

6.   Data architecture

To ensure the quality of global aggregates for financial stability purposes, the data architecture issues related to the data collection and transmission from the reporting entity to the national/regional authority (first tier) and then from the national/regional to the global level (second tier) is discussed in this Section. Both reporting approaches based on aggregation at entity or transaction level are considered. Nevertheless, it is important to note that collateral re-

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[18]   See footnote 10.

use must be calculated at the entity level, because collateral can only be re-used by individual entities.

6.1 First tier: Data collection at the national/regional level

If reporting in a jurisdiction is done at the entity-level, the relevant authorities need to calculate Table 2 for each firm, regardless of whether firms in their jurisdiction report at an entity- or transaction-level. National/regional averages need to be weighted by volume of total collateral received.

Table 2

Entity A	Collateral received	Collateral posted	Collateral re-used
Collateral Type 1	10	20	5
Collateral Type 2	100	60	40
…	…	…	…
Total	1,000	1,100	500

This information should then be aggregated across firms, as shown in Table 3.

Table 3

Jurisdiction A	Collateral received	Collateral posted	Collateral re-used
Entity A	1,000	1,100	500
Entity B	350	30	35
…	…		
Total	2,200	1,800	750

The total collateral re-used should be calculated as the sum of collateral re-used by all firms in the jurisdiction. The re-use rate should be calculated as the weighted average of all firms. Averages need to be weighted by volume of total collateral received (except for the re-use reliance rate that needs to be weighted by volume of total collateral posted). For the collateral multiplier, additional information on the pool of securities is needed.

In a similar manner, collateral re-use can be aggregated by type of collateral. The total collateral received, posted and re-used for each collateral type would be aggregated by firm (Table 4).

Table 4

Collateral type 1	Collateral received	Collateral posted	Collateral re-used
Entity A	52	7	2
Entity B	500	400	101
…	…	…	…
Total	1,300	900	300

6.2 Double counting issues

Generally, double-counting should not play a role here, as the above defined metrics only rely on information on one leg of transactions (i.e. the collateral leg). This holds irrespective of the type of reporting.

6.3 Second tier: data aggregation at the global level

At the global level, collateral re-used globally should be calculated as the sum of collateral re-used in all jurisdictions (Table 5). Global averages need to be weighted by volume of total collateral received (except for the re-use reliance rate that needs to be weighted by volume of total collateral posted).

Table 5

Jurisdiction	Collateral received	Collateral posted	Collateral re-used
A	2,200	1,800	750
B	3,350	2,000	800
…	…		
Total	9,800	5,000	2,000

> *Q10. Are there any views on the data architecture issues related to measuring collateral re-use as set out in this Section? Do you see any statistical issues arising as a result of the proposed aggregation approach?*
>
> *Q11. Are there any other views on other aspects of this document?*