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ESRB
European Systemic Risk Board
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# ESRB REPORT ON THE EFFICIENCY OF MARGINING REQUIREMENTS TO LIMIT PRO-CYCLICALITY AND THE NEED TO DEFINE ADDITIONAL INTERVENTION CAPACITY IN THIS AREA

## Executive summary

Under Article 85 of EMIR, the European Commission, in cooperation with the European Systemic Risk Board (ESRB) and the European Securities and Markets Authority (ESMA), is under the obligation to assess the efficiency of margining requirements to limit pro-cyclicality and the need to define additional intervention capacity in this area.

This report constitutes the ESRB's contribution towards this assessment.

Although the legal text refers specifically to margining requirements, given the significant economic features in common between margins and the determination of haircuts, the report also considers, where relevant, haircut requirements. This provides the European Commission with a comprehensive view on the potential pro-cyclical implications of decisions in terms of collateral management. The report focuses on margins and haircut setting for central counterparties (CCPs), as the regulatory technical standards on bilateral margin requirements have not been endorsed at this stage. In this respect, the ESRB notes that a significant portion of trading with financial instruments is not centrally cleared and therefore the pro-cyclical implications of margining and determination of haircuts are not necessarily limited to the CCP ecosystem.

The key channel for pro-cyclicality of margins and haircuts is through changes in market prices of financial instruments within participants' portfolios and assets posted as collateral. CCP models for setting margins and haircuts may create a positive correlation between price volatility and the level of margins or haircuts, which in turn implies that margins and haircuts might be lowered in periods of low volatility and increased when the latter rises. The lowering of collateral requirements allows CCP clearing members (and their clients) to collateralise a higher level of exposure with the same amount of collateral and may thereby increase leverage, while a sudden and large increase in collateral requirements can create the conditions for a systemic liquidity spiral. The benefits of a proper and well-calibrated anti-cyclical toolkit are evident: the risk that clearing members and their clients will be exposed to significant and unexpected fluctuations in their collateral obligations is limited; otherwise this possibility could affect their decisions in terms of portfolio allocation.

EMIR and the relevant delegated legislation contain several provisions whereby CCPs and market participants for bilateral cleared financial instruments are requested to duly consider the potential pro-cyclical implications of their decisions. In particular, the EMIR regulatory technical standards (RTSs) No 153/2013 specify in Article 28(1) three options for how a CCP can take into account po-

tential pro-cyclicality of *margin* requirements. The first option (a) is a margin buffer, which it allows to be temporarily exhausted in periods where calculated margin requirements are rising significantly. The second option (b) assigns at least a 25% weight to stressed observations in the look-back period, while the third option (c) applies a margin floor calculated on a ten-year historical look-back period. A CCP shall employ at least one of the three options.

*Haircuts* must be calculated in a conservative manner to limit pro-cyclical effects as far as possible. To take the possible pro-cyclical effects of haircut changes into consideration, the RTS requires CCPs to include in their haircut calculation historical price volatility from stressed market conditions.

The ESRB has developed its opinion on the "efficiency of margining requirements and the need to define additional capacity intervention" on the basis of a twofold perspective, i.e. considering a) the actual performance of the EMIR provisions and b) a qualitative analysis of the existing provision with a view to whether the overall anti-cyclical "toolbox" included in EMIR may be considered complete or can be reinforced.

From the first standpoint, i.e. the actual performance of the EMIR provisions, the ESRB stresses that margining and haircut requirements have formally been set by CCPs in accordance with EMIR only recently – the first European CCP was authorised in March 2014. Over time they have been gradually extended to the other CCPs since authorised. This means that the time window, i.e. the population of statistical data available to evaluate the efficiency of margining requirements, is rather limited. Any empirical evaluation based on such a short time span can only be considered preliminary, as no significant systemic events have taken place since March 2014 and pro-cyclicality is best evaluated after observing a full credit and business cycle.

With this necessary caveat in the background, the ESRB notes that in this first, short period of implementing the EMIR provisions, no significant evidence of pro-cyclical implications stemming from margining and haircut requirements of European CCPs emerged.

It is necessary to clarify that, in this period, only a very limited number of large market swings occurred that could have triggered significant changes in margins and/or haircuts. In this respect, the ESRB noted the "US yield flash crash" episode of October 2014 and the Swiss franc fluctuation of January 2015. On the basis of the available information, the ESRB did not see on these occasions any evidence of significant changes in margining and haircut requirements: the changes were relatively contained or focused in specific product classes.

However, notwithstanding the results of this first short period of EMIR provision implementation, the ESRB notes that, under the second perspective (i.e. the qualitative analysis), the overall anti-cyclical equipment of EMIR could be reinforced, while confirming the current design.

In particular, the regulation provides CCPs with significant discretion in implementing the requirements on pro-cyclicality. Also there are no regulatory requirements explicitly addressing the potential strong correlation between margins and haircuts during a stress scenario. Furthermore, EMIR does not explicitly provide specific pro-cyclicality requirements for "add-ons" that CCPs can (and often do) add to initial margins. These add-ons are usually based on risk factors other than the volatility of a single or a group of financial instruments and, in many cases, are applied to individual clearing members. Where linked to changes in a clearing member's creditworthiness, add-ons can

potentially result in an additional request for collateral just when a clearing member's access to the money market is most difficult.

The ESRB believes that the overall anti-cyclical contribution of the EMIR legal framework could be significantly enhanced if the above gaps were filled. Taking this into account, the ESRB recommends that the European Commission consider the following in the EMIR review:

- **Binding guidance on the implementation of Article 28(1)(a), (b) and (c) of the RTS No 153/2013**. Such guidance would in specify in relation to option (a) what constitutes a temporary exhaustion or a significant rise in calculated margin requirements; in relation to option (b) how a stressed period should be identified and incorporated into the margin calculation; and in relation to option (c) a method for handling the situation where the amount of stressed observations in the look-back period declines to a level below a predefined threshold. The binding guidance would ensure that there is a consistent framework for implementation, that stress periods are well-defined and that the provisions do not result in an insufficiently low level of margins from an anti-cyclical perspective. In the case of option (a), the guidance would ensure that the buffer is in place when it is needed and that the buffer is used effectively.
- **A less flexible framework for calibrating collateral haircuts**. The framework should seek to address the pro-cyclicality of haircuts and the potential positive correlation with margin requirements. The ESRB proposes that the EMIR provision contains a minimum length for the look-back periods to be taken into account when estimating stress or predefined minimum haircuts.

These proposals do not introduce additional requirements. Rather the proposals are aimed at providing clear guidance on the parameters to be used by CCPs, avoiding potentially significant differences in their interpretation and thus enhancing their effectiveness on an EU-wide basis.

- The following proposal is aimed at stimulating a CCP's governing bodies to consider and adopt a holistic anti-cyclical stance, which takes into due consideration all the various components of a CCP's risk management. It can be expected for the overall efficiency of the anti-cyclical measures to be enhanced with only limited or no additional costs for the CCPs: **A documented policy by CCPs on the overall tolerance for pro-cyclicality.** This "pro-cyclicality report" should make the overall anti-cyclical policy of CCPs transparent to their competent authorities and members of the college and, in an appropriate manner and degree of detail, to the clearing members. In particular, the policy should make it clear how the different components of a CCP's risk management system (initial margins and haircuts, add-ons, collateral requirements, etc.) interact with each other under a pro-cyclicality perspective. The policy should be approved by the appropriate internal governance bodies. The report will ensure that pro-cyclicality is considered for all relevant components of the risk management system in a transparent way and that the pro-cyclical interactions of the components are explicitly addressed.

In additional, the ESRB would like to propose:

- **More granular transparency requirements on pro-cyclicality**. This would allow clearing members to better anticipate and manage liquidity strains potentially triggered by calls on margins, haircuts or add-ons. While EMIR requires CCPs to be generally transparent to clearing members about risks, no specific requirement is set for pro-cyclicality requirements.
- **A definition of pro-cyclicality in the EMIR level 1 text.** Including a definition of pro-cyclicality in EMIR will ensure a clear and consistent reference point for the provisions related to pro-cyclicality. The ESRB suggests considering the definition of pro-cyclicality contained in the CPMI-IOSCO report on Principles for Financial Market Infrastructures.[1]

Finally, the ESRB has also evaluated EMIR with a view to ensuring that policy-makers are afforded the necessary flexibility to deploy instruments as required for the prevention and mitigation of systemic risk.

This includes the risk associated with pro-cyclical margin and haircut requirements for centrally and non-centrally cleared transactions, but also the potential build-up of leverage in the financial system or specific parts of the financial system. The issue of pro-cyclicality of CCP margin requirements is already addressed in EMIR, as described above. However, the three tools in the EMIR RTS Article 28(1) for mitigating the pro-cyclicality of margins provide CCPs with some degree of flexibility in calibrating margins. The result of the calibration depends on the CCP's trade-off between the private benefits of minimising over-margining in periods of low volatility and high market liquidity and the social costs of having to cope with higher pro-cyclicality of margin requirements. Authorities can have a macroprudential role in ensuring that this trade-off does not result in margins being too low in periods of low volatility and high market liquidity. In the same way, the authorities can have a macroprudential role in addressing financial and synthetic leverage in the financial system or parts of the financial system. This can be done through conservative and potentially counter-cyclical margins and haircuts for both centrally and non-centrally cleared transactions.

Against this background, the ESRB proposes:

- **A further review of EMIR in 2018, specifically on the macroprudential use of margining and haircuts to address and prevent systemic risks.** The ESRB foresees a role for competent authorities through the setting of margin and haircut requirements that go beyond the minimum requirements set by EMIR, after appropriate involvement of macroprudential authorities. A review in 2018 will allow for sufficient time to take into account the outcome of international discussions on the use of margins and haircuts as macroprudential tools. It would also allow the ESRB to work further on the principles that would govern these tools and provide for further experience with the existing provisions in EMIR.

The ESRB considers it necessary to include in the revised text of EMIR an illustrative considerandum and a fixed deadline for the review of this important issue to ensure progress is also made in international discussions and to provide authorities with the appropriate instrument without unnecessary delay.

[1] *Principles for Financial Market Infrastructures*, CPSS-IOSCO, BIS, April 2012.

The tools would potentially be used with a macroprudential perspective similar to the counter-cyclical capital buffer provided for in the European banking legislation. The relevance of such a proposal is underlined by the growing systemic relevance of CCPs and margin and haircut practices in bilateral non-cleared trading too, as these trades will have to be adequately collateralised with variation and initial margins in the future. Therefore, the toolbox which authorities can rely on should be adjusted accordingly.

However, the ESRB is mindful of the challenges stemming from such a proposal, ranging from the very identification of the conditions which would trigger the authorities' intervention to the difficulties in the practical implementation. The ESRB is conscious that these challenges could be better overcome if an internationally agreed reference framework is in place.

With this in mind, the ESRB considers a future review on this specific issue to be an effective way to balance the need for the tools with the need for further work on the principles governing such a framework.

# 1 Introduction

The European Commission is under the obligation to review the European Market Infrastructure Regulation[2] (EMIR) and, in particular, assess, in cooperation with the European Securities and Markets Authority (ESMA) and the European Systemic Risk Board (ESRB), the efficiency of margining requirements aimed at limiting pro-cyclicality and the need to define additional intervention capacity in this area[3]. This report presents the ESRB's views on the topics based on the implementation of the EMIR provisions to date. It also incorporates the assessment of haircut requirements. Margins can be posted in the form of securities to whose values haircuts are applied, and for this reason both margins and haircuts should be analysed with respect to their potential pro-cyclical effects.

This ESRB contribution should be viewed in the light of the limited period in which margining and haircut requirements have been formally set in accordance with the EMIR provisions. The implementing and regulatory technical standards (ITS/RTS) finalising the requirements for central counterparties (CCPs) entered into force in the first quarter of 2013[4] and the RTS on colleges for CCPs entered into force in October 2013[5]. CCPs were able to obtain authorisation in accordance with EMIR provisions only after the adoption of these supplementing regulations, which translated into the first authorisation being granted on 18 March 2014 to Nasdaq OMX Clearing AB (Sweden). To date, 16 CCPs have been authorised to provide services and perform activities in the EU in accordance with EMIR, with the last authorisation granted on 22 January 2015.

The report focuses on the pro-cyclicality of margin and haircut requirements on CCPs, as the regulatory technical standards on bilateral margin requirements have not been endorsed at this stage.

Section 2 of the report introduces the key definitions and concepts and the ESRB's interpretation of the EMIR provisions related to pro-cyclicality of margins and haircuts. Section 3 reviews some of the most relevant literature on pro-cyclicality of margins and haircuts. This is followed by an empirical analysis in Section 4 of the changes in initial margins and haircuts during two episodes of market stress. Section 5 provides a qualitative analysis of the existing regulation and possible additions to this regulation that can address pro-cyclicality. Section 6 underlines the need to set margin and haircut requirements consistently for both centrally and non-centrally cleared transactions to ensure a level playing field and avoid creating unintended incentives for market participants. This provides the basis for the policy proposals presented in Section 7.

# 2 Definitions, concepts and interpretations

## 2.1 Definitions and concepts adopted in the report

### 2.1.1 Margins and haircuts

CCPs require from clearing members collateral in the form of initial margins to cover credit risk, i.e. to protect themselves against the risks stemming from a default by their counterparty. In general, the initial margin should be large enough to cover losses from market price movements in a de-

2 Regulation (EU) No 648/2012 of the European Parliament and the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories.
3 EMIR Article 85.1 (d).
4 Implementing technical standards (ITS) No 1248/2012 and regulatory technical standards (RTS) No 152/2013 and 153/2013.
5 Regulatory technical standards No 876/2013.

faulter's portfolio of financial instruments between the time when the portfolio was last marked to market for collateral purposes (i.e. with respect to derivatives, when the variation margin was last exchanged) and the time of hedging/liquidation of the defaulting participant's portfolio. The collateral can take the form of cash or highly liquid non-cash assets with minimal credit and market risk. For non-cash collateral and cash collateral in foreign currencies, a CCP applies a haircut to protect itself against losses resulting from declines in the market value of the assets between the time the collateral was last marked to market and the time a defaulter's collateral is liquidated. The haircut is defined as the difference between the market value of an asset and the value of that asset accepted as collateral by the CCP.

Participants in a CCP typically pay/receive variation margins on a daily or intraday basis to settle any net value losses/gains on their position.

Initial margins may be supplemented by various add-ons, such as concentration add-ons, aimed at addressing the concentration of a participant's position or creditworthiness add-ons. Some clearing members also transfer more collateral to the CCP than required. This over-collateralisation may be treated as a voluntary margin buffer and can limit pro-cyclicality to some extent.

### 2.1.2 Pro-cyclicality

Neither Level I nor Level II EMIR provisions contain an explicit definition of "pro-cyclicality". However, the term has been defined in various ways by global and European standard-setters[6]. Adopting the definition of the Principles for Financial Market Infrastructures (PFMI, CPSS-IOSCO, 2012), the term will for the purposes of this report refer to the changes in risk management requirements or practices that are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability.

The key channel for pro-cyclicality of margins and haircuts is through changes in market prices of financial instruments in participants' portfolios and assets deposited as collateral. CCPs use risk-based models to determine margin requirements and collateral haircuts. These models are typically based on a positive correlation between price volatility and the level of margins or haircuts, which implies that margins and haircuts will be lowered in periods of low volatility and raised when volatility increases. Margin requirements are also influenced by factors/variables such as the expected time until the portfolio can be closed out in the market (i.e. liquidated), the time interval with which a portfolio is marked to market for collateral purposes and the possibility of changes in the maturity of the transactions, while the level of the haircuts on collateral also depends on the creditworthiness of the issuer and the liquidity of the collateral assets. The market liquidity and, for haircuts, the creditworthiness of the issuer may be negatively related to price volatility and further increase the potential pro-cyclical nature of margins and haircuts.

Two examples provide a clearer picture of the dynamics of this cyclicality. In these examples, it has been found useful to distinguish between the potential impact of pro-cyclicality in the expansionary phase of the business and credit cycle, and its impact at times of stress:

- In periods of high market liquidity and increasing asset prices, typically associated with low price volatility, haircuts and margins may be lowered to reflect the favourable market conditions.

[6] See Annex 1 for a list of the definitions used by the Financial Stability Board, the Bank for International Settlements, the European Commission and the European Banking Authority.

This allows clearing members to collateralise a higher level of exposure with the same amount of collateral. If clearing members use this leeway to conclude more trades, then the leverage in the financial system increases. This makes the system more vulnerable to potential market swings. The increased demand for financial assets and risk positions may strengthen an existing positive trend in market prices of assets used as collateral, which provides even further room for increased leverage.

- An expectation of higher future price volatility or sharp increases in current volatility can potentially lead to large increases in initial margins and haircuts that subsequently increase the liquidity pressure faced by clearing members. This may force clearing members to reduce or close positions if they do not want or are unable to re-margin their existing ones, reinforcing the de-leveraging and further contraction of the markets. The negative effects of this de-leveraging can be further exacerbated through associated fire sales, amplifying the negative trend in these markets and creating contagion through mark-to-market losses. This creates the conditions for a systemic liquidity spiral, as the fire sale reduces market liquidity and leads to further increases in margins/haircuts and funding illiquidity. The downward liquidity spiral is more likely to occur when haircuts and margins are increased from a low level.

As noted above, although there are various definitions of pro-cyclicality, quantitative metrics for identifying or measuring pro-cyclicality are still being developed. In the CCP context, early work has identified two metrics – one that examines margin variation across the cycle and one that focuses on short-term margin increases – as useful measures in the CCP context (Murphy et al., 2014).

#### 2.1.3 Efficiency of margin requirements

The assessment to be performed under Article 85(1)(d) of EMIR concerns the "*efficiency* of margin requirements to limit pro-cyclicality". An assessment of efficiency should not focus solely on the possible ways to reach the objective of limiting pro-cyclicality, but should also seek to balance the trade-off between mitigation of pro-cyclicality on one side and risk sensitivity and over-margining on the other.

Margin requirements could be considered *effective* with regard to limiting pro-cyclicality if they display a neutral or an inverse sensitivity to risk, i.e. if they stayed constant throughout the cycle, counteracted pro-cyclicality or were capped during periods of high volatility. However, this approach may not be *efficient* if it reduces or eliminates the risk sensitivity of the CCP's margin model and leads to inadequate risk coverage of the CCP in the face of market volatility and/or ties up too much collateral in some periods (over-margining). Excessive collateral requirement relative to exposure size could also incentivise financial counterparties to turn away from voluntary central clearing or to look for alternatives in other jurisdictions. In relation to risk sensitivity, an efficient margin model would, as a minimum, need to ensure that the potential costs of closing out a defaulting clearing member's positions are covered throughout the cycle, in accordance with the requirements set out in Article 41 of EMIR.

Striking an appropriate balance between these opposing characteristics will be a key factor in judging the efficiency of margin requirements in relation to the mitigation of pro-cyclicality.

### 2.1.4 Additional intervention capacity

In addition to the assessment of the efficiency of margin requirements, Article 85(1)(d) of EMIR calls on the ESRB to assess the need to define additional intervention capacity in this area.

If any additional intervention capacity is needed, one approach would be to pursue the mitigation of pro-cyclicality through instruments directly embedded into CCPs' margin models. This would build upon the current approach under EMIR (i.e. defining a series of minimum requirements to be applied to margin models) by either improving the existing requirements or introducing new (additional) requirements. These requirements could ideally allow margin models to achieve an adequate rule-based balance between risk sensitivity and pro-cyclicality and thus eliminate the need for any additional discretionary intervention by authorities.

A second approach could be to provide authorities with macroprudential instruments that allow for adjusting margins and haircuts to address the systemic risks arising from pro-cyclicality. When designing these macroprudential tools, authorities could rely on the concepts developed for macroprudential policy in the banking sector[7], where a distinction is made with regard to whether instruments are governed by a strictly rule-based approach or "guided discretion". Under a strictly rule-based approach, macroprudential instruments are activated and adjusted solely on the basis of indicators and threshold values to calibrate intervention, which mitigates the risk of inaction bias. A "guided discretion" approach allows for some discretion in the calibration of interventions that are anchored by a clear set of principles and supported by indicators. However, national authorities shall remain responsible for deciding the appropriate balance between rules and judgement in the decision-making process. Communication and evaluation are key for successful macroprudential interventions, as they foster transparency and accountability, which are crucial in the early stages of developing these tools.

Alternatively, a combination of the two approaches could be followed to improve the performance of margin requirements under EMIR, apply amendments or additional mitigation requirements to margin models, and provide authorities with macroprudential tools.

## 2.2 Interpretation of the relevant EMIR provisions

### 2.2.1 EMIR provision on pro-cyclicality of margins

The importance of CCP pro-cyclicality is addressed in the Principles for Financial Market Infrastructures. Notably, Principle 5 outlines the establishment of conservative haircuts calibrated to include periods of stressed market conditions and Principle 6 requires that the margin models should limit the need for pro-cyclical changes with potential to cause destabilisation.

Within the EU, it is recognised in Recital 68 of EMIR that "*margin calls and haircuts on collateral may have pro-cyclical effects. CCPs, competent authorities and ESMA should therefore adopt measures to prevent and control possible pro-cyclical effects in risk management practices adopted by CCPs, to the extent that a CCP's soundness and financial security is not negatively affected.*" This is reflected in Article 41(1) of EMIR, where it is stated that a CCP shall regularly "*monitor and, if necessary, revise the level of its margins to reflect current market conditions taking into account any potentially pro-cyclical effect of such revisions.*"

[7] See ESRB, *Flagship Report on Macro-prudential Policy in the Banking Sector,* March 2014.

With respect to Article 41 of EMIR, the RTS No 153/2013 on requirements for CCPs specifies in Article 28(1) three options for how a CCP can take account of potential pro-cyclicality:

"*A CCP shall ensure that its policy for selecting and revising the confidence interval, the liquidation period and the look-back period deliver forward-looking, stable and prudent margin requirements that limit pro-cyclicality to the extent that the soundness and financial security of the CCP is not negatively affected. This shall include avoiding when possible disruptive or big step changes in margin requirements and establishing transparent and predictable procedures for adjusting margin requirements in response to changing market conditions. In doing so, the CCP shall employ at least one of the following options:*

*(a) applying a margin buffer at least equal to 25% of the calculated margins which it allows to be temporarily exhausted in periods when calculated margin requirements are rising significantly;*

*(b) assigning at least a 25% weight to stressed observations in the look-back period calculated in accordance with Article 26;*

*(c) ensuring that its margin requirements are not lower than those that would be calculated using volatility estimated over a ten-year historical look-back period*."

Article 28 does not specify if "margin" refers to the initial margin or total margin (including add-ons, see below), which can give rise to different approaches to the implementation of the provision across CCPs.

Option (a) applies a margin buffer at least equal to 25% to the amount of margins calculated on each financial instrument. This option requires CCPs to raise margin requirements in normal times to reduce the impact of margin increases during periods of financial stress, when the margin buffer can be exhausted at the discretion of the CCP. The provision provides limited guidance on the use of this buffer as it only states that it should be "temporarily exhausted" without specifying when and at what pace this should occur and how the buffer should be build up afterwards.

Option (b) assigns at least a 25% weight to stressed observations in the look-back period calculated in accordance with Article 25[8], which defines the time horizon for the calculation of historical volatility. Article 28(1)(b) and the related provisions do not provide any guidance on how the stressed observations should be selected or how to include them in the look-back period. For example, a CCP can choose to include a small number of stressed observations with a high weighting or a large number of stressed observations with small relative weights per observation.

Option (c) requires CCPs to calculate margin intervals over the time series of the instrument for a look-back period of at least ten years, applying a confidence level of at least 99% for financial instruments other than OTC derivatives and 99.5% for OTC derivatives, and to ensure that margin requirements are not lower than those resulting from such calculations. Limiting the look-back period to ten years gives rise to the risk that stressed observations are phased out and eventually disappear from the look-back period without new stressed observation being added.

[8] The reference to Article 26 in Article 28.1 (b) of EMIR RTS is an error. The correct reference is Article 25.

With these three tools, an issue to consider is whether the three options are equivalent in terms of anti-cyclical "performance", namely whether the adoption of one approach rather than another can produce different or equivalent results in terms of margin requirements.

It must be remembered that EMIR mandates a minimum look-back period of one year, provided that "*...the data used for calculating historical volatility capture a full range of market conditions, including periods of stress*" (Article 25 RTS). Taking this into account, it should also be considered that the three options can be applied to different look-back periods and thus produce different results. Consequently, it is difficult to identify ex ante one tool among the three that is the most efficient in all circumstances.

### 2.2.3 EMIR provision regarding pro-cyclicality of haircuts

In Recital 68 of EMIR, the European Parliament and the Council noted that haircuts on collateral may have pro-cyclical effects, as mentioned above. This is taken into account in Article 41 of the RTS No 153/2013 on requirements for CCPs. In applying the RTS, the CCPs are obliged to value their collateral at least daily and to use prudent haircuts which "*reflect the potential decrease of the value of the collateral over the interval between its last revaluation and the time by which the collateral can reasonably be assumed to be liquidated under stressed market conditions*" in order to "*avoid large and unexpected adjustments to the amount of the collateral required*" (Recital 39 RTS). This means that haircuts must be calculated in a conservative manner to limit pro-cyclical effects as far as possible.

To take the possible pro-cyclical effects of haircut changes into consideration the RTS requires that CCPs include in their haircut calculations historical price volatility from stressed market conditions.

The RTS provides CCPs with significant discretion in implementing these requirements. It does not indicate precisely how to incorporate stressed conditions or what criteria should be taken into account when rating the issuers' creditworthiness (Article 41 of the RTS states that the CCPs "*shall not fully rely on external opinions"* and shall "*take into consideration the risk arising from the establishment of the issuer in a particular country"*). There are neither rules regarding look-back periods to be taken into account when estimating stress nor pre-defined minimum haircuts foreseen at present. The use of soft terms such as "prudent", "as far as possible" and others provides the CCPs with great flexibility and hinders comparability of the adequacy of CCPs' collateral haircuts.

### 2.2.4 Other EMIR provisions concerning pro-cyclicality

In addition to initial and variation margins, CCPs usually employ a wide range of add-ons that are added to initial margins. These add-ons are usually based on risk factors other than the volatility of a single or a group of financial instruments, and in many cases are applied to individual clearing members. For instance, such risk factors could be the absolute or relative value of a clearing member's position, its creditworthiness or its wrong-way exposure. EMIR is silent on specific pro-cyclicality requirements of such categories of add-ons.

Other provisions that can have significant implications in terms of pro-cyclicality concern the transparency and governance requirements of CCPs. In this regard, EMIR contains requirements aimed at ensuring the overall transparency of a CCP's risk management and a CCP's general risk-containment-oriented governance. Furthermore a specific requirement is set for transparency and governance from a pro-cyclicality perspective. In particular Article 28 and Article 41 of the RTS re-

quire CCPs to "*avoid as far as possible disruptive or big step changes*" in margin requirements and haircuts, while Article 28 requires CCPs to establish "*transparent and predictable procedures for adjusting margin requirements in response to changing market conditions"*, and Article 41 requires "*haircut policies and procedures [to be] independently validated at least annually"*. However, greater granularity with regard to these transparency and governance requirements may be warranted.

### 2.3 ESRB recommendation on intermediate objectives and instruments

The ESRB's recommendation on intermediate objectives and instruments of macroprudential policy (ESRB/2013/1) provides Member States with an indicative list of macroprudential instruments grouped by intermediate objective that should be considered in cooperation with the national macroprudential authorities. The list includes "margin and haircut requirements on CCP clearing" as a potential instrument to strengthen the resilience of financial infrastructures (intermediate objective no. 5). Recognising that CCPs are likely to become increasingly important for the financial system, the ESRB stresses the need for appropriate micro- and macroprudential regulation of CCPs and notes that "although EMIR does not yet provide a role for macroprudential authorities in setting CCP margin requirements, this can be reconsidered during the first scheduled reviews."

## 3 Review of the related literature

This section summarises some of the key findings of the literature, which can help form and formalise insights with respect to the area of pro-cyclicality of margins and haircuts. It should be borne in mind that the models are simplified and stylised by nature and primarily based on US market data.

Brunnermeier and Pedersen (2009) show that margins can be destabilising if lenders raise them when price volatility is expected to increase. This pro-cyclicality in margins can force capital-constrained borrowers to fire-sell assets in a falling market to meet the increase in collateral requirements. The drop in asset prices may also force some borrowers to sell assets due to mark-to-market losses. This creates a liquidity spiral with an adverse loop between funding and market liquidity. Acharya and Viswanathan (2011) argue that the deleveraging and asset price deterioration that happens after an adverse shock is particularly great when the shock happens in good economic times, as seen in the latest financial crisis. The low cost of short-term debt in good times leads highly leveraged financial institutions to enter market, which are forced to deleverage when the ability to roll over the debt is suddenly restricted. The low cost of short-term debt can be caused by lower margin requirements and other credit terms, which have a tendency to decrease in good times, as described in BIS-CGFS (2010). An empirical analysis of margin setting for two CCPs in the USA performed by Abruzzo and Park (2014) shows that the lowering of initial margins in periods with low volatility happens gradually, while margins are raised quickly following spikes in volatility. The asymmetric changes in initial margins imply that CCPs' adjustment of margins to a sudden increase in volatility is likely to be more disruptive after a long period of low volatility, as the margins are increased from a lower level. This may reinforce the destabilising effect of pro-cyclical margins as described above.

Gorton and Metrick (2012) show how the fear of market liquidity for bonds used as collateral in repo transactions drying up triggered a "repo run" in 2007-08 through increases in haircuts. This increase in repo haircuts and the subsequent decline in asset prices are argued to be the main explanation for the financial crisis. The paper has often been cited as an argument for introducing

minimum haircuts to reduce the relative changes in haircuts through the cycle. Copeland, Martin and Walker (2014) find that similar pro-cyclical changes in haircuts could not be observed in the tri-party repo market during the financial crisis. The levels of haircuts and funding were relatively stable. The benefits from minimum haircut requirements should, for this reason, be expected to vary across markets, according to Copeland, Martin and Walker (2014).

Hardouvelis and Theodossiou (2002) analyse the correlation between initial margin requirements and asset price volatility. Higher initial margin requirements during periods of stable or increasing stock prices are shown to be associated with lower subsequent price volatility, as the higher margins reduce participation in the market by irrational investors and speculators. A temporarily lowering of initial margin requirements in markets characterised by falling prices could reduce volatility by reducing the fire-sale pressure from margin calls and reduce the cost of arbitrage for investors that see the price movements as unwarranted. Brumm et al. (2015) show in a theoretical framework that a broad application across products is important for minimum margin floors and counter-cyclical variation of margins to be effective, as a broad application reduces leakage into products not subject to the regulation.

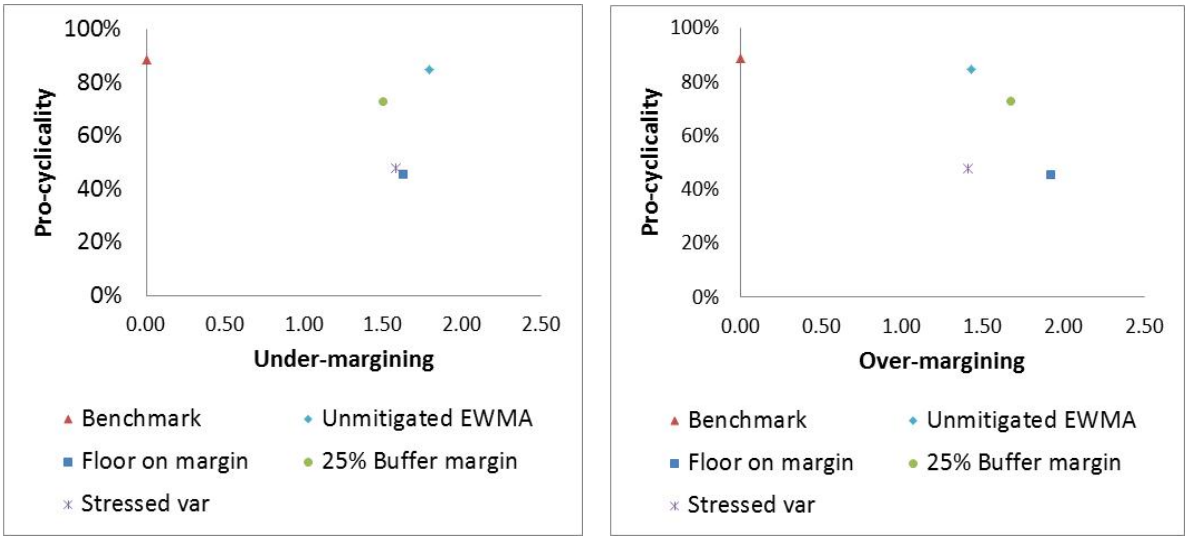
In conclusion, the academic studies indicate that the pro-cyclicality of margins can be destabilising as it can create liquidity spirals and lead to de-leveraging. The de-leveraging is particularly great if the increase in margins happens in good economic times. After a long period of low volatility, the favourable environment can result in a gradually lowering of margins and entry of highly leveraged firms to the market, leading to a greater relative increase in margins and deleveraging when volatility increases. Counter-cyclical margin requirements may have a dampening effect on price volatility but it is important for such a tool to have a broad application to be effective to avoid regulatory arbitrage.

## Box 1: A comparative analysis of tools to limit pro-cyclicality

Forthcoming research at the Bank of England (Murphy, Vasios and Vause, 2015) uses a simulation framework to analyse the performance of the three tools described in the EMIR RTS for pro-cyclicality mitigation and referred to in Section 2.2.1 above. Each tool was analysed for 1) the extent to which it reduced pro-cyclicality, as measured by the size of a typical large margin call; 2) the extent to which its use resulted in more margins being called for that was needed to cover the risk; and 3) the extent to which its use resulted in less margin being called than was needed.

The results naturally depend on the precise portfolio and risk factors chosen and on the calibration of the tools used. Chart 1 (left) shows typical results.

**Chart 1. Under-margining (left) and over-margining (right) with different margining models**




Here “Benchmark” is the correct model, based on the real returns process. The unmitigated exponentially weighted moving average (EWMA) is a typical margin model without any pro-cyclicality mitigation. The same model is also shown with, respectively, the floor (EMIR tool 3), the buffer (EMIR tool 1), and the use of stressed VaR (EMIR tool 2) pro-cyclicality mitigation.

It can be seen that all three tools mitigate pro-cyclicality and all three reduce the extent of the under-margining of the original model. The floor and stressed VaR perform very similarly in these dimensions. These results indicate that the EMIR requirements may be helpful in reducing the risk of pro-cyclical adjustments in the CCP margin, although the three specific tools described in the legislation (especially the buffer) have quite different properties.

Over-margining can be seen as a cost of pro-cyclicality mitigation. The impact of the three tools here is shown in Chart 1 (right).

Here we can see that the stressed VaR achieves almost the same degree of pro-cyclicality mitigation as the floor on margins, but at a lower cost in over-margining.

It is important to note here that different tools behave differently in different dimensions. The ten-year floor, for instance, is good at mitigating pro-cyclicality across the cycle, but will do nothing to reduce the impact of large margin calls when the margin is already over the floor level.

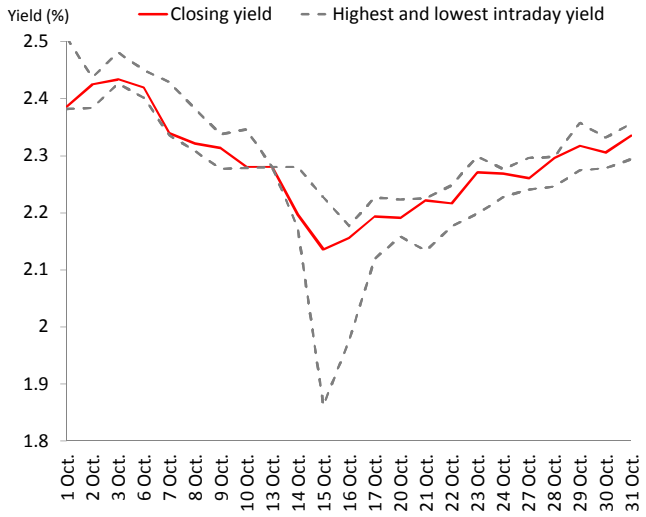
# 4 Empirical survey

An empirical analysis of the pro-cyclicality of margins and haircuts under EMIR is hindered by the short data history. The CCPs authorised to offer services and activities in the EU in accordance with EMIR received their authorisations over the period from 18 March 2014 to 22 January 2015.

The ESRB has conducted a survey focusing on the margin changes around two events that took place since the first CCP authorisation under EMIR and gave rise to large changes in intra-day price volatility: the "US yield flash crash" on 15 October 2014 and the Swiss National Bank (SNB)'s decision on 15 January 2015 to unpeg the Swiss franc (CHF) from the euro.

The "US yield flash crash" relates to the large decline in the US Treasury yield within a short period of time on the morning of 15 October 2014, which could not be explained by fundamentals (Chart 2). The episode was characterised by a simultaneous drop in market liquidity. As a result, spill-overs to other markets and wider-spread volatility occurred. Chart 3 depicts the euro area ten-year government benchmark bond yield as an example of this spill-over.

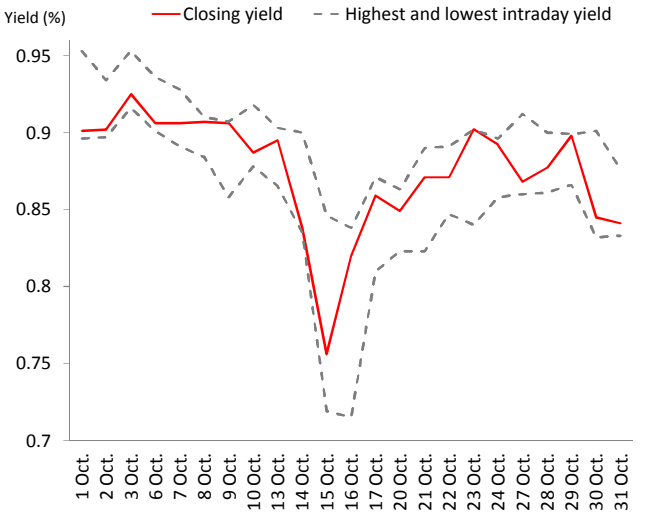
**Chart 2: US 10Y government bond yield (2014)**




Source: Bloomberg

The Swiss National Bank unpegged the CHF from the euro on 15 January 2015, which resulted in a significant and very swift appreciation in the CHF versus the euro and other currencies, together with a temporary drying-up in liquidity (Chart 4). The CHF appreciation also resulted in a decline in the prices of European cash equity products, notably those issued by companies headquartered in Switzerland and companies with large exposure to Switzerland.

**Chart 3: EUR 10Y government bond yield (2014)**

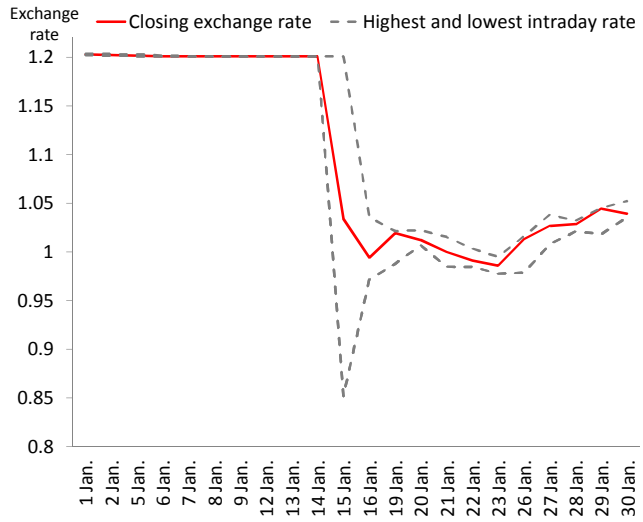



Source: Bloomberg

The survey conducted by the ESRB shows that a large share of CCPs were unaffected by either of those events due to the product classes they are authorised to clear and the collateral they accept. For the CCP clearing product classes directly or indirectly affected by the "US yield flash crash", the initial margin and haircuts stayed largely unchanged. Some individual clearing members did receive margin calls on 15 October 2014. It is unclear to what extent these margin calls were related to the "US yield flash crash", but there were no observations of broad-based margin calls following the event.

The effect on initial margins was more pronounced following the SNB's decision to unpeg the CHF from the euro. The largest changes were observed in the *aggregate* margin requirements, which increased due to increased trading activity, but for some products the initial margin *percentages* also increased substantially, sometimes twofold.

**Chart 4: EUR/CHF exchange rate (2015)**




Source: Bloomberg

For both events, the changes to haircuts and initial margins were relatively contained or concentrated in specific product classes, where they did not trigger a broader liquidity spiral. It is important to note that the anti-procyclicality provision within EMIR does not exclude increases in margins. But it should be recognised that some margin increases were observed in the limited period in which margining and haircut requirements have been formally set in accordance with the EMIR provisions. However, the survey does not allow for an empirical analysis of changes in margins and haircuts through a full business or credit cycle. Neither does the survey show how effective margin and haircuts would have been in a systemic crisis with broad stress in the financial market.

# 5 Qualitative analysis of EMIR and the regulatory technical standards

## 5.1 Analysis of the existing regulation

### 5.1.1 Interaction between haircuts and margin requirements

Sudden and sharp changes in haircuts and margins can have undesirable pro-cyclical effects, as described above. If the pro-cyclical effects of haircuts and margins materialise simultaneously in stressed market conditions, the financial stability implications are likely to be more severe. Higher haircuts would reduce the value of the collateral secured, while the more conservative margin requirements would raise the need for more collateral value to securitise the same trade position. This would create pressure on clearing members from two sides to either close out positions or raise new supplementary collateral, which may increase the pro-cyclical feedback loops.

The risk-based models used by CCPs in setting margins and haircuts are based on factors that can be positively correlated with each other and negatively correlated with the business and credit cycle. Margin requirements are typically based on the price volatility of the participant's portfolio of financial instruments, the interval between margin calls, the market liquidity and the possibility of changes in the duration of the transactions. Haircuts on collateral are largely calculated on the basis of the price volatility of the asset posted as collateral, the liquidity of the market for this asset and the creditworthiness of the issuer. Market liquidity and the price volatility of the participant's portfolio of financial instruments and assets used as collateral would in particular be expected to be strongly and negatively correlated during periods of stress.

Article 49 of EMIR specifies that a CCP must regularly review the models and parameters adopted to among other thing calculate margin requirements and collateral requirements subject to rigorous and frequent stress test. But there are at the moment no regulatory requirements in EMIR that explicitly address the potential strong correlation between margin and haircuts during a stress scenario[9]. The relevance of a combined scenario becomes less threatening when the resilience of haircuts and margin requirements to stress are ameliorated separately, while there could be room to more explicitly take the potential correlation into account in stress-testing.

### 5.1.2 Add-ons

#### *Concentration add-on*

EMIR addresses concentration risk in its various forms, as this risk can be considered an aspect of other risks, such as liquidity risk, investment risk, custody risk or counterparty credit risk. Hence this risk is an integral part of a CCP's risk management framework[10]. As far as margin requirements are concerned, according to Article 26 of the RTS, the CCPs must evaluate the concentration of the positions when determining the liquidation period needed to manage the default of a clearing member. The level of concentration of the market that the CCPs will use to close out the positions should also be taken into account when determining the confidence level and the liquidation time horizon used for margin calculation (Article 24 and 25 of the RTS).

Outright concentration limits are the main tool provided for by EMIR to deal with concentration risk in collateral, treasury investment or liquidity arrangements. With respect to position concentration, the practices of CCPs vary and, in addition to concentration limits, it is also common practice to use concentration add-ons. The European CCPs have adopted different approaches in this context. For example, a CCP may require the clearing member to post an additional margin (concentration margin) if, in the event of a breach of the concentration limit, the clearing member does not undertake the corrective action requested by the CCP within a specified time period. In other cases, the CCP may automatically require concentration margins when the concentration thresholds are exceeded or, despite the margin add-on being calculated automatically, this additional margin may only be called to members when deemed necessary by the CCP. Depending on the approach followed, the application of the concentration add-ons can be automatic or discretionary, i.e. alt-

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[9] Article 30 of the EMIR RTS specifies that the framework for determining the size of the default fund and pre-funded available resources to cover potential losses that exceed the losses to be covered by margin requirements should reflect the risk profile of the CCP, taking into account cross-border and cross-currency exposures where relevant. It is under an obligation to identify all the market risks to which a CCP would be exposed following the default of one or more clearing members, including unfavourable movements in the market prices of cleared instruments, reduced market liquidity for these instruments and declines in the liquidation value of collateral.

[10] Concretely, EMIR explicitly establishes that concentration risk must be taken into account with respect to:

- Liquidity risk (Article 44 of EMIR and Articles 32, 33 and 34 of the RTS): the CCP is required to monitor and control the concentration of its liquidity risk exposures to any entity towards which it has a liquidity exposure and include the application of exposure and concentration limits.
- Collateral (Article 46 of EMIR and Article 42 of the RTS): the CCP must address this risk not only by establishing concentration limits to guarantee sufficient diversification of collateral across the number and type of issuers, type of assets and the clearing members; it must also take these into account when calibrating the haircuts applied to collateral.
- Investment risk (Article 47 of EMIR and Article 45 of the RTS): the CCP must establish concentration limits and monitor the concentration of the financial instruments in which its financial resources are invested at different levels (number and type of instruments, issuers and counterparties).

In addition, EMIR also requires CCPs to consider concentration risk when conducting stress tests (Article 52 of the RTS) and also in the sensitivity tests performed by the CCPs (Article 59 of the RTS).

EMIR also takes a broader perspective on this risk, by requiring that the CCPs account for their overall risk exposure to any individual obligor (Article 47(7) of EMIR) and that they analyse this risk at group level.

hough they are subject to automatic triggers their application may follow an internal decision-making process and, in some cases, the CCP may need to seek approval of the relevant national competent authority prior to the implementation.

The use of concentration add-ons is a way to increase the sensitivity of the CCP models to adequately cover the risks to which the CCPs are exposed. In particular, from a macroprudential standpoint the use of concentration add-ons can be seen, in principle, as a valuable instrument to link exposures to the current or expected liquidity of the underlying market and as a tool to discourage excessive exposure to certain financial instruments or counterparties. Nevertheless, depending on the modalities of their practical implementation, these add-ons can exacerbate pro-cyclical effects during periods of market stress. If the size of concentration add-ons is not adequately calibrated, they can lead to excessive margin calls, contributing to liquidity pressures on clearing members and to pro-cyclicality if this happens during periods of stress. Moreover, the timeframe given to the clearing members to provide this additional margin can also have a pro-cyclical impact. The lack of transparency in their application process may also contribute to pro-cyclicality. In the absence of clear criteria on the application of the concentration add-ons in the CCP risk management framework, clearing members may not be able to adequately measure their exposure to the CCPs and their liquid resources requirements, and may therefore not adopt measures to anticipate the increase in future margin requirements. On the other hand, in the case of automatically triggered concentration add-ons and despite their transparency, it would be advisable in a stress scenario to allow the CCPs some discretion in how these add-ons are applied. This is especially the case if, in conjunction with other CCP risk management measures (which might be reasonable when analysed in isolation), they might introduce significant liquidity and pro-cyclical pressures in the financial system. This discretion, however, should provide flexibility for a CCP to act, taking into account the market risk context.

The use of concentration add-ons may be a useful complementary measure, as it would incentivise clearing members to diversify their portfolios and reduce excessive exposure to certain instruments, issuers or counterparties. However, in order to limit pro-cyclicality, the transparency of the concentration add-ons setup should be ensured and some degree of discretion should be left to CCPs to apply measures mitigating the pro-cyclical effects of concentration add-ons in stress situations.

***Creditworthiness add-on***

Some CCPs use a creditworthiness add-on as a tool to safeguard the resilience of their default waterfall where there is an increase in a clearing member's probability of default[11].

Creditworthiness add-ons are different in nature from margins, concentration add-ons and contributions to default funds. The latter do not take into account the credit quality of the counterparties which trade them. Instead creditworthiness add-ons are triggered by negative changes in the evaluation of the financial soundness of clearing members. Creditworthiness add-ons are therefore

11 A creditworthiness add-on, triggered by the deterioration in the creditworthiness of a clearing member, makes it less likely that the losses of a defaulting clearing member will affect the non-defaulting parties' resources included in a CCP's default waterfall, i.e. the so-called "skin in the game" of the CCP itself and the other members' contribution to the default fund.

likely to put additional pressure on the liquidity positions of those clearing members whose credit quality is low.

However, the available alternatives to credit add-ons have the potential to generate even worse pro-cyclical implications. The deterioration in the creditworthiness of a clearing member could mean that the CCP's membership requirements are no longer fulfilled and thus its position must be closed out. This could have more severe pro-cyclical implications than an increase in add-ons if the clearing member can easily meet those add-ons.

#### 5.1.3 International consistency

The implementation of anti-cyclical measures outlined in EMIR has the ability to limit pro-cyclicality. In this respect, it must be noted that the recent CPMI-IOSCO assessment of the compliance of EMIR with the PFMIs recognises that the anti-cyclical provisions of the EU Regulation are fully compliant. However, there can be substantial differences in the volume of financial resources called for when comparing models that include such anti-pro-cyclical measures and those that do not, which points to a lack of granularity in the PFMIs. Consequently, this would encourage CPMI-IOSCO to review the principles of anti-pro-cyclicality and application in different jurisdictions to ensure international consistency and avoid potential regulatory arbitrage. In this context, we recommend that the international discussion be broadened to include the question of authorities' additional macroprudential intervention as well.

### 5.2 Future work on margin models to address pro-cyclicality

Possible new requirements should aim at striking the right balance between transparency and flexibility. In order to enhance transparency of risk management frameworks and the predictability of future changes in margins, a CCP may, for example, apply metrics that trigger automatic changes in margin requirements. Such thresholds would provide transparency and clarity to the market, but also have the potential to be too pro-cyclical. Automatic triggers reduce a CCP's flexibility to adjust its margin requirements to either counteract pro-cyclicality or enhance risk sensitivity when conditions change. This can result in large step changes in the margin. In this concrete example, more frequent triggers with lower step increases at each level could potentially reduce pro-cyclicality.

Table 1 presents a qualitative comparative analysis of both existing and possible additional measures aimed at curbing the pro-cyclicality of margin requirements. Several characteristics of the suggested measures are presented in the table. This includes a general description, the way the measure addresses pro-cyclicality under normal and stressed market conditions and the relationship to the current regulatory framework.

The analysis of the tools in Table 1 is at an early stage but shows two potential anti-pro-cyclicality tools not presently considered in EMIR that could reduce the pro-cyclicality of margins. These tools exhibit beneficial and detrimental effects like any anti-pro-cyclicality tool and would require further analysis. For this reason, the ESRB does not consider that they should be included in the policy proposals presented in Section 7 of this report, but wishes to signal that further work could be carried out in the future to examine the beneficial and detrimental effects more thoroughly. Over time such research and analysis could underpin a more outcomes-focused regime within EMIR.

**Table 1 – Qualitative comparative analysis of anti-pro-cyclicality measures**

| Measure | General description | Type of measure | Type of pro-cyclicality addressed | | Relationship with the business and credit cycle | Need for more precise technical specifications | Relation with current regulations |
|---|---|---|---|---|---|---|---|
| | | | Normal markets | Stressed markets | | | |
| **25% margin buffer** | Apply a margin buffer (add-on) equal at least to 25% of the calculated margins, to be exhausted when margin requirements are rising significantly | Add-on | | Quick positive changes | Indirect | | Implemented (EMIR RTS Article 28) |
| **Margin with a 25% weight on stressed periods** | Use a look-back period where 25% of observations belong to a stressed market period | Smooth-out | Excessively low levels Quick negative changes | | Indirect | | Implemented (EMIR RTS Article 28) |
| **Ten-year margin floor** | Lower boundary on margin requirements given by margins computed with a ten-year look-back period | Floor | Excessively low levels | | Indirect | | Implemented (EMIR RTS Article 28) |
| **Counter-cyclical add-on** | Apply a margin buffer (add-on) equal at least to *x*% of the calculated margins, where *x* could be a positive function (e.g. logistic function) of an indicator of the economic cycle | Add-on | | Quick positive changes | Direct | High – qualitative and quantitative | Only for further analysis – possibly major issues for qualitative (indicator and function) and for quantitative (*x*) specifications |
| **Margin step limit** | Explicit limit (i.e. *x*) on the percentage increase and decrease of margin requirements within an *n*-day period and to be removed under favourable/ negative market conditions | Smooth-out | Quick negative changes | Quick positive changes | Indirect | Medium – only quantitative | For further analysis – possibly minor issues for quantitative (*x* and *n*) specifications |

***Counter-cyclical add-on***

CCP risk management frameworks could directly account for the correlation between margin requirements and the business and/or credit cycle. Two possible approaches are outlined below.

**Add-on linked to the business or credit cycle**. This approach would apply a margin add-on that is positively related to a measure for the business or credit cycle to each instrument in a CCP's portfolio. In this way, all individual – and hence aggregate – margins would feature lesser relative increases during contractions in the business or credit cycle (as the opposite pressure given by increasing risk factors would be offset) and exhibit lower pro-cyclical dynamics. The add-on could act as a buffer that would be exhausted in periods of increasing volatility to counter increasing margin requirements. As regards the economic indicators, HP-filtered GDP growth and credit-to-GDP

could be possible indicators for the business and credit cycles respectively. In both academic and policy circles related to macroprudential regulation, these two measures are often used as key indicators. However, given the particular nature of CCPs – whose risk profiles are particularly affected by rapid price movements and market liquidity – systemic risk indices, liquidity indices or measures for the aggregate velocity of money could also be considered. For instance, the Composite Indicator of Systemic Stress (CISS) could effectively link the margin add-ons of individual instruments to the dynamics of the aggregate economic cycle.

**Add-on linked to asset-specific indicator**. As an alternative, a link could be established between the margin add-on and an indicator of the cycle specific to the asset class in question. This would have the advantage of linking the counter-cyclical buffer to a measure that better reflects the dynamics of the market that is relevant to that instrument. For instance, various components of the CISS could serve as proxies for cycle dynamics of individual asset classes.

A combination of the two margin add-ons above might have some benefits, although its implementation could be complex. The combined approach would be especially useful in addressing large price shocks to particular instruments that, at least initially, affect only their asset-specific market, but that have potentially systemic consequences: the indicator linked to the specific asset class, but not other asset-specific indicators, would reflect the rising volatility of the instrument, while the indicator linked to the economic cycle would pick up the increase in overall riskiness.

***Margin step limit***

As a smooth-out measure, a limit on increases in aggregate margin requirements aims to curb rapid and potentially disruptive changes in margin requirements. The cap should not be extended to the various individual risk factors, as these factors may be driven by their associated idiosyncratic risks, which are not necessarily linked to the economic cycle. Margin step limits could be implemented in two main ways. First, outright limits could be imposed on the permitted percentage increase in individual or aggregate margins. In the latter case, the limit could be placed proportionally on the contribution of the margin on each cleared transaction to the increase in aggregate margin requirements. Second, rapid and disruptive step changes could be avoided by changing the individual parameters affecting the computation of individual margins (e.g. the length of the close-out period, length of the look-back period, etc.) depending on the current conditions of financial markets. Such changes in individual parameters should always be gradual and, potentially, may target maximum percentage changes in aggregate margin requirements. However, this measure would lead to temporary under-collateralisation of the CCPs, as the margin would not increase as much as demanded from a microprudential risk management point of view.

## 5.3 Macroprudential use of margins and haircuts

The ESRB is also examining EMIR with a view to ensuring that policy-makers are afforded the necessary flexibility to deploy instruments as required for the prevention and mitigation of systemic risk. This includes the risk associated with pro-cyclical margin and haircut requirements for centrally and non-centrally cleared transactions, but also the potential build-up of leverage in the financial system or specific parts thereof.

A number of studies have highlighted the potential for macroprudential variation of margins and haircut setting for OTC derivatives as well as securities financing transactions (SFTs): BIS-CGFS

(2010) reviews haircut-setting and margining practices in SFTs and OTC derivatives markets and recommends that macroprudential authorities consider measures that involve counter-cyclical variations in margins and haircuts. This is echoed in the BCBS-IOSCO (2015) framework for margin requirements for non-centrally cleared derivatives that "*recognise that national supervisors may wish to alter margin requirements to achieve macroprudential outcomes*". The FSB (2014) sets out a regulatory framework for numerical haircuts on non-centrally cleared SFTs to inter alia limit the pro-cyclicality of leverage in the non-banking system and notes that numerical haircuts may be used as a macroprudential tool by national and regional authorities.

The potential for varying minimum margin and haircut requirements in a counter-cyclical manner has also been mentioned by central bank executives from both the United States and the EU in recent speeches, especially in relation to SFTs (see e.g. Yellen (2014) and Constâncio (2015)).

Macroprudential use of margins and haircuts has the potential to reduce or limit the build-up of systemic risks in three ways:

- **Financial leverage**: Conservative initial margins for trading portfolios/positions in financial instruments or haircuts on collateral can reduce the amount of secured or repo financing that can be obtained with a given amount of the collateral, while increased collateral requirements for derivative positions tie up collateral that otherwise could be used for SFT financing. Haircuts and initial margins set by macroprudential authorities could therefore play a role in enhancing the robustness of the system by decreasing or limiting the leverage in the financial system or in particular market segments, e.g. the non-bank sector.
- **Synthetic leverage**: Conservative initial margins and haircuts reduce the build-up of synthetic leverage via derivatives. Synthetic leverage can be created by contingent commitments from swaps, futures and other derivatives and securities lending. Synthetic leverage can play a key role in fuelling illiquidity spirals due to the pro-cyclical nature of margining and haircuts, especially in times of stress.
- **Pro-cyclicality**: Macroprudential use of margins and haircuts may make CCPs and counterparties in non-centrally cleared transactions internalise the negative externalities of pro-cyclical setting of margins and haircuts. In particular, a CCP may only partly take into account the negative effects of sudden and large margin calls on the economy through deleveraging and fire sale of assets described in Section 2.1.2. Reduced margins and haircuts in periods with favourable market conditions can attract more trading volumes and elevate profits, while the social cost of a sharp increase in margins and haircuts following a rise in volatility is only partly borne by the CCP[12]. Counter-cyclical add-ons could potentially help to reduce the pro-cyclical effects of margining and haircut setting by CCPs and counterparties in non-centrally cleared transactions by ensuring a sufficient level of collateral is required in good times, thereby reducing the impact of sudden margin calls and haircut raising in bad times.

[12] The losses stemming from a clearing member's default are partly borne by the surviving clearing members if the losses exceed the defaulting member's total margins, the default fund contributions and a tranche of the CCP's capital allocated to the default fund ("skin in the game").

The issue of pro-cyclicality is already partly addressed in EMIR, as described in Section 2. However, the three tools in the EMIR RTS for mitigating the pro-cyclicality of CCP margins provide CCPs with a degree of flexibility in the calibrations of margins, e.g. in terms of the pace at which a margin buffer is built up after being exhausted or the inclusion of stressed observations in the look-back period. The calibration depends on the CCP's trade-off between the private benefits of minimising over-margining in periods of low volatility and high market liquidity, and the social costs of having to cope with higher pro-cyclicality of margin requirements. Authorities can play a macroprudential role in ensuring that this trade-off does not result in margins being too low in periods of low volatility and high market liquidity.

For these reasons, the ESRB sees a potential role for competent authorities to set margin and haircut requirements that go beyond the minimum requirements laid down by EMIR after appropriate involvement of the macroprudential authorities.

There are two important aspects to these tools. Firstly, there needs to be the option of imposing margins and haircuts with respect to particular asset classes, e.g. interest rate derivatives denominated in a given currency. Secondly, to avoid regulatory arbitrage and the severe ineffectiveness of the instrument, international reciprocity has to be ensured, at least at EU level, with respect to exposures in particular asset classes. Failure to do that would mean that clearing could be moved to other jurisdictions and the tool would be ineffective.

The role of authorities in margin setting will also be relevant for initial margins on transactions *not subject to central clearing* when the mandatory exchange of initial margins on such transactions enters into force. If this is not the case, a serious risk of transfer of activity from CCPs to non-centrally cleared transactions as a consequence of macroprudential decisions on margins and haircuts for CCPs only must be considered.

It is also worth exploring if it would be beneficial to apply the macroprudential margins and haircuts at transaction level to ensure that all relevant transactions are covered, including those contracted by non-banks, regardless of whether these transactions have been concluded in the centrally cleared market, in the non-centrally cleared market or by EU counterparties clearing their trades via a non-EU CCP[13].

**Mandate and coordination**

The ESRB believes that the primary policy responsibility should be with national competent authority with a close involvement of the relevant macroprudential authorities. The involvement may take the form of consultations or direct participation in decision-making, if feasible. The interaction of macroprudential authorities and the competent authorities should not limit the competent authorities' ability to take appropriate actions in a timely manner, while macroprudential authority should still have the flexibility to issue recommendations on the setting of the margins and the haircuts, if deemed necessary. The potential risk of in-action bias is especially relevant for margins and haircuts, compared to other macroprudential instruments, as conditions in financial markets might change rapidly.

[13] Although the mandate of EU macroprudential authorities would not allow the setting of margin requirements for non-EU CCPs, it would allow macroprudential margins to be required at transaction-level for all EU counterparties (regardless of where the trade is cleared).

An active role of the ESRB or ESMA might be necessary to ensure that regulatory arbitrage and coordination among different jurisdictions within the EU are properly addressed. For example, the ESRB could have a role in issuing recommendations to ensure reciprocity across EU countries, either on its own initiative or after notifications from member institutions.

The ESRB considers it important for the effective functioning of the single market and the future stability of the EU economy that authorities have the option to require more conservative margins and haircuts for macroprudential reasons within the EU framework with adequate and strong safeguards that preserve the single market. This would strengthen the hand of the relevant authorities in ensuring, either on their own initiative or following a recommendation by the ESRB, that the margin and haircut requirements properly reflect macroprudential developments in national economic and financial cycles.

**Issues for further consideration**

Macroprudential use of margin and haircut requirements for centrally and non-centrally cleared derivative transactions is an important policy instrument, and further work is needed on specific issues. This includes:

- **Practical implementation**: The operationalisation of the margin requirements as a macroprudential instrument may encounter objective implementation difficulties due to a wide spectrum of financial instruments. One route that could be considered for implementing the margin instrument is by establishing asset class categories sharing similar risk factors relevant for the determination of margins – an approach that is conceptually similar to the methodology for non-centrally cleared derivatives proposed by BIS-IOSCO (2015). For haircuts, the FSB (2014) framework for numerical haircuts could be a relevant point of reference.
- **Indicators and triggers**: A counter-cyclical add-on adjusted by authorities could be linked to the business or credit cycle. Alternatively, a link could be established between the margin add-on and an indicator of the cycle specific to the asset class in question. This would requires the identification of relevant indicators and trigger levels for the activation and release of the add-on and calibration of step sizes. There are similarities with the issues for macroprudential instruments targeted towards banks' capital.
- **Interplay with existing macroprudential instruments**: The introduction of CRD IV/CRR gave macroprudential authorities a set of policy instruments to address financial stability risks in the banking sector. These have since been operationalised and used in several EU countries. EMIR covers both financial and non-financial companies, but operationalisation of margin and haircut requirements as a macroprudential instrument has to be carried out with appropriate consideration of the interplay between the existing macroprudential tools.
- **Macroprudential tools in other markets**: Going forward and beyond EMIR, the ESRB also considers it important that the scope of macroprudential margins and haircuts should be as broad as possible to avoid regulatory arbitrage and shifting of activity. The FSB has already proposed a policy framework for minimum haircuts for non-centrally cleared SFTs between banks and non-banks and is expected to expand the scope of this framework to non-bank-to-non-bank SFTs. Competent authorities with close involvement of macroprudential authorities should also be given the option to use the haircuts as a macroprudential

tool, e.g. by raising the numerical haircut floors and varying them over time in a counter-cyclical manner.

## 6 Effect on incentives

Mitigating pro-cyclicality ultimately means adopting a prudent approach in setting margining and haircut requirements which, in turn, means costs for counterparties that must collateralise their positions. To ensure a level playing field and reduce regulatory arbitrage, margin and haircut requirements for CCPs and for non-centrally cleared transactions should be set consistently.

If regulatory requirements only or prevailingly target centrally cleared transactions, the relevant trading activities could shift from CCPs to the non-centrally cleared domain given that the cost of using CCPs is high compared with the "bilateral" dimension.

For standardised classes of derivatives subject to mandatory clearing, activities could shift to non-standard derivatives, which are less liquid and more opaque.

The same holds true at international level: in the presence of significant differences across jurisdictions in terms of the risk management approach there is a substantial risk, at least for the most volatile sectors such as OTC derivatives, that activity will shift towards regions where risk management requirements (including those on pro-cyclicality) are less rigorous.

## 7 Policy proposals

The analysis presented above shows that as far as the **efficiency** of the EMIR margining requirements for CCPs is concerned, no material evidence of inefficiency has emerged in the ESRB analysis, which has been carried out through empirical observation of the actual performance since the first CCP was authorised under EMIR in March 2014 and theoretical analysis of the three tools provided for by the RTS. It must be stressed that the population of actual observations is very low. In the very few examples of significant market swings occurring in this limited period, no significant evidence of pro-cyclical implications induced by margins has emerged.

However, this does not automatically mean that there is no room for improvement. The ESRB would like to suggest for consideration the following **areas of improvement of the existing framework** in EMIR:

- **Binding guidance on the build-up and exhaustion of the margin buffer**. Article 28(1)(a) of the RTS No 153/2013 requires that CCPs apply a margin buffer to margins, which can be temporarily exhausted in periods where calculated margin requirements are rising significantly. The RTS does not provide any guidance on what constitutes temporary exhaustion or a significant rise in margins. Binding guidance could ensure a consistent framework and that the buffers will be in place and will be used in periods of market stress.
- **Binding guidance on the method for including stressed observations in the look-back period.** Article 28(1)(b) of the RTS No 153/2013 requires that CCPs assign at least a 25% weight to stressed observations in the look-back period. However, there is no detail on how a stressed period should be identified or incorporated into the margin calculation. The ESRB suggests that binding guidelines be developed on the definition of stressed observations and the relative weighting of individual stressed observations.

- **Binding guidance on the implementation of the ten-year look-back period that ensures that sufficient stress observations are always included.** Limiting the look-back period to ten years gives rise to the risk that stressed observations are phased out and eventually disappear from the look-back period without a new stressed observation being added. Binding guidelines could specify that when the level of stressed observations included in the look-back period falls below a pre-specified level, the CCP should shift to option (a) or (b) from Article 28(1) or that the look-back period should be prolonged.
- **A less flexible framework for calibration of collateral haircuts**. The framework should seek to address the pro-cyclicality of haircuts and the potential positive correlation with margin requirements. The measures in EMIR provide CCPs with considerable flexibility on the calibration of their collateral haircuts, as they do not indicate precisely how to incorporate stressed conditions or what criteria should be taken into account when rating the issuers' creditworthiness. The ESRB proposes **incorporating** the provision of minimum look-back periods to be taken into account when estimating stress or pre-defined minimum haircuts.

These proposals do not introduce additional requirements. Rather they are aimed at providing clear guidance on the parameters to be used by CCPs in order to avoid potentially significant differences in their interpretation and thus enhance their effectiveness on an EU-wide basis. In the absence of such guidance, it could happen in some cases that these requirements are interpreted in such a way that a robust anti-cyclical "buffer" is not ensured, thus limiting the possibility of market swings translating swiftly into significant changes in margins and haircuts.

- **A definition of pro-cyclicality in the EMIR Level 1 text.** Including the definition of pro-cyclicality in EMIR will ensure a clear and consistent reference point for the provisions related to pro-cyclicality. The ESRB suggests considering the definition of pro-cyclicality contained in the PFMIs.

In the interests of legal certainty and transparency, it seems preferable that a definition of pro-cyclicality be embedded in the legal text. This would allow CCP operators, supervisory authorities and interested stakeholders in general to rely on objective terms of reference in defining and/or evaluating a CCP's anti-cyclical toolkit.

With regard to the potential **additional intervention capacity,** the ESRB would like to suggest for consideration the following issues, which in its opinion deserve appropriate attention from a macroprudential perspective:

- **A documented holistic approach to pro-cyclicality is recommended for CCPs**. Whereas EMIR deals separately with the pro-cyclicality of margins and haircuts, it does not explicitly provide specific measures for the other risk management measures which CCPs usually employ, such as concentration and creditworthiness add-ons. Furthermore, it does not prescribe that CCPs should consider, under a pro-cyclicality perspective, how margins and haircuts may interact with each other and with the add-ons triggered by concentration and credit risks. The ESRB believes that it would be useful to have a stated policy by CCPs on the overall tolerance for pro-cyclicality clearly documented and approved by the appropriate governance bodies. This "pro-cyclicality report" should be made available to the respective CCP's competent authority. The conclusions from the report could also be shared with the members of the college, for instance, and incorporated into the results of review

and evaluation carried out by the competent authorities in line with Article 21 of EMIR, which should be communicated to the college.

This suggestion does not introduce additional burdens on CCPs: it is aimed at encouraging a CCP's governing bodies to consider and adopt a holistic anti-cyclical stance, which takes into due consideration all the various components of a CCP's risk management. The rationale behind these suggestions is that CCPs can take a variety of decisions in relation to risk management, whose effect under a pro-cyclicality perspective can be better evaluated following a holistic approach. On this basis it can be expected that the overall efficiency of the anti-cyclical measures of a CCP will be enhanced or at least can be better evaluated by the relevant supervisors or stakeholders in general.

- **Appropriate transparency requirements**. A key issue in avoiding pro-cyclical implications from CCPs' choices in terms of risk management is their predictability, so that clearing members can anticipate and manage liquidity strains potentially triggered by calls on margins, haircuts or add-ons. Although EMIR requires CCPs to be generally transparent towards clearing members in relation to risks, no specific requirement is set for pro-cyclicality requirements. In this respect, more granular provisions would be warranted.

A key issue in any anti-cyclical toolkit is the predictability of the measures it aims at "disciplining" in order to enable clearing members and their clients to embed these potential collateral demands into their decisions on portfolio allocation. Properly granular transparency requirements on a CCP's pro-cyclicality toolkit could significantly help in this regard.

- **A further review of EMIR in 2018 specifically addressing the macroprudential use of margining and haircuts to address and prevent systemic risks.** The ESRB sees a role for competent authorities to set margin and haircut requirements that go beyond the minimum requirements set by EMIR after appropriate involvement of macroprudential authorities. A review in 2018 would allow for sufficient time to take into account the outcome of international discussions on the use of margins and haircuts as macroprudential tools. It would also allow the ESRB to work further on the principles that would govern these tools and provide for further experience with the existing provisions in EMIR. This review clause could be accompanied by an illustrative considerandum that elaborates on the benefits expected from this additional tool and on the conditions for its exercise.

This additional EMIR review could also be considered in a broader perspective, taking into account that the framework under which CCPs operate is undergoing significant development at the moment. In Europe, the European Commission is expected to publish a proposal on recovery and resolution of CCPs later this year, and it is expected that several clearing obligations for classes of standardised OTC derivatives will come into effect in the coming years. At a global level, a more detailed transparency framework has been developed. The CPMI-IOSCO is also undertaking a review of CCP stress testing to identify how the relevant PFMIs are being implemented and whether additional guidance in this area is needed. These initiatives are expected to have a significant impact on the way CCPs operate, the available information about their activities and the derivatives market in Europe.

Under an international convergence perspective, the ESRB notes that European legislation is in some respects more granular than the PFMIs, while at the same time allowing a certain degree of

flexibility for CCPs. As noted above, while the current anti-pro-cyclicality provisions within EMIR are broadly effective and contribute to systemic stability, there are potentially other methods for minimising pro-cyclicality that may perform as well as or better than the measures in EMIR. As the literature on identifying and measuring pro-cyclicality develops, there may be scope to move to a more outcomes-based approach for anti-pro-cyclicality provisions within EMIR.

Given the inherently cross-border nature of a significant part of CCP activity, the ESRB encourages the European Commission to support international standard-setting bodies in assessing the need to adopt more granular provisions in terms of pro-cyclicality, so as to avoid a situation in which an incentive arises to steer clearing activity towards CCPs adopting *ceteris paribus* less rigorous (and therefore less costly) pro-cyclicality requirements. This granularity should not discourage innovation in pro-cyclicality mitigation techniques, that is to say, the set of granular parameters/tools to be identified by the standard-setting bodies should also permit any tool which performs at least as well as the “mandated” toolkit.

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***Annex 1 – Definition of pro-cyclicality in other regulation or papers***

| Source | Definition |
|---|---|
| **Financial Stability Board** | |
| **Note for the FSF Working Group on Market and Institutional Resilience, 9/2008, pp. 1-2** | The term pro-cyclicality is generally used to refer to the mutually reinforcing ("positive feedback") mechanisms through which the financial system can amplify business fluctuations and possibly cause or exacerbate financial instability. |
| **Joint FSF-BCBS Working Group on Bank Capital Issues, Reducing pro-cyclicality arising from the bank capital framework, 3/2009, p. 2** | The term pro-cyclicality in this note refers to situations where the cyclicality of such measures causes adverse feedback dynamics which further amplify financial market volatility, illiquidity or economic cycles. |
| **Report of the Financial Stability Forum Working Group on Provisioning, 3/2009, p. 3** | In this context, the term pro-cyclicality refers to the amplification of otherwise normal business fluctuations. |
| **Report of the Financial Stability Forum Addressing Pro-cyclicality in the Financial System, 4/2009, p. 8** | The term pro-cyclicality refers to the dynamic interactions (positive feedback mechanisms) between the financial and the real sectors of the economy. These mutually reinforcing interactions tend to amplify business cycle fluctuations and cause or exacerbate financial instability. |
| **Bank for International Settlements** | |
| **The role of margin requirements and haircuts in pro-cyclicality, 3/2010, p. 8** | Pro-cyclicality refers to the mutually reinforcing interactions between the financial and real sectors of the economy that tend to amplify business cycle fluctuations and cause or exacerbate financial instability. Such feedback mechanisms tend to be particularly disruptive when stress in the financial system exacerbates economic downturns. |
| **Principles for Financial Market Infrastructures, 4/2012, p. 178, p. 47** | Pro-cyclicality – The changes in risk management requirements or practices that |

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| | are positively correlated with business or credit cycle fluctuations and that may cause or exacerbate financial instability. **(p. 178)**<br><br>In this context, pro-cyclicality typically refers to changes in risk management practices that are positively correlated with market, business, or credit cycle fluctuations and that may cause or exacerbate financial instability. **(p. 47)** |
| **European Commission** | |
| **Working document accompanying the Proposal amending Capital Requirements Directive on trading book, securitisation issues and remuneration policies, SEC(2009) 975 final, COM(2009) 362 final, 7/2009, pp. 44-46** | Pro-cyclical effects can be defined as those which tend to follow the direction of and enhance an economic cycle. Within the financial system, such effects transpire as the tendency of financial activity to amplify business fluctuations, which in turn may contribute to financial instability. These effects operate through feedback mechanisms, which may give rise to self-sustaining booms and busts. |
| **Working Paper accompanying the Regulation on prudential requirements for credit institutions and investment firms, 949 final, SEC(2011), 7/2011, p. 58** | Pro-cyclicality of the financial system can be defined as the tendency of financial activity to amplify business fluctuations which may lead or contribute to financial instability. |
| **Proposal No 1060/2009 on credit rating agencies and a Proposal 2009/65/EC on the coordination on laws, regulations and administrative provisions relating to UCITS and Directive 2011/61/EU on Alternative Investment Fund Managers, SEC(2011), 1354 final, 11/2011, p. 191** | Pro-cyclicality refers to the tendency to increase the effect of variations in the economic cycle. This is often applied to something that increases the effect of a negative economic impact, such as “cliff” effects. |
| **Working paper accompanying the Proposal on structural measures improving the resilience of EU credit institutions and the Proposal on reporting and transparency of securities financing transactions, SWD/2014/030 final, 1/2014, p. 293** | Pro-cyclicality – A condition of positive correlation between the value of a good, a service or an economic indicator and the state of the economy. The value of the good, service or indicator tends to move in the same direction as the economy, growing when the economy grows and declining when the economy declines. The term |

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| | is generally used to refer to the mutually reinforcing mechanisms through which the financial system can amplify business fluctuations and possibly cause or exacerbate financial instability. These "positive feedback" mechanisms are particularly disruptive and apparent during an economic downturn. |
| **"Solvency II": Frequently Asked Questions, p. 7** | Rules can be described as pro-cyclical when they unnecessarily amplify swings in underlying economic cycles or contribute to excessive market movements. |
| **European Banking Authority** | |
| **Report on the pro-cyclicality of capital requirements under the Internal Ratings Based Approach, 12/2013, p. 5** | Pro-cyclicality is defined as "the dynamic interactions (positive feedback mechanisms) between the financial and the real sectors of the economy". A pro-cyclical capital requirement regulation refers to a regulation which tends to amplify business cycle fluctuations and cause or exacerbate financial instability.<br><br>Pro-cyclicality (the issue of variations in capital requirements across the economic cycle, the subsequent impact on lending behaviours and the potential pro-cyclicality effect as amplification of the economic cycle by the financial sector).<br><br>According to the Financial Stability Board (2009), the term "pro-cyclicality" refers to "the dynamic interactions (positive feedback mechanisms) between the financial and the real sectors of the economy". |