Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions

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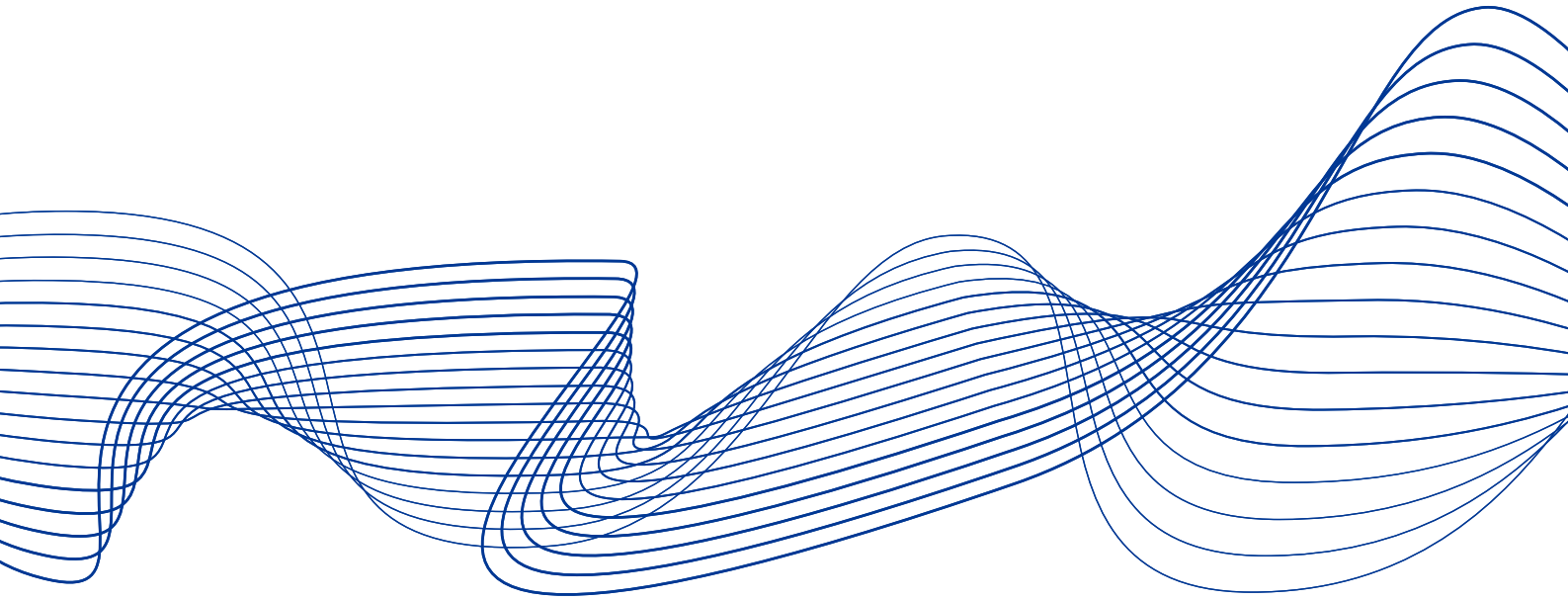
By
ESRB Expert Group on the Macroprudential Use of Margins and Haircuts



ESRB
European Systemic Risk Board
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Executive summary

This report considers systemic risks arising from the procyclicality associated with margin and haircut practices and sets out possible policy options to address these. Post-crisis regulatory reforms have resulted in the majority of derivatives being centrally cleared or subject to bilateral collateral requirements. These include the exchange of variation margins, the posting of initial margins and the application of collateral haircuts. These regulatory reforms have made the financial system safer by preventing the build-up of unsecured exposures, thereby reducing counterparty credit risk and the risk of contagion in the event of default. A side effect of the greater use of collateral is that the systemic risk profile has seen a transformation of credit risk into liquidity risk, as market participants need to be able to provide high-quality collateral at short notice in response to movements in market prices. In particular, if securities financing transaction (SFT) markets become impaired during times of market stress, counterparties may not be able to rely on them to source the right collateral to meet margin calls for other transactions at short notice. In such cases, collateral requirements, including margin and haircut practices, may lead to or amplify procyclical developments by channelling liquidity strains through the financial system. A previous report (ESRB, 2017) includes a comprehensive analysis of these risks and a broad list of potential macroprudential tools to address them. This report revisits and extends the findings in ESRB (2017) through data analysis and market intelligence on the functioning of the derivatives and SFT markets. It reduces the broad list of potential tools presented in ESRB (2017) to a narrower set of policy options for further work.

ESRB (2017) identifies potential macroprudential tools designed both to constrain the build-up of leverage during booms and to reduce liquidity strains during times of market stress. ESRB (2017) sets out how increases in asset prices enable the build-up of leverage, as fewer securities are required to collateralise a given exposure, and how falls in asset prices trigger automatic calls for more collateral, which might force deleveraging. This may be compounded by the characteristics of the risk-based models that market participants use. These models typically link the calculation of margins and haircuts to price volatility, meaning that margin and haircut requirements tend to decrease when financial market conditions are benign and to increase when volatility rises. This can exacerbate “leverage cycles”, in which market participants use the collateral freed up by higher asset prices and lower margin and haircut requirements to increase their borrowing and contingent commitments through derivatives, thereby accumulating financial and synthetic leverage. When asset prices fall, firms are faced with higher margins and haircuts at the very time that their collateral declines in value or – in extreme cases – is rendered ineligible by the collateral taker. This process can lead to a destabilising deleveraging mechanism if firms have to close out positions, triggering asset fire sales. Reflecting this, ESRB (2017) sets out a comprehensive list of potential tools designed to reduce both the build-up of leverage during booms and liquidity strains during times of stress.

The ESRB now places greater emphasis on tools designed to reduce liquidity strains during times of market stress than on those that constrain the build-up of leverage during booms. Since its previous report, the ESRB has undertaken analytical work and conducted market intelligence to close knowledge gaps in areas including market practices in and the functioning of the derivatives and SFT markets. This has confirmed the central importance of SFT markets in

transforming collateral and has influenced the ESRB's thinking in two ways. First, during booms, well-functioning SFT markets enable market participants to transform a broad range of collateral at low cost. Second, during times of stress, impairment of SFT markets means that they can also cause substantial strain on individual counterparties that cannot quickly and easily transform collateral into cash. The interplay of impaired SFT markets and liquidity demands from variation margin and initial margin calls with increases in haircuts and/or changes in collateral eligibility can create severe liquidity stress in the financial system and endanger financial stability. Reflecting the central importance of SFT markets in transforming collateral, most of the policy options developed in this report are designed to reduce liquidity strains from margins and haircuts during times of stress. To the extent that they reduce the cyclicality of initial margins, they may also contribute to reducing the build-up of leverage during booms.

In identifying possible policy options, the ESRB is guided by three principles, geared towards supporting and strengthening key elements of the post-crisis regulatory reforms. When revisiting the tools identified in ESRB (2017), the ESRB agreed on three principles for identifying policy options that warrant further work. First, the move to central clearing has been a cornerstone of the post-crisis regulatory reforms and should not be undermined. Reflecting this, the policy options identified in this report are designed to preserve or enhance incentives to use central clearing. Second, policy options designed to mitigate procyclicality should not lead to regulatorily-induced undercollateralisation of market participants. This is relevant in particular for central counterparties (CCPs), which have become critical nodes in the post-crisis financial system for the management of counterparty risk. Reflecting this, ceilings or corridors for initial margin and haircuts, which were discussed in ESRB (2017), are not considered further in this report. Third, by preventing the build-up of uncollateralised exposures, the exchange of variation margin has made the financial system safer. In line with this, although variation margin calls can put severe liquidity stress on market participants, the policy options identified in this report focus on mitigating the impact of variation margin calls on the liquidity of market participants and do not restrict the use of variation margin.

The ESRB has identified six options designed to either limit the cyclicality of margins and haircuts in derivatives and SFT markets or to increase the resilience of market participants. First, in order to prevent variation margin gains collected intraday remaining at CCPs and depriving the financial system of liquidity during times of stress, the ESRB sets out an option to require CCPs to pass through the intraday variation margin gains they collect. Second, an option to ensure that initial margin levels do not fall to excessively low levels during prolonged periods of low volatility could be to introduce initial margin floors in centrally and non-centrally cleared derivatives markets, supplementing existing tools in the European Market Infrastructure Regulation (EMIR). Third, in order to ensure that the margin and haircut practices of clearing members towards their clients do not transmit procyclicality through the financial system, a policy option could be to address risks from procyclicality in client clearing. This could be considered in a forthcoming Commission delegated act mandated under EMIR Refit. Fourth, in order to reduce procyclicality risks stemming from increases in haircuts and the tightening of collateral eligibility criteria, one policy option could be to develop guidance for market participants on the use of notice periods, so that changes in haircuts and collateral eligibility do not occur suddenly. Such guidance could then be considered by ESMA. Fifth, an option to ensure that market participants transacting in derivatives markets are better equipped to meet margin calls during times of stress could be to introduce a cash collateral

buffer for counterparties active in centrally and non-centrally cleared derivatives markets that is usable for all margin calls, including variation margin calls. Sixth, to address remaining risks in bilateral SFT markets, one option could be to consider a reform extending the risk mitigation techniques used (and mandated by EMIR) in non-centrally cleared derivatives markets to non-centrally cleared SFTs. As is already the case in centrally cleared SFTs, this would imply the use of two-way initial and variation margins as counterparty credit risk mitigation techniques.

The ESRB intends to carry out further analysis of these options, their potential effects on the relevant markets and how they could be incorporated into regulatory frameworks. The ESRB intends to carry out further work to analyse the functioning and impact of the options identified in this report. This could include (i) an assessment of the policy options (potentially using new data sources), (ii) analysis of any side effects they may have and (iii) a further assessment of the interaction between the options and existing regulations, such as the anti-procyclicality regime set out in EMIR. Four of the options identified – the mandatory pass-through of intraday variation margin, initial margin floors, the strengthening of client clearing and guidance on notice periods – would require changes to the regulatory framework for centrally cleared and non-centrally cleared derivatives. By contrast, introducing cash collateral buffers for entities engaging in derivatives transactions would require changes to the prudential rules that apply to banks, insurers and other financial entities. The sixth policy option on bilateral SFTs, which is an extension of the globally agreed safeguards applied to derivatives transactions, would require the development of a new regulatory framework.

In identifying these options, the ESRB is mindful that further work and engagement with regulatory standard-setters and industry representatives is needed. Although the ESRB is not charged with developing detailed regulatory standards, it is conscious that some of the options identified might entail increased operational complexities and costs for market participants, with potential implications for the competitiveness of the EU financial system. Regulatory standard-setters are well-placed to take account of these considerations in due course through their public consultations and cost-benefit analyses. In its further work, the ESRB would also contribute to identifying these complexities and costs from a financial stability perspective. The ESRB is also mindful that in a global financial system where market activities can transcend international borders, the sixth option in particular has a global dimension and must be consistent with – if not identical to – other international regulatory initiatives in this area. These include the minimum haircut framework for non-centrally cleared SFTs designed by the Financial Stability Board (FSB). Reflecting these considerations, the ESRB will engage with stakeholders, including market participants and international bodies, in fleshing out the options set out in this report.

1 Introduction

Greater use of collateral following the post-crisis regulatory reforms has made the financial system safer by preventing the build-up of unsecured credit exposures. The role of collateral in the financial system has increased since the global financial crisis. This reflects a shift in market participants' preferences towards secured transactions and international regulatory reforms requiring collateralisation of many credit exposures that had previously been uncollateralised. In particular, the Group of Twenty (G20)[1] post-crisis reform programme has led to the introduction of clearing obligations for standardised over-the-counter (OTC) derivatives in major jurisdictions, including the European Union (EU), and to global standards for collateral requirements on non-centrally cleared derivatives transactions. These reforms have resulted in the majority of derivatives being centrally cleared or subject to bilateral collateral requirements. Consequently, most derivatives transactions involve variation margin being exchanged, initial margin being posted and collateral haircuts being applied. These regulatory reforms of the global derivatives markets have made the financial system safer by preventing the build-up of unsecured exposures, thereby reducing counterparty credit risk and the risk of contagion.

A side effect of the greater use of collateral is that the systemic risk profile has seen a transformation of credit risk into liquidity risk, and that operational complexity has increased. This transformation reflects the need for market participants to be able to provide high-quality collateral at short notice in response to movements in market prices and/or changing market conditions. It is widely recognised that collateral requirements can create procyclical dynamics (e.g. Brunnermeier and Pedersen, 2009; ESRB, 2017; Maruyama and Fernando, 2019), and some of the requirements under EMIR are specifically designed to reduce the procyclicality that might arise from the models CCPs use to calculate initial margin requirements. As described in ESRB (2017), increases in asset prices lead to an increase in the valuation of securities that have been provided as collateral in bilateral or centrally cleared derivatives transactions. As fewer securities are required to collateralise a given exposure, this enables the build-up of leverage. Conversely, a fall in asset prices triggers automatic calls for more collateral to be provided to the CCP or a bilateral counterparty and might force deleveraging. These dynamics may be compounded due to the characteristics of the risk-based models that market participants use to compute initial margin and haircuts. Since these models use volatility as a key input, margin and haircut requirements tend to decrease during good market conditions and increase when volatility rises in times of market stress. This can exacerbate "leverage cycles" when market participants use the collateral freed up by rising asset prices and lower margin and haircut requirements to add to their borrowing and contingent commitments from derivatives, accumulating leverage. Following a fall in asset prices, market participants are faced with higher margins and haircuts at the moment the value of their collateral declines or – in extreme cases – is rendered ineligible by the CCP or collateral taker in a bilateral transaction. This process can lead to a destabilising deleveraging mechanism if market participants have to close out positions, triggering asset fire sales.

ESRB (2017) identifies potential tools designed to both constrain the build-up of leverage during booms and reduce liquidity strains during periods of market stress. EU and

[1] See **G20 Leaders' Statement from the Pittsburgh Summit**, September 2009.

international bodies, including the ECB, ESMA, ESRB, FSB, BCBS and IOSCO, have identified the possibility of addressing procyclical collateral requirements through the macroprudential use of margins and haircuts. BCBS and IOSCO have recognised that national supervisors "may wish to alter margin requirements to achieve macroprudential outcomes" pointing to "a macroprudential 'add-on' or buffer on top of baseline (or minimum) margin levels" as one possible way of achieving this (BCBS-IOSCO, 2015). And in the context of non-centrally cleared SFTs, the FSB has noted that numerical haircut floors could be used as a macroprudential tool (FSB, 2015). In 2017, the ESRB published a report (ESRB, 2017) that further develops these ideas and includes a comprehensive list of potential macroprudential tools designed to address systemic risks from procyclicality associated with margin and haircut practices. This includes tools to reduce the build-up of leverage during booms and others to reduce liquidity strains during times of stress.

ESRB (2017) also identifies a number of challenges that require further analytical and conceptual work to close knowledge gaps. For example, some of the tools identified in ESRB (2017), such as speed limits or ceilings, would interfere with the prudent risk management of individual market participants, especially CCPs. Moreover, ESRB (2017) recognised that SFTs enable collateral optimisation and transformation, suggesting that tools targeted at a specific market, entity or an asset class could be circumvented. This could in turn have implications for whether tools should focus on reducing the build-up of leverage or on reducing liquidity strains during times of stress. To address these challenges, ESRB (2017) concluded that further analytical and conceptual work was needed to close knowledge gaps, including on market practices in and the functioning of the derivatives and SFT markets.

This report describes the analytical and conceptual work to close these knowledge gaps, which has helped narrow the broad list of tools presented in ESRB (2017). Since its previous report, the ESRB has conducted market intelligence to close knowledge gaps with regard to market practices in and the functioning of the derivatives and SFT markets. In particular, the ESRB held a workshop with a broad range of industry representatives, including representatives of CCPs, clearing members and clients of clearing members, to discuss market practices in SFTs and derivatives transactions and the cash management implications of margins and haircuts. To better understand specific aspects of client clearing, the ESRB also approached the supervisors of some of the largest providers of client clearing services and held bilateral calls with them and some of the client clearing providers. To learn more about the pass-through of intraday variation margin at CCPs, it engaged with supervisors of EU CCPs. In addition, representatives of ESRB member institutions undertook analytical work which informed this report. For example, empirical work by ECB staff (Cominetta, Grill and Jukonis, 2019) simulates how the margins on a static derivatives portfolio would have behaved over a longer period under CCPs' initial margin models. Deutsche Bundesbank staff undertook empirical work on haircuts based on newly available data on SFTs. Bank of England staff developed an analytical model (O'Neill and Vause, 2018) that provides a tool to compare the effects of different policies. Based on the insights gained, this report narrows down the broad list of potential tools presented in ESRB (2017) and identifies six policy options.

The remainder of this report is structured as follows. Section 2 provides an overview of market practices in centrally and non-centrally cleared SFTs and derivatives transactions and their cyclical behaviour. Section 3 sets out the impact of margin and haircut settings on market participants and

describes how, in combination, they could have procyclical effects. Section 4 lists policy options to address the risks identified in the previous sections, and Section 5 sets out the conclusions.

2 Cyclicality of market practices in SFTs and derivatives transactions

Margin and haircut requirements in the derivatives and SFT markets fulfil an important function in CCPs' and counterparties' risk management in bilateral trades. The credit exposures between two counterparties in SFTs and derivatives transactions change with the price movements of the assets or indices on which the contracts are based. To prevent this price-driven build-up, market participants have developed the practice of collateralising these exposures as they materialise. This collateralisation includes posting initial margin, exchanging variation margin and using collateral haircuts[2]. Often used in combination, these techniques reduce counterparty credit risk and the risk of contagion for CCPs and market participants in bilateral trades by preventing unsecured exposures from building up, thereby reducing losses in the event of a counterparty's default.

The ESRB analyses seven drivers of margin calls and their cyclicality. If a counterparty deems that the bilateral credit exposure is above its risk tolerances, it will react by issuing a margin call to the other counterparty to collateralise the increased exposure. There are a number of possible reasons for these margin calls.

1. Change in the price of the contract (typically referred to as variation margin)
2. Change in the value of initial margin due to changes in the price of the contract (referred to as adjustment to the initial margin)
3. Change in the methodology or parameters for the calculation of initial margin
4. Change in the counterparty-specific add-ons driven by changes in the price of the contract and the resulting adjustment in initial margins
5. Change in the model or parameters for the calculation of counterparty-specific add-ons

If margins are posted in assets other than cash, there may be two further reasons for margin calls.

6. Change in the price of the collateral
7. Change in the haircut or parameters of the haircut model

These seven drivers determine the size and direction of the margin call that counterparties may issue to each other, and this section will explore each element in detail.

Variation margin covers current exposures resulting from gains and losses on open transactions and is exchanged on a frequent basis (daily and intra-daily). Variation margin is used in SFTs and derivatives transactions. It offsets the price variations in the contract, preventing the build-up of exposures for the CCP or other market participants in bilateral transactions. Variation margin is a backward-looking tool, driven by actual changes in prices as they materialise.

[2] ESRB (2017) gives a detailed overview of these concepts.

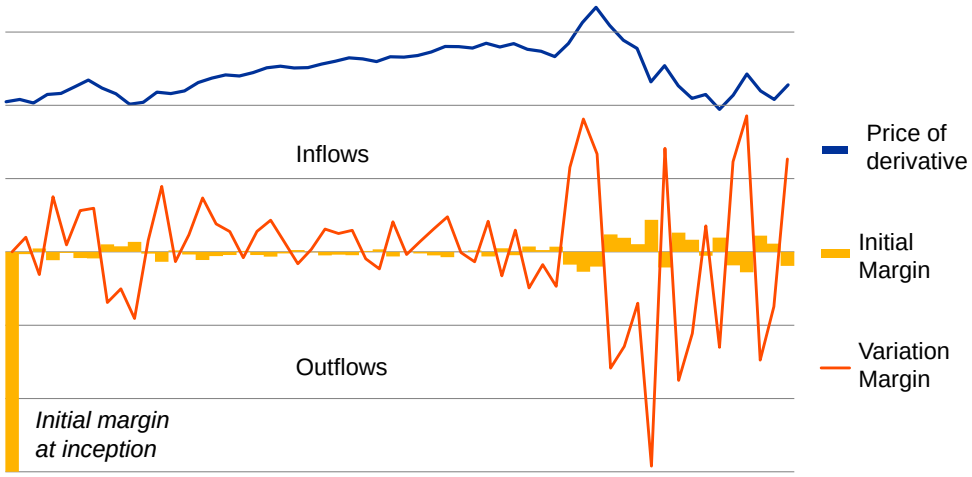
By offsetting profit and losses among counterparties to a trade, CCPs or bilateral counterparties reset their counterparty credit risk that results from past market movements. This means there is no remaining exposure from past price movements that would add to the forward-looking risk in the event of a counterparty's default. Daily variation margin is usually posted in cash (except in bilateral SFTs) for reasons of operational convenience in transferring the outstanding amounts between counterparties. However, as cumulated variation margins can become large over time, stable balances of posted variation margin can be collateralised using non-cash instruments. It is collected from all market participants under EMIR, including institutions such as insurance companies, funds and large non-financial companies. Most of these counterparties typically hold directional portfolios with fewer netting opportunities and large stocks of securities on their balance sheets and operate with low cash resources. Furthermore, these institutions rely more on the collateral transformation services of their clearing members or liquid SFT markets to transform their non-cash collateral into cash collateral, as they do not have access to central bank liquidity and may have difficulties in providing the cash needed to pay the variation margin in stressed conditions.

Initial margin is a forward-looking risk management tool that protects one counterparty against replacement losses stemming from the default of another counterparty. The credit exposure towards a counterparty is not limited to the past performance of the contract, which is addressed by exchanging variation margin, but also includes the cost of either liquidating or replacing the contract in the event of a counterparty's default. Initial margin is designed to cover the market risk of a position over the margin period of risk (MPOR), i.e. the time horizon needed to hedge or close out the position of a defaulting counterparty in a bilateral or centrally cleared trade. Initial margin is paid up front and unlike variation margin is forward-looking, as it is an estimate based on replacement costs in the event of default. It is therefore computed based on the time required to liquidate or replace the contract, and on the volatility of the price of the contract during the liquidation period. In a bilateral transaction, both parties post initial margin. For centrally cleared contracts, CCPs receive initial margin payments from their clearing members but do not post initial margin to them. Under EMIR, counterparties can post initial margin in the form of cash or highly liquid assets. Different types of counterparties have different preferences as to the type of instrument to be posted. Among dealer banks, cash is currently widely used. This helps to overcome operational complexities in exchanging initial margin during the course of a day, since it is directly available and is not subject to collateral haircuts. Conversely, clients of clearing members usually prefer non-cash collateral, as they have lower cash reserves.

Liquidity flows originated by variation margin calls often dwarf those stemming from initial margin. To quantify the relative size of variation and initial margin calls for derivatives markets, ISDA (2018) reports that in Q4 2017 firms falling under the first phase of the introduction of the clearing obligation for derivatives posted variation margin of about USD 630 billion. Over the same period they received nearly USD 900 billion of variation margin from their counterparties. For both bilateral and centrally cleared derivatives transactions, variation margins account for approximately 80-90% of the net daily cash flow payments from margin calls, according to industry representatives who participated in an ESRB workshop on market practices in derivatives transactions and SFTs. Figure 1 shows a stylised comparison between variation and initial margin payments. While the (stock of) initial margin to be posted at the beginning of a transaction is usually higher than single variation margin payments, variation margin payments (both positive and negative) are larger than initial margin calls and may move substantially over time.

Figure 1

Stylised example of variation margin and initial margin flows



Source: ESRB illustration.

CCPs and bilateral counterparties might not distinguish between initial and variation margin calls. CCPs and other counterparties do not necessarily differentiate between variation and initial margin when calling for margins, including intraday margins. However, this report differentiates according to the economic distinction between variation and initial margin: variation margins are backward-looking, as they relate to past price movements, while initial margins are forward-looking estimates of liquidation shortfall losses conditional on a default over a predefined time horizon. This economic concept can be used to clearly distinguish between variation and initial margin calls.

When initial or variation margin is posted in non-cash collateral, haircuts are applied to account for the market, liquidity and credit risk of the securities used as collateral. Since the value of non-cash collateral varies over time, CCPs and counterparties in bilateral trades are exposed to the risk that the price of securities held as collateral will have decreased at the time that the counterparty pledging collateral defaults. This risk is mitigated by monitoring the value of the collateral and by discounting (haircutting) the current market value of non-cash collateral. Collateral haircuts are based on estimates of future market liquidity and volatility, and are therefore adjusted whenever one of these risks changes.[3]

Add-ons are an integral component in capturing counterparty-specific risks. Variation margin and initial margin do not cover all risks associated with the potential default of a counterparty in a contract. Other risks that market participants may want to address include the concentration of the other counterparty's positions in the market, the perceived wrong-way risk between a counterparty's position and its solvency, and the creditworthiness of the trading partner. To offset these risks, market participants may call for additional prefunded resources, in addition to those determined by initial margin calculations. These add-ons adjust when prices move or when price movements trigger reassessments of the add-on calibration models. As is the case for initial

[3] Haircuts are also applied on cash collateral in foreign currencies to account for exchange rate risk.

margin, add-ons are estimates and depend on the expectations of the counterparty applying these tools.

Margin calls of counterparties incorporate all risk components, which may react differently to changing market conditions. Changes in market conditions lead to changes in the bilateral credit exposure between two counterparties, determining the size of the prefunded resources that prudent counterparties wish to hold. Some of the elements presented above react linearly to changes in market prices, such as variation margin calls. Other elements react in a non-linear way, as they are driven by estimates, such as recalibrations of initial margin, haircuts and add-ons. These changes may not be in the same direction; for example, increases in add-ons or initial margins may coincide with inflows of variation margins, and vice versa.

SFTs are a funding mechanism for the collateral that is provided as initial or variation margin. Traditionally, SFT markets are used as a source of short-term collateralised funding or for the provision of eligible collateral in derivatives transactions. They are therefore instrumental to the functioning of margin requirements in derivatives markets (see Box 1 for a description of derivatives and SFT markets in the EU). The typical SFT is a collateralised loan in which the lender provides short-term funding against assets posted by the borrower as guarantee. The collateralised nature of SFTs implies that exposure arises on both the loan side and the collateral side of the trade. In SFTs, initial margin, variation margin and collateral haircuts are also used as risk mitigation techniques. In the SFT context, initial margin and haircuts are used interchangeably[4] and are designed to protect the collateral taker, primarily against market risk. This report refers to initial margins as pre-paid additional resources exchanged between counterparties, and to haircuts as the practice of discounting the value of the collateral, irrespective of whether it is used in the context of SFTs or derivatives.

This section sets out market practices in SFTs and derivatives transactions. It gives an overview of the SFT and derivatives markets in the EU (see also Box 1), describes the market practices used around the elements listed above, explores how these risk management techniques are used to reduce perceived counterparty credit risk and sets out their cyclical behaviour.

Box 1
Overview of the derivatives and SFT markets in the EU

ESRB (2017) describes the use of SFTs and derivatives and includes an overview of these markets in the EU based on surveys of industry participants. Making use of information from newly available datasets, such as the EMIR derivatives transaction-level data and the ESCB Money Market Statistical Reporting (MMSR) data, this box enriches and updates the overview in ESRB (2017) and complements the description of the market structures. It starts with a description of the derivatives markets and then gives an overview of the SFT markets in the EU, which are closely connected with each other.

[4] Conventionally, the term "haircut" is used when referring to the (smaller) magnitude of the cash leg over the collateral, and "margin" when referring to the (larger) magnitude of the collateral leg over the cash. For example, €100 in cash to €102 in collateral can be expressed as either 102% initial margin or a 1.96% haircut. This report uses only the term "haircut".

Derivatives markets

Derivatives are traded on exchanges or are entered into between counterparties OTC without intermediation, and are either bilaterally or centrally cleared. Derivatives markets can be classified by trading venue (exchange-traded or OTC derivatives) and by type of clearing (bilaterally or centrally cleared derivatives). While exchange-traded derivatives are usually centrally cleared, OTC derivatives can be bilaterally or centrally cleared, depending on the liquidity, the degree of standardisation of the derivatives contract and the existence of a clearing obligation.

Derivatives markets are typically characterised by a core-periphery structure. Participants in derivatives markets comprise all types of financial firms (e.g. banks, insurance companies, funds) and some non-financial firms (e.g. corporates, payments institutions). Large dealer banks, which participate as market makers and hedge their open positions, are at the core of the network. These banks are clearing members at most EU and non-EU CCPs, but also clear bilaterally. Furthermore, some dealer banks offer clearing services to their clients. Clients are usually market participants with smaller derivatives portfolios that prefer to connect indirectly to a CCP, given the costs and requirements involved in being a clearing member (see Section 2.4).

At end-2017, the gross notional outstanding in EU derivatives markets was €660 trillion (ESMA, 2018a). Broken down by asset class, ESMA (2018a) states that interest rate derivatives account for 69% of gross notional outstanding, foreign exchange derivatives for 12% and all other classes for less than 5% each. This includes all transactions where at least one counterparty to a trade is domiciled within the European Economic Area (EEA). These market participants are required under EMIR to report their trades to trade repositories.

Interest rate and credit derivatives are increasingly cleared centrally in the EU. According to ESMA (2018a), central clearing rates for credit derivatives grew from 25% to 27% in 2017. 60% of these trades were cleared at EU CCPs, and 40% at non-EU CCPs. For interest rate derivatives, the central clearing rate increased from 40% to 58% in 2017, with 98% of these trades cleared at EU CCPs. These increases have been driven by the phasing-in of the clearing obligation for some classes of credit and interest rate derivatives in the EU and by incentives for voluntary clearing in the EU regulatory framework, e.g. higher capital requirements for non-centrally cleared derivatives. Paradoxically, an increase in central clearing can lead to a decrease in the proportion of cleared contracts by outstanding notional. Because central clearing offers higher netting and compression opportunities than bilateral clearing, the more contracts are cleared centrally, the more contracts can also be netted and compressed. This reduces the rate of centrally cleared contracts. Without netting and compression opportunities, the increase in observed central clearing rates would be even higher.

The collateral in use for the bilateral and central clearing of OTC and exchange-traded derivatives differs. As described in the introduction to Section 2, market participants are required to provide collateral in the form of initial margin to other market participants or the CCP. The eligible collateral is different in bilateral and centrally cleared derivatives transactions. In centrally cleared OTC derivatives, high-quality liquid assets (HQLAs) are usually used, whereas the range of accepted instruments is broader in exchange-traded centrally cleared markets, and broader still in purely bilateral arrangements. ESMA (2018b) reports the collateral structure of 16 authorised EU

CCPs surveyed in 2017 as part of the annual stress test exercise. Clearing members and clients provided approximately 60% of the initial margin received by EU CCPs for OTC and exchange-traded derivatives in the form of securities, and 40% in cash. The CCPs held 42% of cash on central bank accounts, while 57% was held secured at commercial banks (reverse repo) and 1% was deposited (unsecured) at commercial banks. With regard to collateral securities, clearing members and clients mainly provided government bonds (92%). The remaining collateral securities comprise other fixed income securities, including corporate bonds (7%) and equities (1%).

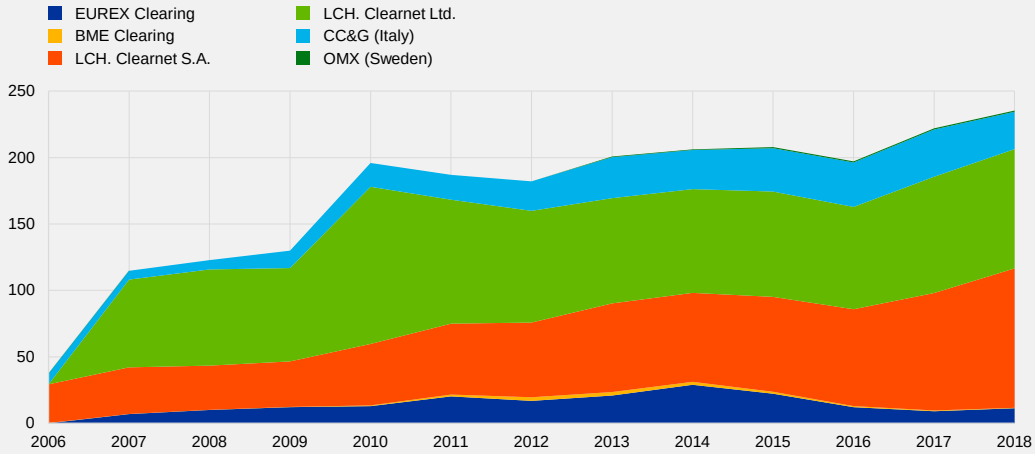
SFT markets

The structure of SFT markets varies across several dimensions – depending on the type of participants involved, the trading infrastructure used and the collateral exchanged. The main types of SFTs are repurchase agreements (repos), securities lending and margin lending. The nature of participants (bank/non-bank entities), the organisation of the market (centrally cleared/bilateral/triparty) and the type of collateral may differ significantly across instrument types and market segments. This part presents an overview of the SFT market. While it only refers to German MMSR data, the findings are in line overall with the Eurosystem's MMSR data, which cover the 52 largest monetary financial institutions (MFIs) in the euro area. However, due to data access and confidentiality restrictions, the ESRB cannot show this data at Eurosystem level.

Chart A

Annual volumes of centrally cleared EUR repos by EU CCP

(EUR trillions)



Source: ECB Central Counterparty Clearing Statistics.
Note: BME Clearing includes volumes cleared at MEFF Clearing before 2013.

Centrally cleared repos represent the largest segment of the overall repo market, followed by bilateral trades. In 2018, the total volume of centrally cleared repos denominated in euro exceeded €235 trillion (Chart A)[5]. Total volumes in centrally cleared repos increased strongly

[5] In 2019, LCH Ltd allowed its clearing members to move their clearing business from LCH Ltd to LCH SA. The resulting changes in market shares are not yet reflected in the statistics.

between 2006 and 2018, and particularly during and after the global financial crisis in 2009, for example at LCH RepoClear[6], in the MTS repo market (for Italian government bonds)[7] and in the German repo market[8]. German MMSR data shows that for the latter, the fraction of nominal transaction volume which is cleared centrally rose from about 60% in 2016 to nearly 80% in 2019, Furthermore, the market size increases from roughly €75 billion centrally cleared daily trading volume in 2016 to over €150 billion in 2019. The increased use of CCPs in repo markets can be attributed to several factors, including regulatory incentives: multilateral netting by CCPs reduces credit exposures and the number of interconnections between market participants[9] and, combined with favourable capital treatment, gives dealers incentives to clear centrally (Krahnen and Pelizzon, 2016).

In the euro area repo market, government bond collateral is mainly used. However, bank bonds, corporate bonds and bonds issued by other financial corporations also play a significant role (see Chart B for an illustration based on German MMSR data[10]).

Approximately 50% of repo transactions on the German market by number are cleared bilaterally (German MMSR data). Non-centrally cleared transactions include bilateral repos, where the transaction is directly agreed upon and cleared between the two counterparties, and triparty repos, in which an intermediary in charge of post-trading services such as collateral management and settlement connects buyers and sellers. The triparty repo market only accounts for a relatively small share of the European market (around 10%), although triparty repos involve a broader range of collateral, including corporate bonds and especially equities (ESMA, 2016a).

The vast majority of trades in the German repo market have a short maturity, with more than 80% of turnover traded overnight. This reflects the main drivers of repo transactions, namely the short-term refinancing needs in the case of cash-driven trades and immediate coverage requirements or settlement needs arising from short sales in the case of security-driven trades. However, when considering stocks of repos, only 25% of repo trades on banks' balance sheets have a maturity shorter than three days.

6 LCH RepoClear reports a volume of cleared repo trades of €197 trillion in 2018, up 36% from an average of €145 trillion in 2013-16 (see **LCH Ltd's website**; accessed on 26 April 2018).

7 In 2018, the share of centrally cleared volumes for Italian government bonds exceeded 97%, reaching €25 trillion (in 2017) from an average of €20 trillion in 2013-16, which equates to an increase of around 21% (Banca d'Italia calculations based on MTS data).

8 The volume of centrally cleared repos has doubled in the last two years, reaching a daily figure of €150 billion at end-December 2018 (German MMSR data).

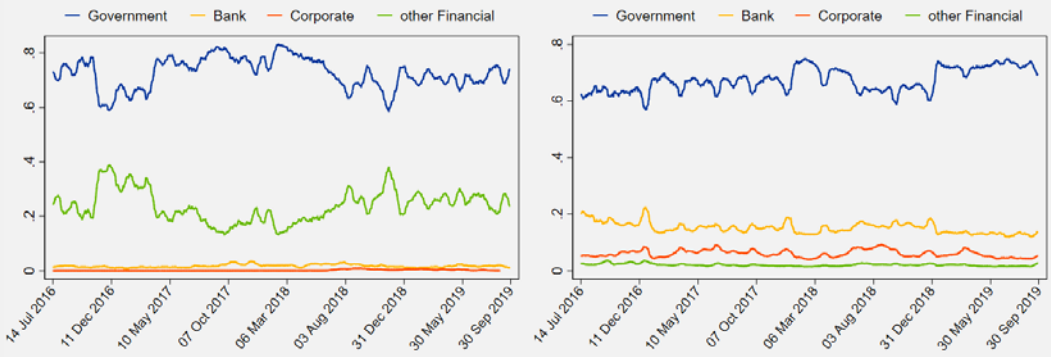
9 According to Banca d'Italia estimates of trades on the MTS repo market, multilateral netting reduces the overall credit exposure of participants in the general collateral segment, which is used for liquidity management, by 10% while the reduction exceeds 40% if the special repo segment, which is used to a greater extent for securities lending, is counted (Banca d'Italia, 2016).

10 Evaluating the European MMSR data confirms all results produced with German MMSR data.

Chart B

German centrally cleared (left hand panel) and bilateral (right hand panel) repo market: relative size of the transaction volume by sector of the issuer of the underlying collateral

(fraction)



Sources: German money market statistical reporting (MMSR) data; own calculations.

Activity in EU securities lending markets has expanded slowly in recent years. In a securities lending arrangement, the owner of a security lends it temporarily to a counterparty against a fee. The average tenor of a security loan is over 150 days, implying that maturities in securities lending are longer than in repo transactions. In 2018, there was on average €550 billion in EU securities on loan, including around €300 billion in government bonds, €200 billion in equities and €50 billion in corporate bonds (ESMA, 2019). Lenders of securities are typically insurance companies, pension funds and other asset managers. Borrowers mainly include banks and hedge funds that are aiming either to short a security or to use the security, e.g. for collateral transformation or dividend arbitrage. Although two CCPs in Europe currently offer clearing of securities lending trades, the share of centrally cleared transactions appears negligible. Securities lending against non-cash is becoming more popular compared with securities lending against cash (ISLA, 2018).

Margin lending is different from other SFTs, as there is no transaction settlement. Prime brokerage margin lending takes place on a portfolio basis, against a pool of securities, by (re)using assets in the client's margin account as collateral. The client is asked to maintain a certain margin amount, which is updated on a daily basis. In a recent study, the European Banking Authority (EBA) estimated that in 2018 the gross amount of outstanding margin lending and borrowing in the EU was significantly smaller than for other SFTs, at around €30 billion (EBA, 2019).

2.1 Variation margin practices

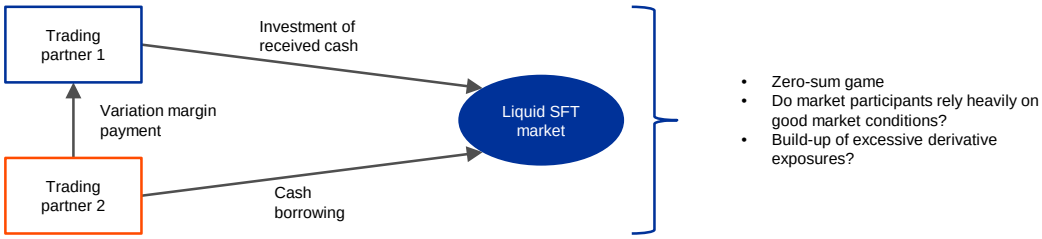
Variation margins are widely used among trading partners. Whereas variation margins were widely used by market participants before the global financial crisis, the daily exchange of variation margins for all new derivatives transactions became mandatory in the EU with the implementation of EMIR. Counterparties in SFTs are not subject to mandatory variation margin requirements.

However, a large proportion of SFT contracts are either centrally cleared, intermediated through a triparty agent or very short-dated[11] (see Box 1), and are therefore subject to daily margin exchanges ("margin maintenance") to offset past market risk.

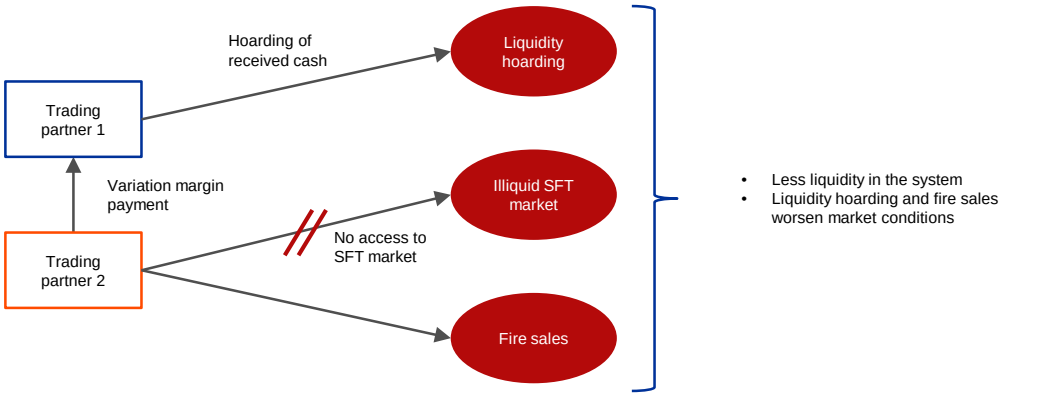
Unlike initial margins or haircuts, aggregate variation margins always net out to zero. Variation margin represents the redistribution of gains and losses between trading partners. In times of low volatility and high liquidity supply, the net aggregate demand for collateral from variation margin exchange is near zero from a systemic point of view and can be considered a "zero-sum game" (Panel A in Figure 2). This is particularly visible in the context of CCPs, which collect and redistribute variation margin across their clearing members and end up with a balanced position at the end of the process.

Figure 2
Variation margin can amplify the drying up of liquidity in times of stress

Panel A: Good market conditions



Panel B: Market stress



Source: ESRB illustration.

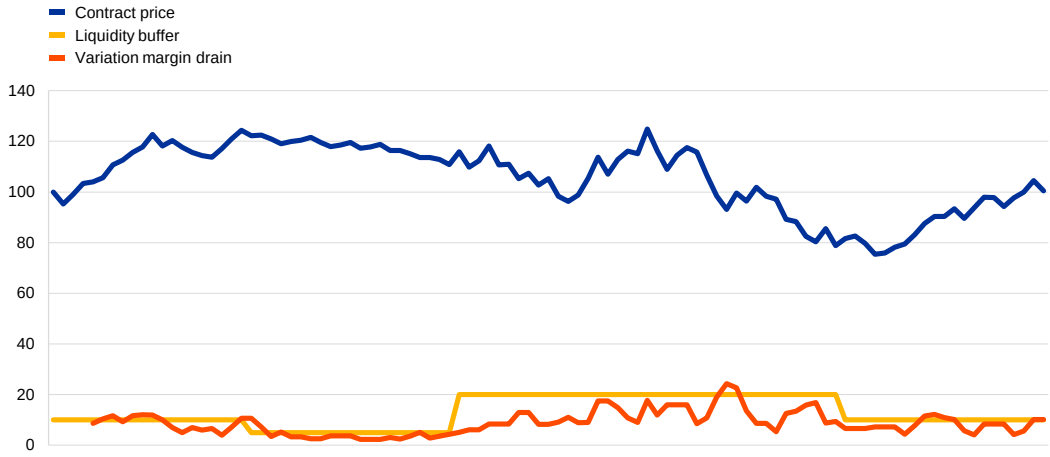
Market practices to fund variation margin have a cyclical impact. The exchange of variation margin is a redistribution of liquidity based on profits and losses of open positions and is neutral with regard to the overall liquidity in the system. However, market participants face uncertainty about future price developments and their respective variation margin inflows and outflows. As a result, they need to hold cash to cover potential future variation margin calls (Duffie et al., 2015).

[11] The repeated rollover of short-dated contracts implies the reassessment of the value of the collateral against the cash leg. This is operationally equivalent to exchanging variation margins on a long-dated contract of equivalent duration.

These cash buffers may increase when market volatility increases or SFT markets dry up, resulting in a crowding-out of liquidity in the system. Estimates of liquidity reserves are based on the volatility of the anticipated flows and the availability and costs of the funding sources. When the expected outflows are small, market participants will hold less cash for the purpose of meeting potential variation margin calls that are due the next day. When volatility is high, these cash reserves are prudentially increased. This is shown in Chart 1.

Chart 1

Liquidity management for meeting variation margin calls



Source: ESRB.

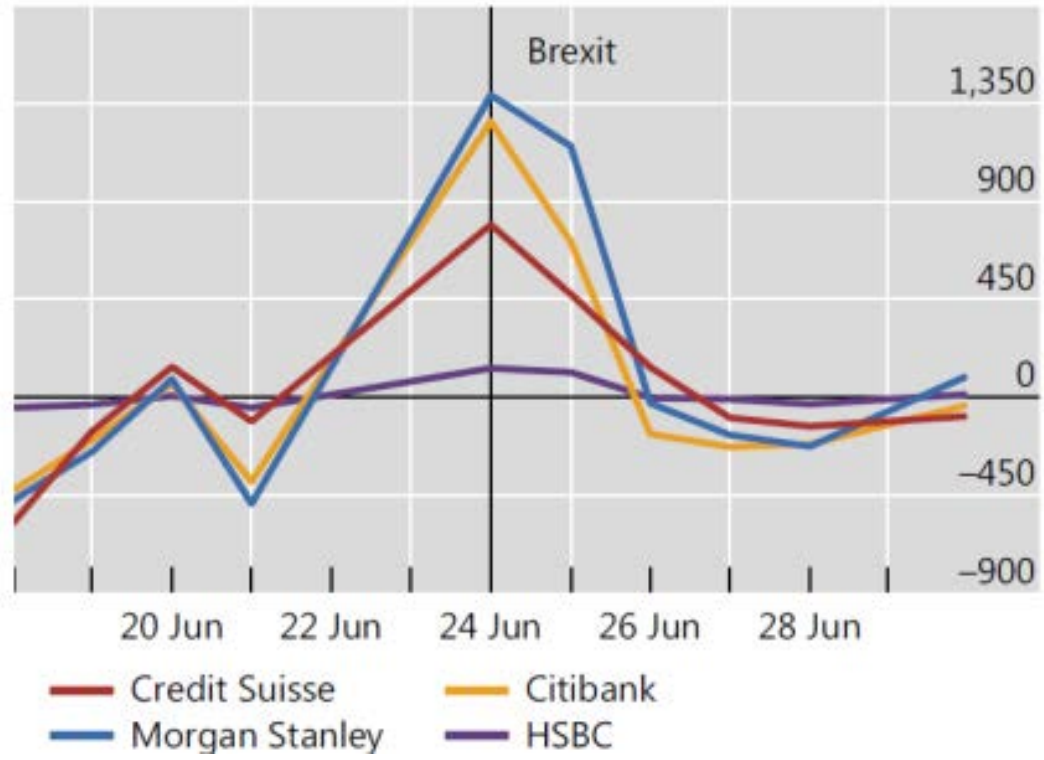
Variation margin calls due to unexpected changes in market prices can lead to liquidity stress in the system. In stressed market conditions, the costs entailed in exhausting the liquidity reserves and the likelihood of depending on short-term borrowing increase. In addition, stressed conditions may also impair the cost and availability of short-term funding. Therefore, liquidity gains from the receiving trading partner may no longer be recycled through SFTs and made available for other uses, thereby crowding out liquidity. As a reaction, market participants may start to hoard liquidity (Figure 2, Panel B), which introduces a procyclical element into variation margining.

In centrally cleared transactions, intraday margin calls and variation margins that are not immediately passed through by the CCP can further absorb liquidity of market participants. CCPs can compute the value of their positions several times within a day and may collect additional margin intraday, especially when market prices change significantly. In this case, most CCPs pay out price-driven variation margins to the counterparties that are in the money only at the end of the day or the next morning. This can have negative effects on liquidity management for market participants that need to cover these increased liquidity needs overnight (see Box 2). This liquidity demand stemming from variation margin flows increases the dependence on collateral transformation transactions and services, especially for non-banks.

Chart 2

Intraday margin calls for US futures commission merchants

(USD millions)



Source: Faruqui et al. (2018).

A recent example of stress amplification via variation margin is the reaction of market participants to the outcome of the Brexit referendum in June 2016. In an ESRB workshop, industry representatives reported that at least in one case – after the Brexit referendum in the United Kingdom in 2016 – volatility spikes in the foreign exchange market put considerable stress on brokers due to high and unprecedented intraday variation margin calls. In some cases, these brokers had to fund the variation margin calls on behalf of clients. This situation was aggravated for clearing members of one CCP, as they were unable to offset excess collateral from the previous day's intraday margin calls for technical reasons.[12] Faruqui et al. (2018) describe the cyclicality of intraday margin calls using the example of the Brexit referendum in the United Kingdom (Chart 2).

[12] The CCP was not deducting intraday margin calls from the next-day variation margin call and so was effectively double-charging the variation margin imbalances, at least for a short period. This problem has since been resolved.

Box 2

Intraday margin schedules: insights from an EU-wide outreach to CCP supervisors

Intraday variation margin calls are a routine procedure in CCP risk management. In current market practices, CCPs typically pay out variation margin in the morning based on the end-of-day prices of the previous trading day. The aggregate gains and losses are calculated for each portfolio based on this information. The CCP then calls variation margin losses and pays out gains accordingly. In times of high intraday volatility, CCPs often call on their clearing members to collateralise provisional losses incurred based on intraday market prices. Unlike the end-of-day variation margin cycles, these intraday calls are viewed by CCPs as mandatory overcollateralisation/replenishment of initial margins in the presence of a high-volatility event. As such, these calls can be partial – i.e. focused on only a subset of the portfolio – and can also be met through non-cash collateral (securities), or the absorption of excess margins posted at the CCP.

The ESRB reached out to supervisors of EU CCPs on intraday margin practices. This exercise focused on the exact timing and collateral used during regular and intraday variation margin calls and expanded the knowledge of the ESRB on these practices. First, after receiving intraday margin calls, clearing members are expected to post the collateral within a short time frame (e.g. 30-60 minutes). Margin calls can also apply to the accounts of clients that may not be able to react at such a short notice. This tight schedule therefore makes it necessary for clearing members to prefund intraday margin calls for many of their clients. Second, while end-of-day variation margins represent a settlement of the daily profit and loss and therefore have to be paid in cash so that the CCP can redistribute them across its members, intraday margins represent collateralisation of temporary intraday exposures, for which CCPs also accept foreign currencies and non-cash collateral. These are usually government bonds and bonds accepted as central bank collateral, but can also be equities from the domestic benchmark index. Excess initial margin collateral can be used for intraday margin payments, but there is not always an automatic procedure for this. Third, unlike CCPs' procedure for regular variation margin calls, CCPs do not always pass through variation margin gains intraday, even though they may require their members to pay for variation margin losses.

Intraday variation margin practices may contribute to exacerbating liquidity shocks. The outreach suggests that current practices, especially when considered in the context of a high-volatility market event, may drain liquidity away from clearing members. Given the use of non-cash collateral and the short time frame for collateralisation, these resources are not easily recycled through the SFT markets or the commercial banking cash circuit, representing a net reduction in available liquidity in the system. Therefore, as volatility-driven unexpected intraday margin calls usually happen during times of market stress, CCP intraday practices force liquidity out of the system precisely when it is needed most (see also the example relating to the Brexit referendum in the United Kingdom discussed in Section 2.1).

2.2 Initial margin, add-ons and haircut practices in derivatives markets

Counterparties in bilateral and centrally cleared derivatives markets use initial margin, collateral haircuts and add-ons to margins and haircuts to manage their risks. This section analyses the models used to calculate initial margin and haircuts in derivatives transactions with regard to their cyclical behaviour.

2.2.1 Initial margin in bilateral and centrally celared derivatives transactions

Initial margin computation at CCPs

CCP models use volatility as a key input for the calculation of initial margin. Models for calibrating initial margin for derivatives are typically based on Value at Risk (VaR) models – which make use of historical data and simulations – or parametric models like the Standard Portfolio Analysis of Risk (SPAN) model. Exposures and market risk are driven by price developments within cleared portfolios, as well as correlations among asset classes' prices, and increase with volatility. Therefore, volatility is a key input into CCPs' initial margin models.

Initial margins behave in a cyclical manner in centrally cleared derivatives transactions. Given that volatility is one of the most important factors affecting the risk of a portfolio, increases in volatility will tend to increase the initial margin requirements. In addition, CCPs recalibrate their initial margin models more often during times of increased uncertainty, leading to more frequent margin calls. Initial margins can be posted in the form of highly liquid assets, and CCPs have a strict policy with regard to eligible collateral. Large, unforeseen margin calls may therefore cause liquidity risks for clearing members, with regard to both the size of margin calls and the pool of eligible collateral accepted by the CCP. Cont (2017) describes this effect as the transformation of counterparty risk into liquidity risk. Abruzzo and Park (2014) analyse the behaviour of margins for different future contracts and find initial margins to be strongly correlated with the underlying asset's volatility.

EMIR provisions contain tools to mitigate procyclical effects in the calculation of initial margin, but their effectiveness depends on the calibration. Murphy et al. (2014) describe the trade-off involved in initial margin models, which should be risk-sensitive but not too procyclical, in order to avoid large and unexpected margin calls. The trade-off is between safeguarding the soundness of the CCP and reducing the impact of large and unexpected margin calls to its clearing members. To reduce the procyclical effects of initial margin modelling in centrally cleared derivatives, EMIR gives CCPs a choice of three anti-procyclicality tools[13]: (i) charging a 25% margin buffer on top of the initial margin computed by the CCP, which can be exhausted to absorb

[13] Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council with regard to regulatory technical standards on requirements for central counterparties, Article 28.

unexpected increases in the computed initial margins, (ii) assigning a 25% weight to stressed observations in the lookback period, or (iii) ensuring that margins are not lower than would be computed using a lookback period of ten years. These tools aim to reduce the likelihood of sudden initial margin increases without causing undercollateralisation of the CCP. CCPs are required to use one of these options in their initial margin calculation. According to an assessment by ESMA (2015), 45% of CCP initial margin models use the ten-year historical lookback period, 45% use the 25% margin buffer, and 10% of initial margin models apply a 25% weight to stressed observations.

According to ESMA (2016b), only a few national competent authorities in the EU have a supervisory process to receive information on the performance of these tools. There is still lack of data to assess the efficiency of the anti-procyclicality measures included in EMIR. Maruyama and Cerezetti (2019) point to the fact that there is no consensus on the efficacy of these tools. Studies by Glasserman and Wu (2017) and Murphy et al. (2016) have found that the effectiveness of the EMIR tools depends on the calibration of the risk factors. Taking this ambiguity into account, ESRB (2015) and ESRB (2018) stress that CCPs have too much room for discretion in the calibration and operationalisation of the tools and that there is scope for further guidance to ensure consistent application at EU CCPs. Recently published guidelines may enhance the effectiveness of the tools by specifying their application (ESMA 2018c). In addition, EMIR states that models and parameters used by CCPs must be validated by their national competent authorities. Nevertheless, as the risk profile of assets and derivatives evolves over time and risk management has to adapt to this evolution to appropriately cover financial risks, the procyclical tendencies of initial margin persist even with well-calibrated anti-procyclicality tools. While risk-sensitivity of models is a desired feature, excessively procyclical models contribute in aggregate to liquidity stress during times of high financial market volatility.

Add-ons to initial margin may further contribute to cyclical developments in CCP risk management. Add-ons to initial margin are used to cover specificities that are not captured by standard models and can be applied, for example, to concentrated portfolios, less liquid positions or wrong-way risk. They are calculated based on the CCP's established risk policies, but can also be complemented by discretionary add-ons, where a CCP by way of an exception calls for additional collateral to cover a specific risk. Since illiquidity and counterparty credit risk[14] typically increase with volatility, these add-ons tend to be cyclical as well.

Initial margin computation in bilateral transactions

EMIR mandates an exchange of initial margin for bilateral OTC derivatives. In bilateral transactions, EMIR requires each counterparty to exchange initial margins as protection against the other counterparty's default. To prevent the posting of initial margins from cancelling each other out, initial margins must be kept in segregated and bankruptcy-remote custody arrangements, which allow counterparties to access the initial margin posted by a defaulted counterparty quickly and with legal certainty. In addition, initial margin collected may not be rehypothecated or reused. As such, initial margin posted under EMIR-compliant arrangements does not add to the risk of the default of the collecting counterparty. This comes at a cost of higher operational expense to

[14] Some CCPs refer to this add-on as an additional (individual) contribution or collateralisation.

maintain the infrastructure for bankruptcy-remote accounts and the liquidity needs at system level to account for collateral that cannot be further reused.

In bilateral transactions, the ISDA standard initial margin model (SIMM) provides a market standard for the computation of non-centrally cleared derivatives. In contrast to centrally cleared markets, where the CCP's margin model centralises the computation of margins, both counterparties need to agree on the initial margin amounts to be exchanged in bilateral transactions. Counterparties may use different models to compute margin calls to each other, provided these are disclosed to the other counterparty so they can be verified. Operationally, this could lead to a situation where the trading counterparties need to monitor multiple models. To avoid such coordination problems, ISDA launched its Standard Initial Margin Methodology[15] in 2016. Market participants expect uptake of the model to increase as the number of institutions in scope rises, which would make the ISDA SIMM model the dominant model in the bilateral market. However, a significant number of counterparties choose to outsource margin computation to third-party service providers.

The ISDA SIMM model appears to be less cyclical, but the governance process determining the inputs into the model could be more transparent. The SIMM model is a variance-covariance VaR model, based on a 99% confidence level and a ten-day margin period of risk for OTC derivatives (compared with a mandatory 99.5% confidence level and a margin period of risk of five days in CCP models). The key input variables are the counterparties' portfolio sensitivities (i.e. the magnitude of how a portfolio changes with fluctuations of underlying factors) and parameters that are calibrated by ISDA at regular intervals. Overall, the use of these key input variables, which respond less to volatility, suggests that cyclicality of the ISDA SIMM model is lower than with CCP models (see also Box 3), as volatility spikes do not immediately feed into the model. Much like the EMIR requirements for CCPs, ISDA uses stressed observations to calibrate the model parameters, further mitigating procyclical developments. The transparency around the process and methodology for calibrating the model parameters could be increased to provide further assurance that cyclicality of initial margin in the SIMM model is lower than in CCP models. The relative amounts of initial margin to be posted in CCP models and the SIMM model are not relevant for an assessment of margin and haircut procyclicality, but it is usually assumed (see also Box 3) that the less procyclical initial margins under the SIMM model come at the cost of requiring higher initial margin to be posted. However, Roberson (2018) finds that the initial margin required depends on the choice of CCP model and could in some cases be higher for centrally cleared transactions than initial margin calculated based on the SIMM model in bilateral transactions.

The approaches to address procyclicality of initial margins differ between CCPs and counterparties in bilateral transactions. For CCPs, initial margins constitute an important part of their resources to be deployed in the event of a counterparty default, alongside other tools. In bilateral transactions, once the initial margin has been depleted, the non-defaulting counterparty can still rely on its own capital resources to absorb the loss. Hence, the loss absorption capacity – and therefore the stability – of CCPs is more dependent on initial margins and their models than is the case in bilateral transactions.

[15] The most recent SIMM methodology was published by **ISDA in September 2019.**

2.2.2 Portfolio margining

Initial margin posted is perceived as a cost, and some market participants seek to reduce their margin requirements through techniques such as portfolio margining or netting. The introduction of the clearing obligation for standardised OTC derivatives and the requirement to exchange margins for uncleared derivatives have increased trading costs for market participants. As a result, EMIR allows – and a number of CCPs offer – portfolio margining, where offsets between positions in different types of derivatives (e.g. different underlying or different type of trading, i.e. OTC or exchange-traded derivatives) are taken into account and margins are reduced accordingly. Market participants can use other techniques such as portfolio allocation or risk bucketing to improve netting efficiencies and reduce their margin requirements through netting benefits.[16]

To prevent excessive netting, EU regulations set constraints for the netting of initial margin. This includes, for example, the ban on netting across multiple asset classes for bilateral derivatives. For centrally cleared derivatives, there is a maximum limit of an 80% reduction[17] between gross and net initial margin calculations when netted across multiple asset classes.[18] However, optimising the use of collateral from derivatives activity incentivises counterparties to allocate positions in the least expensive way, which in turn favours optimising portfolio construction based on correlation matrices.

A sudden change in the correlations underpinning both the initial margin computation and optimisation techniques may lead to undercollateralisation of the CCP. In the event of a breakdown of the correlation, the previously consolidated netting benefits may be reduced or disappear, resulting in a jump in the overall initial margin requirements. As an example, an incident at Nasdaq Clearing in September 2018 was triggered by extreme market movements and a temporary breakdown of long-established correlations between the prices of Nordic and German electricity contracts. This combination generated substantial losses for relative value trades between the two markets, which triggered large variation margin calls and subsequent initial margin adjustments. This incident highlighted that the impact of correlation assumptions on initial margin calculations can be material over periods characterised by stressed markets.

Box 3

Assessing the cyclicality of initial margin in the EU interste rate swaps (IRS) market

This box describes the evolution of initial margins over a longer financial cycle in interest rate derivatives based on a backward projection. As outlined in ESRB (2017) and Section 2.2, initial margin tends to fall when volatility and market prices are low and to increase during times of stress and heightened volatility, which may lead to funding liquidity risk. There is a lack of data

16 Portfolio allocation refers to the technique of allocating an existing portfolio across different counterparties in such a way as to minimise the overall margin requirement.

17 According to Article 27(4) of Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012 supplementing Regulation (EU) No 648/2012 of the European Parliament and of the Council with regard to regulatory technical standards on requirements for central counterparties.

18 See also **ESMA's clarification** regarding the implementation of portfolio margining requirements for CCPs.

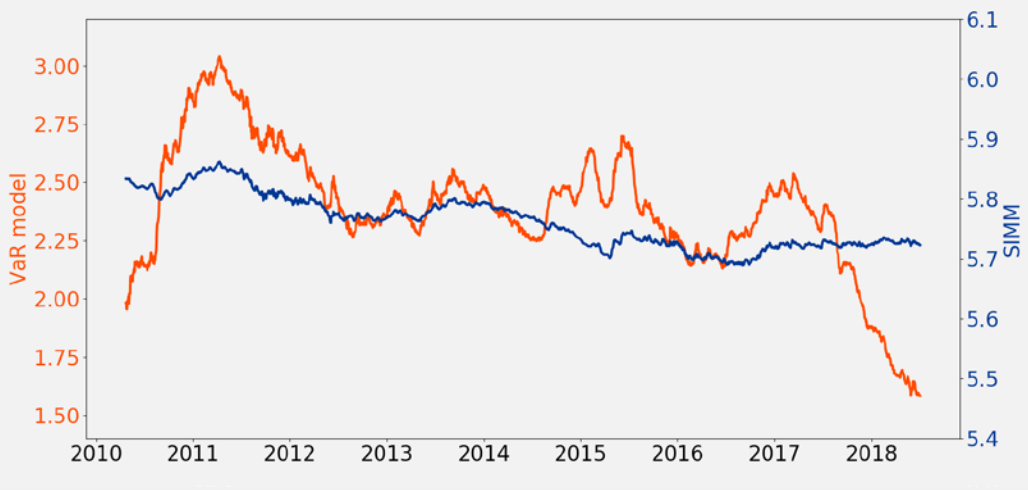
spanning a long enough period to cover the full cycle. Therefore, the initial margin of a fixed portfolio of interest rate swaps is projected back in time over approximately nine years, and the initial margin required to fund that portfolio is computed.

The initial margin for a large portfolio of IRSs is computed over a period of approximately nine years. It is calculated for a large portfolio consisting of around 87,000 outstanding EURIBOR-indexed interest rate swap trades reported on 27 June 2018 in the EMIR derivatives transactions dataset, representing 1,033 individual portfolios between 632 counterparties. The total portfolio has a notional value of €5 trillion, representing around 5% of the total euro area interest rate swap market and 13% of the market share of EURIBOR-indexed contracts. For this set of trades, the initial margin is computed at portfolio level taking into account netting effects for each counterparty pair over the period between mid-2010 and end-2018.

Chart A

Projection of initial margin over the cycle

(EUR billions)



Source: Cominetta, Grill and Jukonis, (2019).

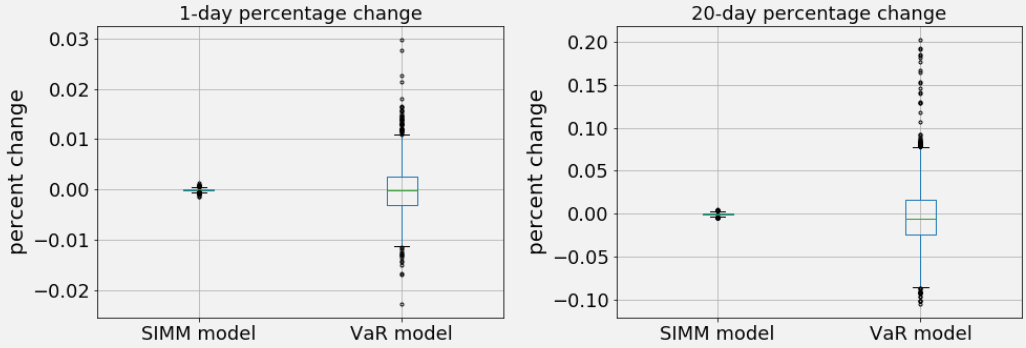
The ISDA SIMM model and a historical exponentially weighted VaR-type model are used to compute initial margin for the interest rate swap portfolios. The ISDA SIMM model is predominantly used in bilateral derivatives transactions (see Section 2.2.1), whereas the historical exponentially weighted VaR-type model (termed the "VaR model") can be considered as an exemplary model for the cleared space. For the SIMM model, the calibration agreed by ISDA in 2018 is used.19 For the VaR model, variants of two anti-procyclicality (APC) tools as stated in the EMIR RTS for CCPs are applied together. Volatility parameters are estimated through a five-year lookback period, and a weighting scheme that favours more extreme historical tail events when

19 ISDA plans to update some parameters on an ad hoc basis.

constructing the loss distributions is used[20]. Finally, the respective standard margin periods of risk are assumed (i.e. five days for the VaR model and ten days for SIMM).

Chart B

Quantitative comparison of the models



Source: Cominetta, Grill and Jukonis, (2019).

The findings of this analysis suggest that initial margin calculated according to the VaR model may vary substantially. The red line in Chart A shows that the initial margin for the interest rate swaps portfolio calculated with the VaR model can vary substantially over time. The initial margin calculated according to the SIMM model (blue line) also varies, but to a significantly lower degree than for the VaR model. This can be seen clearly from the box plots in Chart B, which show the forecast changes in initial margin requirements under the two models. The plots clearly highlight that variation in initial margin in the VaR model is many times the variation in the SIMM model. Roberson (2018) shows that in some cases CCP initial margins could be higher than ISDA SIMM requirements, depending on the portfolio composition. The higher variation of the VaR model is particularly pronounced when looking at 20-day increases in initial margins (see right-hand panel of Chart B). While SIMM generates changes in the 1-2% range, the VaR model can generate 20-day changes reaching above 20%. Crucially, this implies that in some extreme cases the VaR model could generate margin spikes big enough to fully use up the protection against margin increases represented by a 25% buffer. Nonetheless, the analysis also shows that SIMM is more “expensive”, in that it requires substantially higher initial margins than the VaR model. It therefore appears from the simulations that the lower cyclicality of SIMM comes at the expense of lower risk-sensitivity and higher funding costs for derivatives traders using SIMM.

Based on simulated time series of margins, one can consider how anticyclical tools such as margin floors can impact the cyclicality of margins. As an example, we consider a numerical floor for the initial margin defined as a quantile of the SIMM margin, exploiting SIMM’s less cyclical behaviour:

[20] The shorter lookback period is selected in order to reduce the computational complexity. The weighting scheme is part of the EWMA model and rescales the shocks applied to the yield curve by the ratio of past and current volatility. The more dynamic scheme was selected because APC tools lack a transparent definition of what can be considered a stressed period. Intuitively, if volatility of a risk factor now is much lower, the applied weight will be larger.

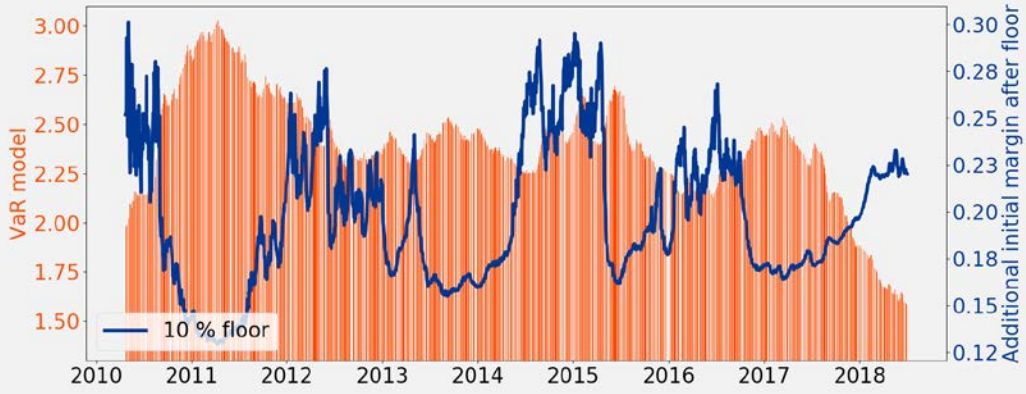
$$IM_t(q) = \max(IM_t^{CCP}, q \times SIMM_t)$$

Chart C shows that the floor kicks in when margins decline (i.e. during upswings in the financial cycle, when volatility declines) and the floor declines when volatility and margins jump. This allows the path of margins to be smoothed. The chart also gives an initial estimate of the additional costs that such a tool would have for traders.

Chart C

Additional initial margin after the application of floor

(EUR billions)



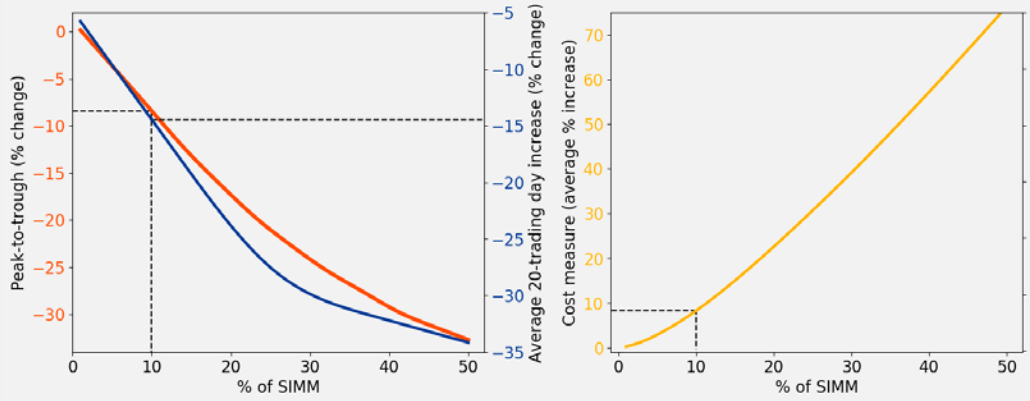
Source: Cominetta, Grill and Jukonis, (2019).

The reduction in cyclicality that can be achieved with the floor has to be weighed against the increase in funding costs in the form of higher margins. Results for the impact of the floor on two different cyclicality measures[21] are shown in Chart D. The floor reduces the magnitude of initial margin swings. As expected, the higher the floor is set (as a % of SIMM – horizontal axis of the left-hand panel), the bigger the reduction in margin swings. However, this reduction comes at the expense of higher average margin through the cycle. As shown in the right-hand panel, increases in the margin floor setting imply increases in average initial margin through the cycle. As a concrete example, the dashed lines in Chart D show that introducing a floor equal to 10% of the SIMM margin would reduce the peak-to-trough and average 20-day increase measures by 8% and 14% respectively (see left-hand panel), but would also increase required margins by 9% (see right-hand panel).

[21] The "peak to trough" measure is the ratio between the highest and lowest margin level required by the model through the cycle; the "average 20-trading day increase" is the average of the top 20% 20-day margin increases generated by the model through the cycle.

Chart D

Peak-to-trough procyclicality measure and cost-benefit ratio



Source: Cominetta, Grill and Jukonis, (2019).

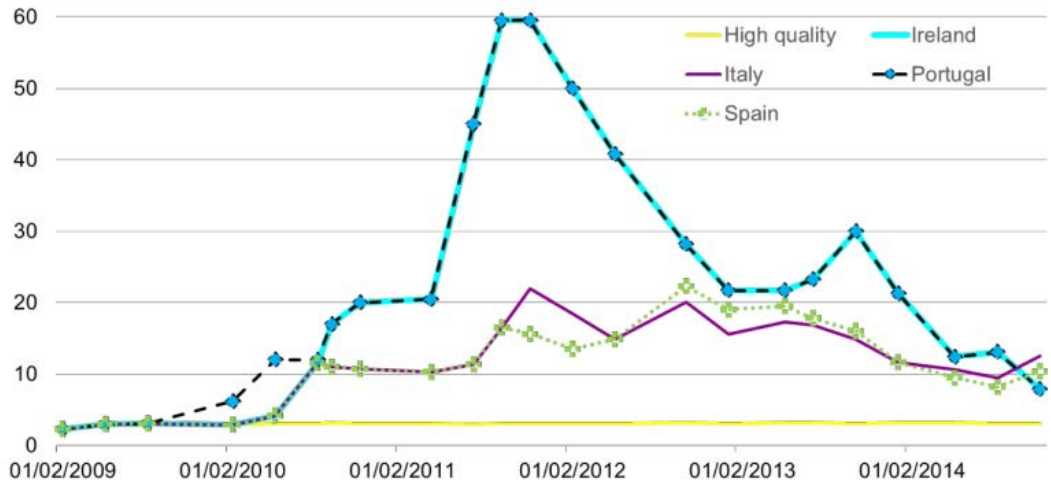
2.2.3 Haircuts in derivatives transactions

Cyclical effects can originate from collateral haircuts. Haircuts have a pronounced cyclical component, as higher price volatility is correlated with general market risk, and an increase in both factors leads to higher haircuts. Charts 3 and 4 show that collateral haircuts increased during euro area recession periods. These effects can be exacerbated if counterparties, particularly CCPs, decide to restrict the types of securities they accept as collateral (e.g. securities issued by a specific sovereign or corporate entity) or to reduce the volume of a type of security that they accept from any single counterparty. EMIR includes some requirements to reduce the procyclicality of haircuts, but as ESRB (2018) points out, there is scope for further guidance on the application of collateral haircuts at CCPs.

Chart 3

Minimum haircuts for collateral by Eurex Clearing AG

(percent)

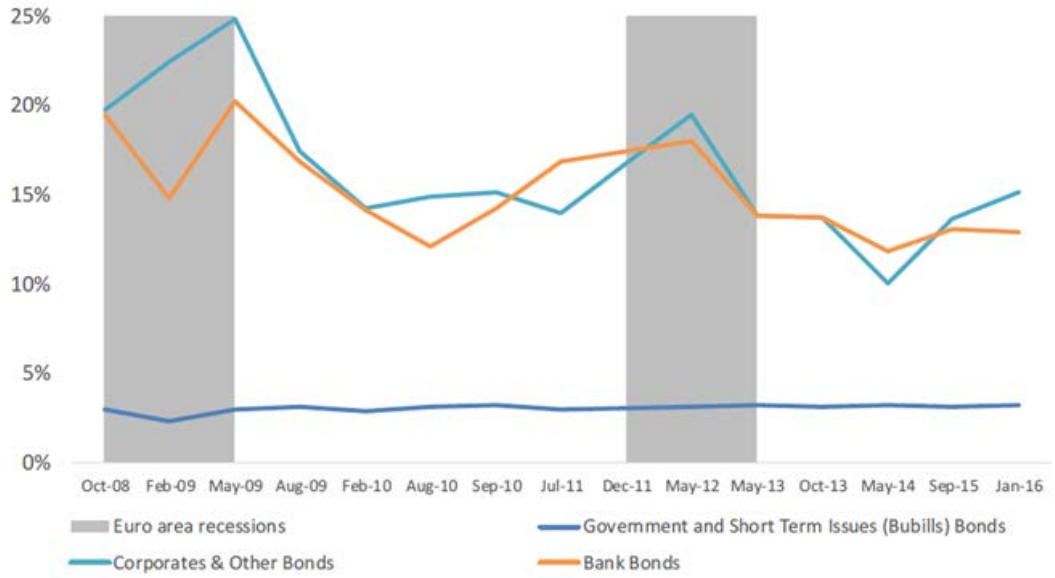


Source: Armakolla et al. (2017).

Chart 4

CCP collateral haircuts at one major CCP, by type of instrument and recession period

(in percent)



Source: ESMA (2016a).

2.3 Haircut practices in SFT markets

There are no legal provisions for setting haircuts in SFT markets yet. In contrast to derivatives transactions (see Section 2.2), SFT markets are not subject to legal requirements with regard to margins and haircuts. Instead, market participants have developed best practices (ICMA, 2018). These include the use of variation margin to offset changes in the value of the security leg of an SFT and prescribe methodologies to compute the haircut on the collateral.

Counterparty credit risk plays a significant role in SFT haircuts. In contrast to bankruptcy-remote initial margin, haircuts only provide protection for one of the counterparties. The counterparty borrowing cash is typically considered to be the risky one, and the counterparty lending cash as the one needing protection. In addition, counterparties that are perceived to be riskier are subject to higher haircuts on the collateral they post, reflecting their higher probability of default. Positive haircuts translate into cash borrowers giving cash lenders collateral worth more than the loan, thereby exposing cash borrowers to the default risks of cash lenders. Reflecting this, the collateral received by riskier counterparties lending cash tends to have a negative haircut. This is due in part to the bargaining power of each counterparty and to the economic drivers of the transactions. The ability to negotiate a higher/lower haircut may also depend on whether the transaction is cash-driven or security-driven. In line with this, Julliard et al. (2019) and German repo data (see Box 4 below) show that SFTs with a riskier cash borrower usually trade with higher haircuts. However, both of these studies only use short time series that generally cover a period of low (perceived) counterparty credit risk. This translates into a low haircut, also reflecting competitive pressures from the ability of riskier counterparties to find multiple sources of repo financing. In stressed markets, counterparty credit risk may have non-linear effects on haircuts.

Haircuts strongly interact with the motive behind an SFT. As the initiating counterparty is usually willing to take exposure, SFTs concluded to obtain specific securities often carry a negative haircut. As a consequence, the cash lender is exposed to the default risk of the borrower. This reduces the incentive to centrally clear such transactions, as CCPs always collect margins from both sides. However, as shown in Box 1, there is an increase in centrally cleared trades, which suggests that this is not necessarily the case. The majority of trades in the centrally cleared repo market are between dealer banks and rely primarily on high-quality collateral. In contrast, non-bank counterparties are more likely to be active in the bilateral segment, while inter-dealer trades that are non-centrally cleared involve riskier collateral to a greater extent. Given the unsecured credit exposure arising from bilateral trades, this particular segment of the market appears more vulnerable to abrupt changes due to stressed market conditions.

The cyclicality of SFT haircuts strongly depends on the collateral type and the transaction mechanism used. Krishnamurthy et al. (2014) and Copeland et al. (2014) find that during the global financial crisis, haircuts on SFTs backed by private asset-backed securities or corporate bonds increased sharply. However, haircuts backed by US government bonds did not move significantly. Gorton and Metrick (2012) find that haircuts in the bilateral repo market showed strongly cyclical behaviour during the global financial crisis, but this pattern is much less pronounced for CCP-cleared or triparty repos (Krishnamurthy et al., 2014; Copeland et al., 2014). In this context, Ebner et al. (2016) and Mancini et al. (2015) conclude that repo markets must

simultaneously show three properties to establish resilience: (i) anonymous CCP clearing, (ii) high-quality collateral and (iii) end-of-day settlement to reduce rollover risk (see also Martin, 2011).

The motivation for entering into an SFT may also affect the cyclicality of haircuts. A theoretical model developed by Infante (2018) explains the difference in haircut cyclicality between bilateral, triparty and CCP haircuts. It is assumed that the triparty repo market is largely used to borrow cash, while the bilateral repo market is used to borrow securities. The model explains how default risk of the intermediating dealer generates haircut cyclicality in the securities borrowing market, but not in the cash borrowing market. In so doing, the model establishes the motive behind a repo agreement (securities vs cash borrowing) as another potential driver of haircut cyclicality. In this context, Infante and Vardoulakis (2018) describe how positive haircuts that expose the cash borrower to default risk of the cash lender may create systemic risk, as cash borrowers are incentivised to disengage from entering into new contracts. In order to lower such risks, Ewerhart and Tapking (2009) show that it is optimal for repo counterparties to minimise exposures by using the collateral of the highest quality. This is widely in line with the common bilateral market practice of zero-haircut repos (see Box 4). Such market practice is possible due to the short tenor of typical interbank repo transactions, which significantly reduces the margin period of risk to be applied for the purpose of addressing price volatility of the collateral. This practice is equivalent to daily variation margin exchange through rollover of the maturing transactions. For longer-dated maturities, market participants have moved to voluntary centralised clearing of SFTs and to triparty repo arrangements. Centrally cleared repos and triparty arrangements share common characteristics: daily variation margin calls, which prevent the build-up of bilateral credit exposures from market price action on the collateral posted, and segregation from trading counterparties of the overcollateralisation component of the trade, while leaving the collateral unencumbered and available for rehypothecation/reuse. As such, the SFT market already makes extensive use of voluntary exchanges of variation margin and initial margin. This partly explains the presence of zero-haircut transactions, as the daily or short-dated rebalancing of the value of the collateral through the rollover covers most of the risks, and the residual risk of substitution in the event of a default is small.

Box 4

Data analysis on drivers of haircuts based on MMSR data

Owing mainly to a lack of data in Europe, little is known empirically about haircuts used in non-centrally cleared SFTs. While the behaviour of collateral haircuts in euro area CCP-cleared trades has been documented, for example in Armakolla et al. (2017) and Boissel et al. (2016), there is less knowledge about haircuts used in bilateral SFT markets. The aim of a research project in the context of this report was twofold, namely to fill this knowledge gap and to investigate the main drivers of bilateral SFT haircuts.

Data

The project relies primarily on the ESCB's MMSR data. Under the MMSR framework, all money market transactions involving euro area credit institutions must be reported daily to the European Central Bank (ECB) and national central banks (NCBs). NCBs have access to transactions reported by credit institutions within their jurisdiction. In the case of SFTs, MMSR data cover repo

transactions and securities loans collateralised with cash. MMSR data reporting began in July 2016, which means that the available time frame for the analysis is relatively short and – although several stress episodes materialised in the course of 2018 – does not include a full business cycle.

Initial findings

The initial findings described here are based on the Bundesbank's MMSR data access, i.e. covering all SFTs within the MMSR scope that are reported by German credit institutions. While these findings may not be fully representative of the whole euro area repo market, repo is largely a cross-border business, with around 90% of the transactions in our data involving a counterparty based outside Germany[22].

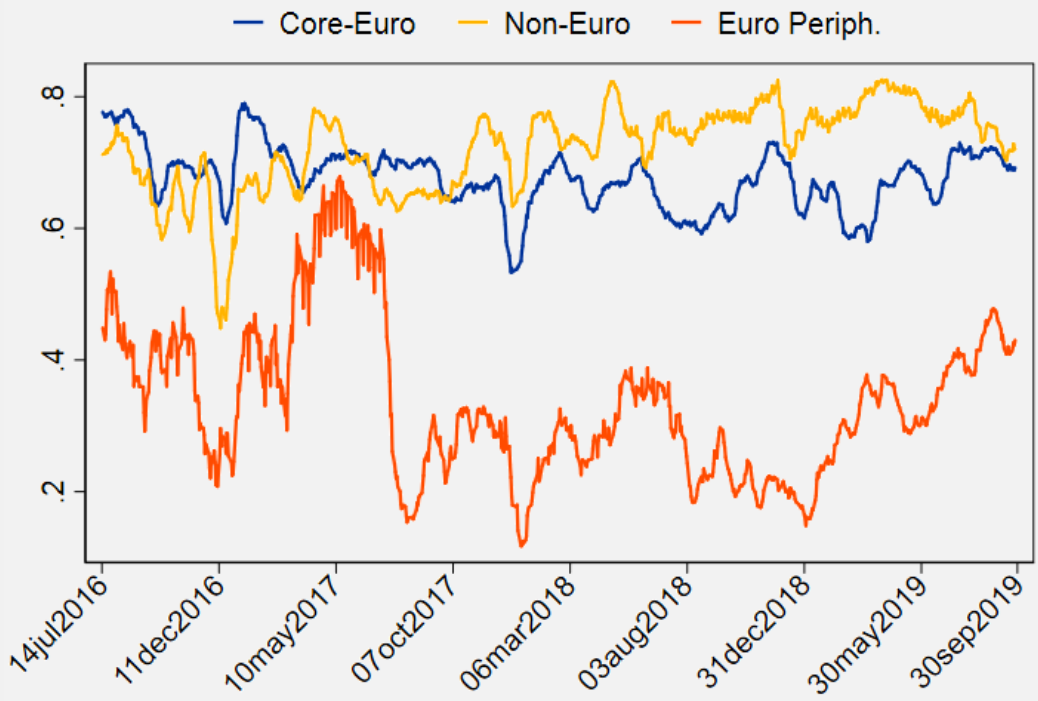
One of the main findings of the work undertaken so far is the predominance of repo transactions with zero haircuts. Around 75% of non-centrally cleared trades report a 0% haircut on the collateral. This is the case in particular for around 80% of repos between German credit institutions and a counterparty based in "core" euro area countries (Austria, Belgium, France, Netherlands). When German banks trade with a non-core EA counterparty, this share drops to around 50% (see Chart A).

[22] The same analyses were conducted using Eurosystem-wide data. The results cannot be shown in this version of the draft report, as the requisite approval has not yet been obtained.

Chart A

German bilateral repo market: relative share of zero-haircut transaction volume by location of counterparty

(fraction)



Sources: German money market statistical reporting (MMSR) data; own calculations.

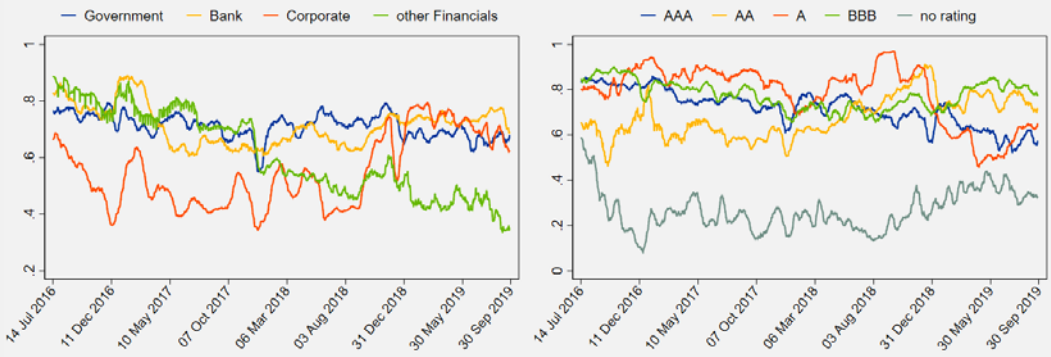
Collateral attributes describe to some degree the pattern that we see in haircuts. Chart B shows that the fraction of zero haircuts is very similar for repos backed by government and by bank bonds. As most of the counterparties in this market are banks, this hints towards a potential source of wrong-way risk. When a counterparty fails and the collateral needs to be liquidated, this collateral may have insufficient value, as haircuts were set too low. Interestingly, the fraction of zero-haircut transaction volume seems to be unaffected by the credit rating of the securities used as collateral (see Chart B). Only non-rated bonds appear to show a significantly lower proportion of zero-haircut transactions.

SFT haircuts are driven by counterparty risk. On average, haircuts are positive when a low-risk institution lends money to a risky counterparty. However, if the low-risk counterparty borrows cash from a riskier counterparty, haircuts tend to be negative. In this way, the low-risk counterparty avoids unsecured exposure towards the riskier counterparty.

Chart B

German bilateral repo market: relative size of zero-haircut transaction volume by sector and rating of the issuer of the underlying collateral

(fraction)



Sources: German money market statistical reporting (MMSR) data; own calculations.

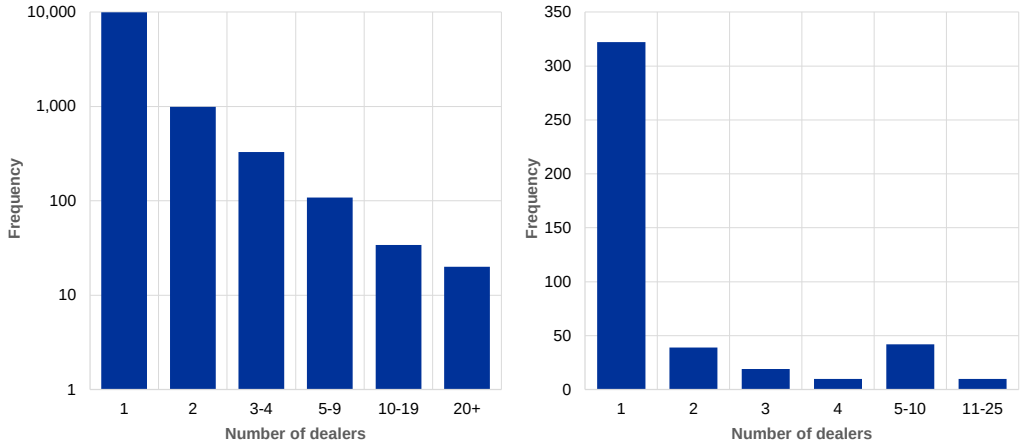
2.4 Client clearing practices

Most firms that are required or opt to use central clearing rely on the services of a clearing member to access CCPs indirectly. CCPs have stringent clearing membership requirements, so not all firms that transact on the relevant market qualify to become clearing members. These requirements include, for example, access to dedicated clearing software and communication networks, trading expertise and the capacity to contribute to the CCP's default management procedures. In addition, the costs and infrastructure requirements involved in becoming a clearing member are high, which means clearing membership is only attractive for firms with substantial business volumes. Most firms that are required to or wish to clear derivatives transactions are therefore clients of one or more clearing members that clear their transactions for them.

Client clearing is highly concentrated. El-Omari et al. (**forthcoming**) describe how in all classes of derivatives, most clients clear their derivatives contracts with just one clearing member, while a smaller share use two clearing members to clear derivatives (see Chart 5). This may reflect the costs to clients of using multiple clearing members for trading and clearing derivatives. This concentration in the provision of client clearing services also means that clients are dependent on their clearing member and may experience difficulties if the clearing member terminates the client clearing arrangement. BIS, CPMI, FSB, IOSCO (2018) find in a survey of clients and providers of client clearing that most clients expect it would take 1-6 months to negotiate and complete a new client clearing arrangement, while clearing members have minimum notice periods of 1-3 months for terminating such arrangements (see Chart 5). In the absence of a back-up clearing member, this gap could leave clients without access to central clearing if their contracts were terminated or if the clearing member were to default.

Chart 5

Number of clearing members per client in interest rate (left panel) and credit derivatives (right panel)



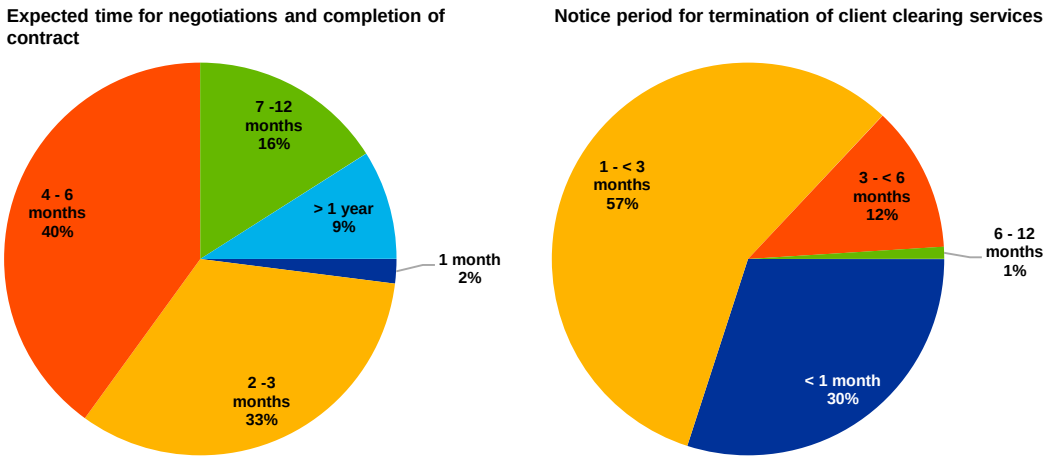
*Source: El-Omari et al. (**forthcoming**).*

Clearing members act as margin intermediaries between the CCP and its clients and tend to use CCP conditions as hard floors towards their clients[23]**.** Although smaller intermediaries may simply rebate the CCP margins to their clients' transactions, most large brokers offering client clearing apply internal models to the overall client positions, either to capture the holistic exposure and risk of the client across all business lines or to extend the benefit of netting to the clients. The margins collected by the broker are thus generally higher than those called by the CCP, which would otherwise translate into the broker permanently funding clients' margin requirements at the CCP. In principle, clearing providers seem to have rigid collateral eligibility schedules, where the CCPs' margin requirements are used as a minimum requirement. However, for clients there is the possibility of transforming collateral using the client clearing provider's repo desk.

[23] Insights into client clearing are based on outreach by SSM supervisors, an industry workshop organised by the expert group in 2018 and market intelligence of member institutions.

Chart 6

Expected time to access new clearing arrangements and clearing service providers' notice period for termination of access



Source: DAT qualitative survey in BIS, CPMI, FSB, IOSCO (2018).

Clearing members have discretion due to bespoke elements in client clearing contracts. Market intelligence has shown a common market practice among clearing members of applying entity-specific add-ons for their clients, which are based on the commercial relationship that these counterparties have. Other commonly bespoke elements in client clearing arrangements include provisions on termination of contracts, increases in margins and add-ons, and notice periods. Due to this lack in standardisation in client clearing contracts, clearing members are able to increase margins and add-ons suddenly, potentially leading to procyclical developments in client clearing. These market practices have been confirmed in industry outreach with providers of client clearing services and supervisors of banks offering client clearing services. As EMIR only includes few requirements for client clearing, the relationship between the clearing member and the client is addressed via bilateral contractual arrangements, which leaves discretion to the clearing member, for example in managing counterparty credit risk with regard to the client.

Clearing members can be both shock absorbers when stress propagates through the system and, conversely, amplifiers of stress. Clearing members use internal models and a replication of CCP models (including add-ons) to calculate initial margin requirements towards their clients. In general, they apply overcollateralisation and require buffers to clients' positions to reduce the need for intraday margin calls to clients. The impact of liquidity spikes on clients could be material, because they often have less sophisticated cash management, restricted access to interbank markets, less availability of high-quality collateral and less access to lender-of-last-resort facilities. However, some participants at an ESRB industry workshop pointed out that in volatile markets the overcollateralisation may not be sufficient and that clearing members will temporarily fund CCPs' intraday calls on behalf of clients. Although contract period or caps on client activity are contractually provided for, they are a last resort, and termination of client clearing relationships is not used as a day-to-day risk management tool. Therefore, clearing members can increase the resilience of the system by temporarily supporting their clients' liquidity needs to avoid technical defaults and facilitate access to central clearing. However, as fewer clearing members provide

these services towards their clients, this impedes access to central clearing and can exacerbate liquidity problems.

2.5 Liquidity planning by market participants to fulfil margin calls

To meet an initial or variation margin call, market participants have to be able to deliver eligible collateral in time. As described in this section, liquidity management, which is conducted in the treasury department of a financial institution, is crucial for the provision of collateral requirements. There are two key dimensions to the efficient management of the treasury tasks related to meeting margin calls: i) the capacity to accurately anticipate future margin calls and ii) the availability of, or capacity to source, eligible collateral.

Table 1

Stylised characteristics of market participants and their access to liquidity and clearing

Market participants	Portfolio characteristics and instruments used	Access to liquidity pools	Role in central clearing	Role in bilateral clearing
Broker-dealers	All derivatives and SFT market segment, hedge their position in the market	Access to central bank liquidity, direct participants in SFT markets	Clearing members at CCPs and offer client clearing services, margin lending and collateral transformation	Market-making intermediaries, offer margin lending and collateral transformation
Banks	Hedging of interest rate, credit and other market risks with regard to their balance sheet but directional portfolios in derivatives clearing; rely on SFTs for liquidity and collateral management	Access to central bank liquidity, direct participants in SFT markets	Clearing members at CCPs and offer client clearing services to other market participants, smaller banks use clearing services via other banks	Use bilaterally cleared instruments for hedging and liquidity management, including SFTs
Investment funds	Usually directional portfolios, few cash buffers, large amounts of collateral assets on balance sheet, whose quality depends on investment strategy	No access to central bank liquidity, are reliant on SFT markets and collateral transformation services by broker-dealers	Some are direct clearing members at CCPs, but majority use client clearing services	Direct counterparties of broker-dealers or banks
Insurance companies	Directional portfolios, low cash reserves but large amounts of high-quality collateral on balance sheets	No access to central bank liquidity, are reliant on SFT markets and collateral transformation services by banks	User of client clearing services	Direct counterparties of broker-dealers or banks
Non-financials	Directional portfolios, small amounts of collateral assets on balance sheets, few liquid resources	No central bank access, reliant on margin funding when requirements exceed average liquidity buffers	Are reliant on clearing services of banks	Direct counterparties of broker-dealers or banks

Source: ESRB.

The capacity to source the right type of collateral depends on each market participant's balance sheet composition and access to liquidity pools. The main characteristics of market participants in terms of portfolio composition, access to liquidity pools and their role in bilateral and central clearing are shown in Table 1.

Some market participants, especially non-banks, depend on collateral transformation services to fulfil their collateral requirements. Counterparties with low cash reserves or few HQLAs may need to transform collateral to be able to generate the necessary cash or eligible securities to meet margin calls. Broker-dealers offer such collateral transformation services for their clients through SFTs. The collateral transformation varies in commercial terms across counterparties.

As a result of collateral transformation services, clearing members acting as intermediaries between clients and CCPs may be exposed to liquidity pressure. Most clients use omnibus segregation accounts (OSAs) to access a CCP.[24] The positions of clients in each OSA are netted, and the CCP requires a net margin for the portfolio. Due to this netting effect, the clearing member collecting margin from clients will in general post less collateral to the CCP. The intermediating clearing member may reuse the additional collateral posted by clients and hence may not have it immediately available. The intermediation of clearing and posting of collateral can lead to difficulties for the clearing member. If, for example, a CCP asks for more collateral due to increased margin requirements or it changes the eligibility criteria of its collateral, the clearing member must provide this additional collateral in a short time. This may include assets that the intermediary might not initially have in its possession, exerting pressure on the intermediary to acquire the collateral needed.

Collateral requirements are not symmetrical, and their flow through the system is impaired by high market fragmentation. Brokers face multiple contractual agreements with clients, other dealers and CCPs, which may not be consistent. The collateral that can be called from one counterparty may not match the collateral that the hedging counterparty requests from the broker.[25] Brokers mediate these idiosyncrasies through their balance sheets, which implies carrying out collateral transformation activities on behalf of their clients. Margin and haircuts represent a cost for collateral transformation activities and may be subject to different regulatory regimes if applied to trades and hedges. In this respect, the SFT market is both an enabler of and a necessary requirement for the transformation of assets into cash (for example to fulfil variation margin calls). However, whereas brokers can access the repo market with relative ease, clients still find it difficult to secure the right collateral even through the repo market – due to regulatory constraints or to limitations in technical capabilities – and therefore rely on brokers to do the transformation for them.

[24] Under EMIR, client collateral in central clearing must be segregated from the collateral of the clearing member in order to allow portability of client positions in the event of a clearing member default. Clients can choose between two types of segregated accounts – individual segregated and omnibus accounts – which differ in the degree of protection and costs. Individual segregated accounts contain only collateral of a single client and offer the greatest protection and portability but come at higher cost. They are therefore only used by large clients. Smaller clients typically use omnibus accounts, where the collateral of multiple clients is pooled.

[25] The typical example is a bilateral trade with a client that the broker hedges through a cleared trade, where the broker might accept a wide range of collateral from the client but can only post cash or HQLAs to the CCP.

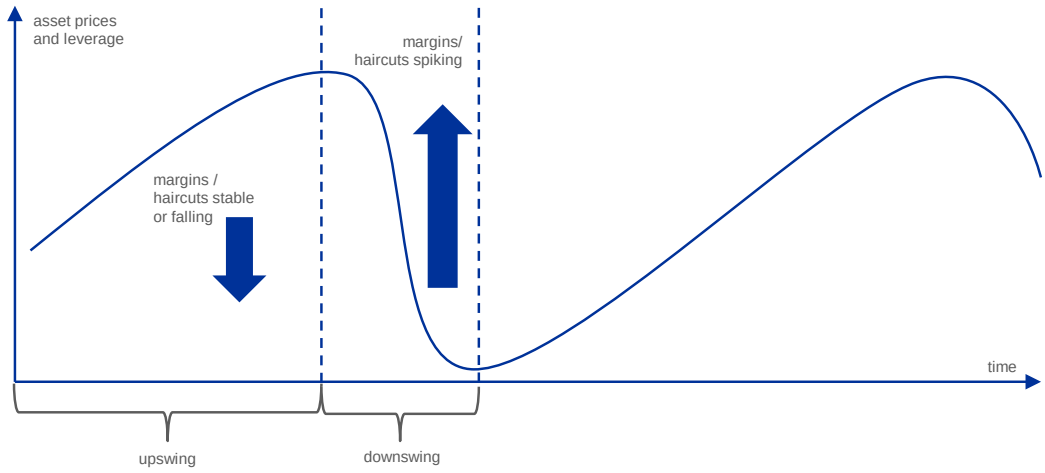
The collateral optimisation process takes place on multiple markets, including repo markets. Market participants that want to exchange collateral for cash in order to optimise collateral flows are only one side of the repo market. On the other side are market participants that engage in securities lending to generate additional return on portfolios, market-makers that need to cover open positions from short-selling activities, and sellers of futures and forwards that need to fulfil their settlement obligations. This generates arbitrage opportunities that are used by market participants in collateral optimisation. For instance, if a specific instrument has a smaller collateral weight with a derivative counterparty than it has with the repo market, e.g. because the derivative counterparty applies higher haircuts than the repo market, the treasurer can repo it out and deliver the cash as the derivative collateral instead. By relying on the repo market, the treasurer can reduce the volume of cash and unencumbered assets that must be put aside to service derivative margin requirements. However, when markets are less liquid or stressed, collateral transformation via repos may also decrease abruptly.

3 Macroprudential concerns stemming from procyclicality of margins and haircuts

3.1 Findings of the previous ESRB report on the procyclicality of margins and haircuts

The previous ESRB report found that margin and haircut-setting practices could contribute to procyclical behaviour. Taking into account the role of collateral in financial risk mitigation, the market structure and the regulatory framework in the EU, ESRB (2017) finds that margin and haircut-setting practices can be procyclical and can exacerbate systemic risk by contributing to the build-up of excessive leverage. Increases in asset prices enable this build-up of leverage, as fewer securities are required to collateralise an exposure and a fall in asset prices triggers calls for more collateral, which may force deleveraging (Figure 3). These dynamics are reinforced by the models market participants use to calculate initial margins and haircuts, which are based on volatility. The interplay between volatility, asset prices and leverage, and the resulting procyclical effects are well described in Geanakoplos (2010), Adrian and Shin (2010), Gorton and Metrick (2012) and Fostel and Geanakoplos (2012).

Figure 3
Collateral requirements, margins and haircuts over the asset price and leverage cycle



Source: ESRB, 2017.

3.2 Interaction of market practices and market participants

This section shows the interaction of market practices, market segments and market participants in the SFT and derivatives markets. It gives a summary of cyclical elements in

margin and haircut setting, shows how the derivatives and SFT markets are linked and sets out the interaction of market practices and market participants that can lead to risks to financial stability.

Cyclicality of market practices

Margin and haircut setting in SFTs and derivatives transactions have cyclical elements. The ESRB undertook analytical work and market intelligence activities to close knowledge gaps, including on market practices and the functioning of the SFT and derivatives markets. Section 2 describes these market practices and gives an overview of the cyclical behaviour of margin and haircut setting in the SFT and derivatives markets. Table 2 provides a summary of these findings.

Table 2
Cyclicality in margin and haircut setting

Instrument	Objective	Driver of cyclicality
Variation margin	Exchanged frequently to cover current exposures from gains and losses of open transactions	In times of market stress, counterparties receiving variation margin might hoard liquidity, reducing liquidity in the system and amplifying the market downturn
Initial margin	Collateral posted to cover the potential future exposures that could arise between the last collection of margin and the liquidation of the counterparty's position after it has defaulted	Initial margin-setting models depend on volatility and market liquidity and can therefore reinforce the financial cycle
Haircuts in derivatives transactions	Discount to collateral value to manage collateral-related risks should the counterparty default	Haircut levels depend on other factors besides collateral quality (e.g. price volatility), potentially leading to cyclical haircut changes
Haircuts in SFTs	Discount on collateral to manage collateral-related risks should the counterparty default	Haircut levels depend on collateral type and quality of collateral. In bilateral SFTs, counterparty credit risk is an additional driver of haircuts
Add-ons	Risk-specific add-ons, can be made at trade level or portfolio level	The risk types that add-ons aim to capture can change with the phase of the financial cycle

Source: ESRB.

As volatility and market liquidity are key determinants of initial margin-setting models, they are cyclical by design and can reinforce the financial cycle. The models used at CCPs have volatility as a key input and hence tend to behave in a cyclical manner, and margin requirements increase with an increase in volatility. In the SIMM model used for bilateral transactions, the key input variables are the portfolio sensitivities of the counterparties and there is lower risk of cyclicality in the model, as volatility spikes do not immediately feed into it.

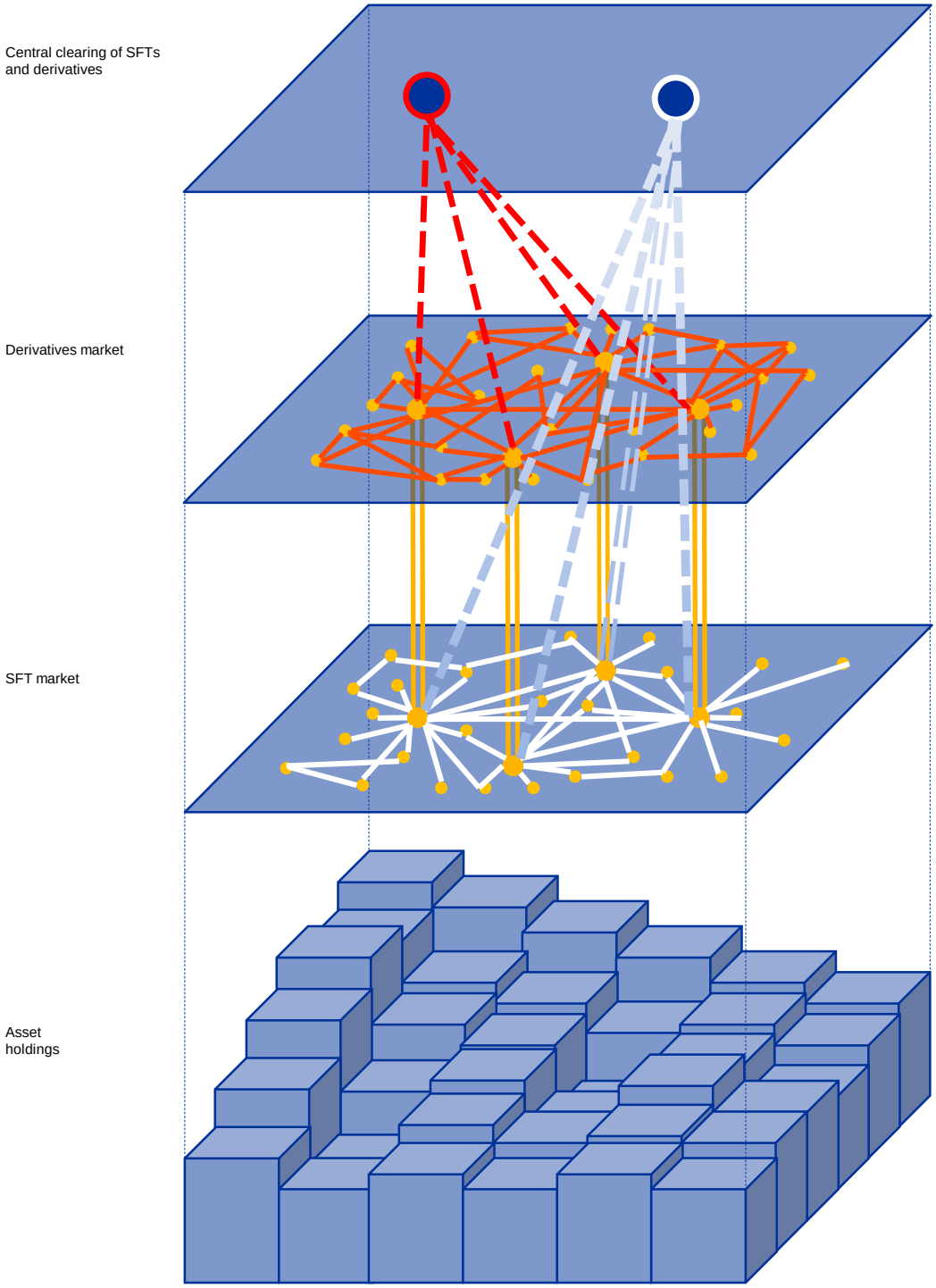
The bulk of the liquidity flows in bilateral and central clearing can be attributed to variation margin rather than initial margin. Variation margin can amplify liquidity stress in the system, especially when there are sudden market price changes. Where variation margin is paid in cash, this liquidity stress is likely to be more severe for market participants that have low cash reserves, such as insurance companies and pension funds.

SFT haircuts may behave cyclically. The cyclicality of haircuts in SFTs depends on collateral type and the quality of collateral, but also on the transaction mechanism in use. Haircuts in bilateral transactions that are agreed between the trading counterparties seem to be driven by counterparty credit risk and exhibit cyclical patterns. This is less pronounced for triparty or centrally cleared transactions, in which haircuts are not negotiated and which may cover a bundle of transactions.

These market practices are not isolated from each other, as market participants are active in different market segments. As shown in Figure 4, when market participants enter into derivatives transactions and SFTs, there is an interaction between their asset holdings, their liquidity management and their activity in bilateral and central clearing. The bottom layer represents financial assets, and different heights represent different valuations. The layer above shows the SFT market, where assets are used as collateral in exchange for cash. As such, SFTs have a critical role, as one of their key functions is to transform the financial assets of market participants into eligible collateral. The network in this layer is concentrated around dealer banks, which serve a large number of nodes, i.e. other market participants. These interactions are represented in white. The third layer represents the derivatives entered into between market participants, which are similar to the counterparties in the SFT markets. At the top are CCPs, at which large firms in both the derivatives and SFT markets clear their trades centrally and net their bilateral exposures. Figure 4 shows the connections between the layers representing market segments and highlights how changes in asset prices have an impact on all layers.

Figure 4

Interconnection between collateral holdings and clearings



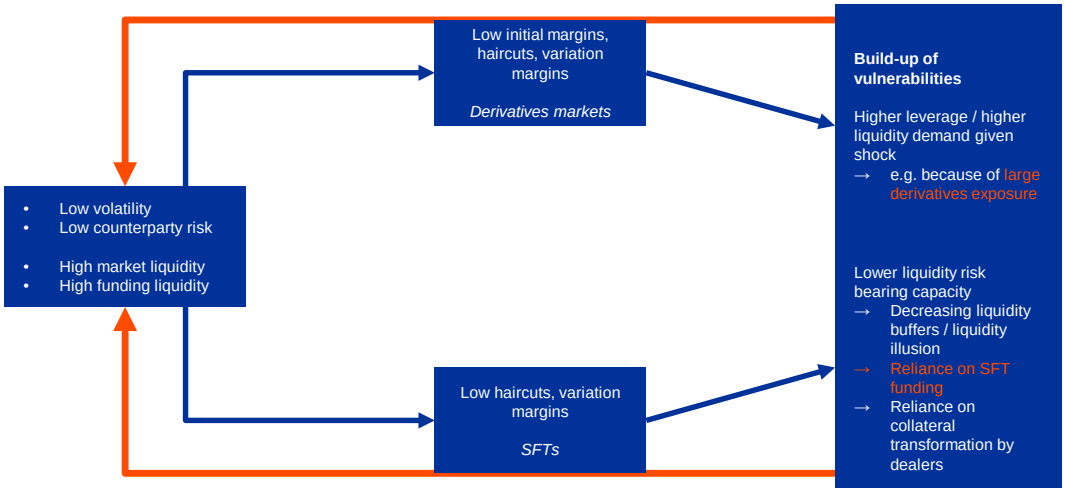
Source: ESRB illustration.

The SFT market plays a central role in the smooth functioning of margins and haircuts, as it is used to transform collateral. Changes in initial margin, variation margin and haircuts lead to higher collateral requirements for market participants. They often use SFT markets to transform their collateral into eligible collateral (including cash collateral). Well-functioning SFT markets enable market participants to source and transform a broad range of collateral into cash collateral at low cost. However, if SFT markets become impaired during times of stress, changes in margin and haircut setting may lead to severe liquidity stress in the financial system. In this case, market participants are faced with higher collateral requirements but may not be able to transform their collateral into cash or other types of eligible collateral.

Procyclicality of market practices

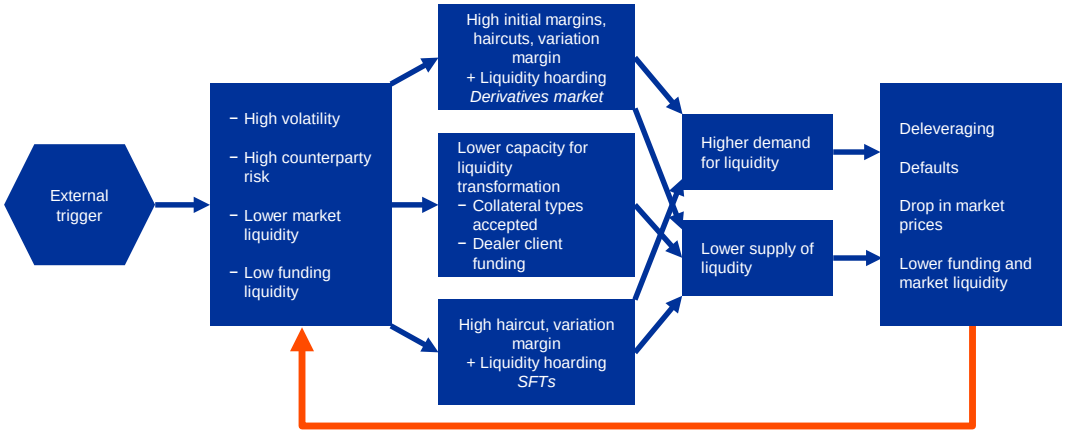
In an upswing, favourable market conditions can lead to low margins and haircuts and the build-up of vulnerabilities. Upswings are typically characterised by high market liquidity, high funding liquidity, low (perceived) counterparty risks and volatility. When market liquidity is plentiful and volatility low, initial margin and haircuts will tend to decrease in both derivatives and SFT markets (Geanakoplos, 2010), which allows financial intermediaries to take on more derivative exposures, thereby increasing leverage. Favourable market conditions may lead to decreasing liquidity buffers and an "illusion of liquidity" among market participants, potentially further increasing the available funding liquidity. Market participants' business models may also evolve, leading to heavy reliance on collateral transformation from dealers and reliance on SFT markets for refinancing purposes in general. In addition, counterparties might start to accept new types of collateral with lower quality and widen the range of collateral accepted. These dynamics increase the derivative exposure and credit that can be extracted from a nominal amount of collateral. While risk aversion on the market and among market participants remains stable, this increase in leverage, liquidity and asset prices is reinforced, potentially leading to a self-sustaining expansion and a build-up of vulnerabilities in the system (see Figure 5). These vulnerabilities may lead to destabilisation and systemic risks when market conditions change.

Figure 5
Upswing



Source: ESRB.

Figure 6
Downswing



Source: ESRB.

In the downswing, changing market conditions lead to higher margins and haircuts in the derivatives and SFT markets. External triggers, such as political events, defaults, market events and changing expectations for the return on investments, can cause a change in market sentiment, leading to higher volatility and decreasing liquidity. As a result, initial margin and haircuts in both derivatives and SFT markets increase. During this phase in particular, CCP risk management acts as an amplifier, since CCPs need to collateralise intraday exposures from clearing members. Furthermore, CCPs' market practices may lead to intraday absorption of liquidity. Clearing members then face margin calls by multiple CCPs at the same time. Since there is a high incentive

for clearing members to avoid running into default procedures at a CCP, clearing members need to withdraw liquidity from other business activities. They may need to liquidate assets, which results in fire sales and can lead to a negative feedback loop (Brunnermeier and Pedersen, 2009), or they may provide less funding for the real economy. This externality is also described in brief in Box 5, based on an analysis by O'Neill and Vause (2018). In addition, the overall capacity for liquidity transformation may decrease, resulting in a smaller range of collateral types accepted and less dealer client funding (see Figure 6). In combination, all these dynamics lead to prudent policies and increases in margin and haircuts, which in turn further exacerbate the deleveraging process, leading to stress in the financial system.

The described dynamics can be broken down into short-term and medium-term developments. Variation margins have a fairly immediate effect on market participants, as they are exchanged and adjusted on a daily basis and therefore belong to short-term developments. Haircuts, the pool of accepted collateral and initial margins in centrally cleared markets, and haircuts and add-ons in bilateral SFT markets are adjusted within a short time frame. This may differ for initial margins in bilateral derivatives markets, as the ISDA SIMM model, which does not react to sudden changes in market volatility, is widely applied here. Reassessment of business practices in relation to clients, for example increasing margins or tighter conditions in client clearing, is likely to lag behind the immediate effects. Medium-term developments can be influenced and possibly amplified by (previous) short-term developments. More generally, while a margin call or haircut increase may impact market liquidity and volatility immediately, it is the self-sustaining feedback between margins/haircuts and market liquidity and volatility that can cause procyclicality, a decrease in funding and market liquidity, and the emergence of fire sales. These swings in market and funding liquidity may, inter alia, affect loan volumes and credit spreads and, through this channel, ultimately affect the real economy[26]. The negative impact of a reduction in liquidity is likely to be more pronounced than the positive impact of an increase in liquidity[27].

The economic consequences of margin and haircut setting depend on the market structure. A CCP's margin call is more likely to cause a liquidity shortage when the market is highly concentrated, as there are a few CCPs, each serving a large fraction of the market. For clearing members, having relationships with a large number of small CCPs establishes a diversified risk of large margin calls. However, the disadvantage of such a strategy is that CCPs' main business model, the netting of exposures, involves substantial economies of scale (Wendt, 2015; Duffie et al., 2015). Similarly, high concentration in client clearing and in bilateral repo markets could lead to more pronounced procyclicality risks. For instance, if client clearing is concentrated at a small number of clearing members, discretionary decisions at these institutions to increase collateral demands vis-à-vis their clients would affect a large number of market participants at once[28]. Therefore, it is important to understand the network structure within different derivatives and SFT market segments. Using data collected under EMIR, Abad et al. (2016) and El-Omari et al. (**forthcoming**) find that the network structure differs greatly across markets in terms of

[26] For an extensive discussion of empirical evidence related to the financial crisis of 2007-09, see Bernanke (2018) and Aikman et al. (2019).

[27] Regarding market liquidity, see, e.g. Dombret et al. (2018).

[28] Higher collateral demands could unfold in the form of: i) higher IMs including add-ons; ii) higher haircuts; and iii) restrictions on collateral acceptance.

concentration. While interest rate derivatives are dominated by CCPs, FX and credit derivatives markets are dominated by large dealer banks.

The cyclicality of margin and haircut practices, the reliance on SFT markets, and liquidity strains stemming from margin and haircut changes may lead to financial stability risks. The regulatory reforms of the derivatives markets made the financial system safer by preventing the build-up of unsecured exposures and thereby reducing counterparty credit risk and risk of contagion. However, if SFT markets are impaired during times of stress, margin and haircut practices may amplify procyclical developments by channelling liquidity strains through the financial system, as counterparties cannot quickly and easily transform collateral into cash. The interplay of impaired SFT markets, liquidity demands stemming from variation margin and initial margin calls, and increases in haircuts or collateral eligibility can lead to liquidity stress in the financial system and endanger financial stability.

EMIR partly addresses risks from procyclical margin and haircut setting in centrally cleared transactions and bilateral derivatives. The regulation gives guidance on the setting of initial margin requirements for CCPs and accounts for the need to preserve the stability of CCPs through margin models that react to changes in volatility. It includes tools that CCPs must apply to reduce the procyclical impact of CCP initial margins. EMIR also provides guidance for collateral requirements in bilateral OTC transactions. It provides for daily variation margin exchange and exchange of initial margin, but is less prescriptive regarding the features of initial margin models in bilateral transactions. EMIR does not provide guidance for the setting of add-ons, which can be a source of procyclical behaviour. It also does not include anti-procyclicality provisions addressing client clearing.

There is no regulatory framework in the EU that applies to SFT markets and seeks to reduce procyclicality. The procyclicality of SFT markets can manifest through increases and decreases in haircuts, as well as via changes in collateral or counterparty eligibility. However, there are no regulatory requirements in place to counteract or mitigate these effects. The policy options identified in Section 4 aim to reduce the liquidity strains from collateral requirements during times of stress, in addition to the existing EMIR provisions, to strengthen client clearing and to improve SFT markets. As a side effect they may also contribute to reducing the build-up of leverage during booms.

Box 5

Fire sale externality and macroprudential margin buffers

This box shows the analysis by O'Neill and Vause (2018), who find that margin calls can lead to a fire sale externality that could potentially be addressed by setting a buffer. The externality may exist if investors have insufficient liquid assets to meet margin calls and hence have to liquidate some of their positions, which then affects other investors by moving prices. One potential way to reduce this externality is to add a macroprudential buffer on top of initial margin requirements. This forces investors to hold more liquid assets against their derivatives positions. Perfect sizing of the buffer by an authority with complete information would eliminate the externality. However, incorrect calibration of this buffer could be costly, as it would force investors to tie up more assets in cash or safe, liquid securities that earn relatively low returns.

Perfect sizing of the buffer would be difficult in practice. It would require, for example, regular and comprehensive details about the potential future price movements of the underlying. To be effective, such a macroprudential buffer would not only need to be set at just the right level, but would also need to be released under any type of liquidity stress, whether that reflected initial margin or variation margin calls. Releasing the buffer only for initial margin calls could result in fire sales to meet large variation margin calls. This would also undermine returns on a day-to-day basis, as investors would hold additional low-yielding liquid assets as a precaution to meet variation margin calls.

Since the optimum buffer could require an unrealistic level of information, testing the performance of buffers based on simpler rules may be more revealing. First, O'Neill and Vause (2018) consider three tools inspired by those in EMIR. These are an initial margin floor, which places a lower limit on initial margin; a stress-weighting mechanism, which always takes price movements during periods of stress into account in initial margin calculations; and a proportional initial margin buffer, which increases initial margin by a certain percentage but releases this amount when overall initial margin requirements would otherwise be increasing rapidly.

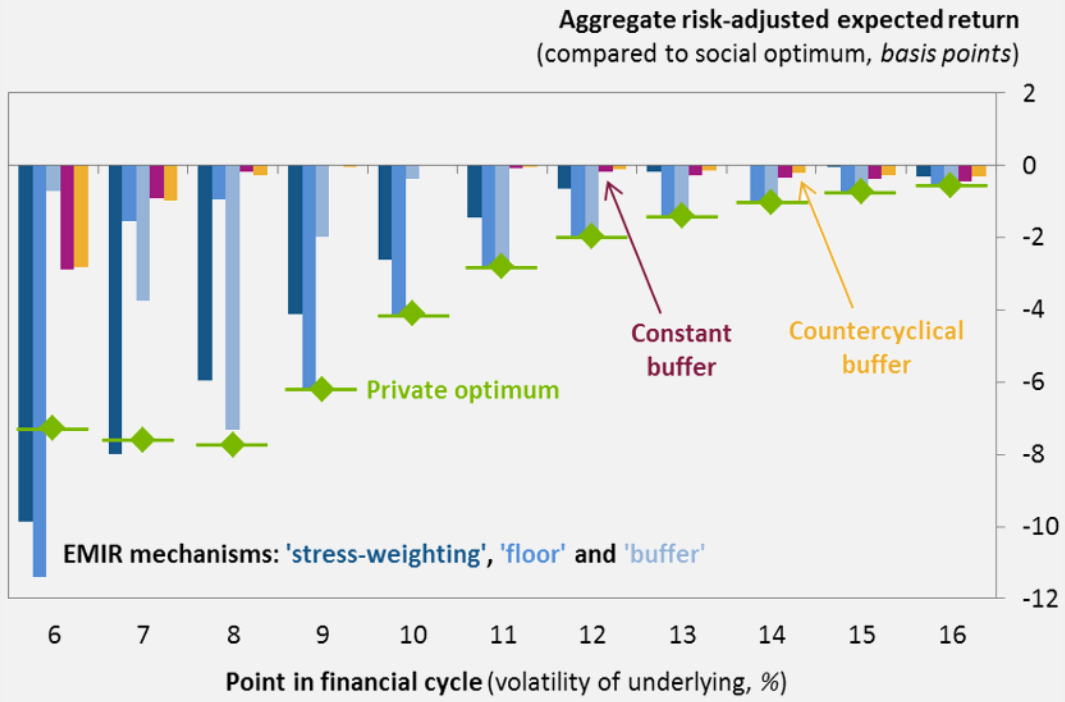
The blue bars in Chart A show the size of the externality (y-axis) at different points in the financial cycle (x-axis) under the alternative EMIR-based tools. For comparison, the green diamonds in the chart show the size of the externality with no anti-procyclicality tool in place. A bar that is smaller than the level of the green diamond shows that a buffer is effective at reducing the externality. Reflecting this, the EMIR-style tools are beneficial at some points of the cycle. However, in states of low volatility the floor and stress-weight tools demand too much additional margin, pulling investment returns below those of the no-policy scenario. A rule that varies the buffer with the inverse of volatility performs better (orange bars), and a constant buffer also works well (purple bars). This is because investors choose to adjust the size of their positions with volatility to keep their portfolio risk and hence the chance of liquidations almost constant. That being the case, a well-calibrated fixed buffer always nudges the outcome close to the social optimum. However, even setting a constant buffer at the right level would require comprehensive information about the structure of the market (e.g. the balance of long and short investors).

This highlights the importance of calibrating a macroprudential buffer correctly. There is only a narrow range of levels of such a buffer that enhances welfare. Below this range, buffers do not bind, while above it they force investors to hold more low-yielding liquid assets than necessary to meet most potential margin calls, diverting resources away from more productive investments.

Chart A

Effectiveness of alternative macroprudenital buffers

(units)



Source: O'Neill and Vause (2018).

4 Policy options

This section identifies six policy options to address the systemic risks from procyclicality associated with margin and haircut practices described in the previous sections. Post-crisis regulatory reforms have resulted in the majority of derivatives being centrally cleared or subject to bilateral collateral requirements, which include the exchange of variation margin, the posting of initial margin and the application of collateral haircuts. These global reforms of the derivatives markets have made the financial system safer, as they prevent the build-up of unsecured exposures and thereby reduce counterparty credit risk and the risk of contagion in the event of a market participant's default. A side effect of the greater use of collateral is that credit risk is transformed to liquidity risk, as market participants need to be able to provide high-quality collateral at short notice in response to movements in market prices. This has also led to an increase in operational complexity.

The findings in the previous sections, in particular concerning the centrality of SFT markets and liquidity strains arising from variation margin, have informed the ESRB's views. The analytical work and market intelligence described in the previous sections confirm the central importance of SFT markets in transforming collateral into cash and have influenced the ESRB's thinking in two ways. First, during booms, well-functioning SFT markets enable market participants to transform a broad range of collateral into eligible collateral or cash at low cost. This makes it difficult to design margin and haircut policies that would effectively constrain the use of derivatives and the build-up of leverage. Second, during times of stress, an impairment of SFT markets means that although variation margin calls net out in aggregate, they can cause substantial strains on individual counterparties that cannot quickly and easily transform collateral into cash. The interplay between impaired SFT markets and liquidity demands from variation margin and initial margin calls, and increases in haircuts and/or counterparties rendering collateral ineligible, can lead to severe liquidity stress in the financial system and endanger financial stability.

The ESRB now places greater weight on tools designed to reduce liquidity strains during times of market stress than on those that constrain the build-up of leverage during booms. Reflecting the centrality of SFT markets, the policy options described in this section are predominantly designed to reduce liquidity strains from variation margins, initial margins and haircuts during times of stress. They may, however, also have a desirable side effect in that they contribute to reducing the build-up of leverage during booms.

In the identification of the policy options, the ESRB is guided by three principles, aimed at supporting and strengthening key elements of the post-crisis reforms of the financial system. The ESRB agreed on three principles to guide its policy options when revisiting the tools identified in ESRB (2017). First, central clearing – as one of the cornerstones of the post-crisis regulatory reforms – should not be undermined. Therefore, the policy options presented in this report are designed to preserve or enhance incentives to clear centrally. Second, the policy options designed to mitigate procyclicality should not lead to undercollateralisation of market participants, especially central counterparties. As a result, ceilings or corridors for initial margin and haircuts, which were discussed in ESRB (2017), are not considered further in this report. Third, the exchange of variation margin has made the financial system safer by preventing the build-up of

uncollateralised exposures. Reflecting this, the policy options identified in this report focus on mitigating the impact of variation margin calls on the liquidity of market participants and should not restrict the use of variation margin.

This section describes six options that aim to either limit the cyclicality of margins and haircuts in derivatives and SFT markets or increase the resilience of market participants. First, a requirement for CCPs to pass through intraday variation margin gains they collect could be introduced (Section 4.1), to prevent variation margin gains collected intraday becoming trapped in CCPs and depriving the financial system of liquidity during times of stress. Second, to ensure that initial margin levels do not fall to excessively low levels during prolonged periods of low volatility, initial margin floors could be introduced in centrally and non-centrally cleared derivatives markets to supplement existing EMIR anti-procyclicality tools (Section 4.2). Third, risks from procyclicality in client clearing could be addressed (Section 4.3), to ensure that the margin and haircut practices of clearing members towards their clients do not transmit procyclicality through the financial system. Fourth, guidance to market participants on the use of notice periods could be developed (Section 4.4), to reduce procyclicality risks stemming from increases in haircuts and from tightening of collateral eligibility criteria. Fifth, a cash collateral buffer for counterparties active in centrally and non-centrally cleared derivatives markets could be introduced (Section 4.5), to ensure that such counterparties are better equipped to meet margin calls during times of stress. Finally, a reform to extend the risk mitigation techniques used (and mandated by EMIR) in non-centrally cleared derivatives markets to non-centrally cleared SFTs could be considered (Section 4.6).

In setting out these policy options, the ESRB is mindful that their eventual implementation would require further work and engagement with market participants and international fora. The ESRB is conscious that some of these policy options may entail increased operational complexities and costs for market participants, with potential implications for the competitive position of EU counterparties. Regulatory standard-setters are well-placed to take account of these considerations, through their public consultations and cost-benefit analyses. The ESRB is also mindful that in a global financial system where market activities cross borders, the sixth option in particular has a global dimension and must be consistent with other international regulatory initiatives in this area, such as the minimum haircut framework for non-centrally cleared SFTs designed by the FSB. Engagement with stakeholders, including market participants and international standard-setting bodies, could help further flesh out the following policy options.

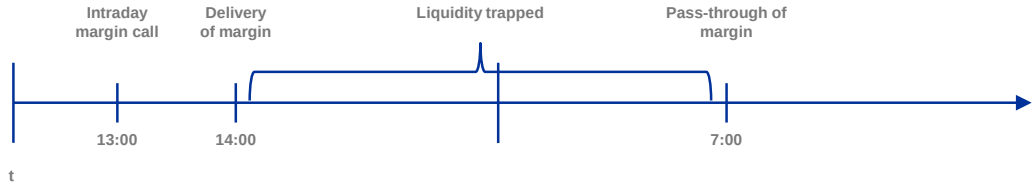
4.1 Pass-through of CCPs' intraday variation margins

One policy option is to ensure that CCPs are obliged to pass through any intraday variation margin collected in the course of the same day. It is common market practice for CCPs to call variation margin losses from counterparties intraday. These margin calls might be triggered by elevated risk resulting from volatility changes or by the exposure resulting from price changes. However, CCPs should be able to distinguish between intraday variation and initial margin calls (see Section 2.1). CCPs typically only pay out variation margin gains to counterparties the next morning (see Box 2 and Figure 7 below). In times of high market volatility, this practice results in liquidity being trapped in CCPs and could create or amplify liquidity stress in the financial system. This risk is recognised in the CPMI-IOSCO Principles for Financial Market Infrastructures, which

state that a CCP “should consider the potential impact of its intraday variation margin collections and payments on the liquidity position of its participants and should have the operational capacity to make intraday variation margin payments.” While these international standards require CCPs to be able to pay out variation margin gains intraday, they do not require them to make such payments. One option to mitigate any risks that might result from liquidity being trapped in CCPs could be to require CCPs to clearly disentangle intraday variation margin calls from intraday initial margin calls and pass through variation margin gains intraday when they also collect variation margin intraday. This requirement could apply to any intraday margin calls driven by price movements and is therefore independent of different naming conventions currently used by CCPs (see Box 2).

Figure 7

Stylised intraday margin schedules at CCPs

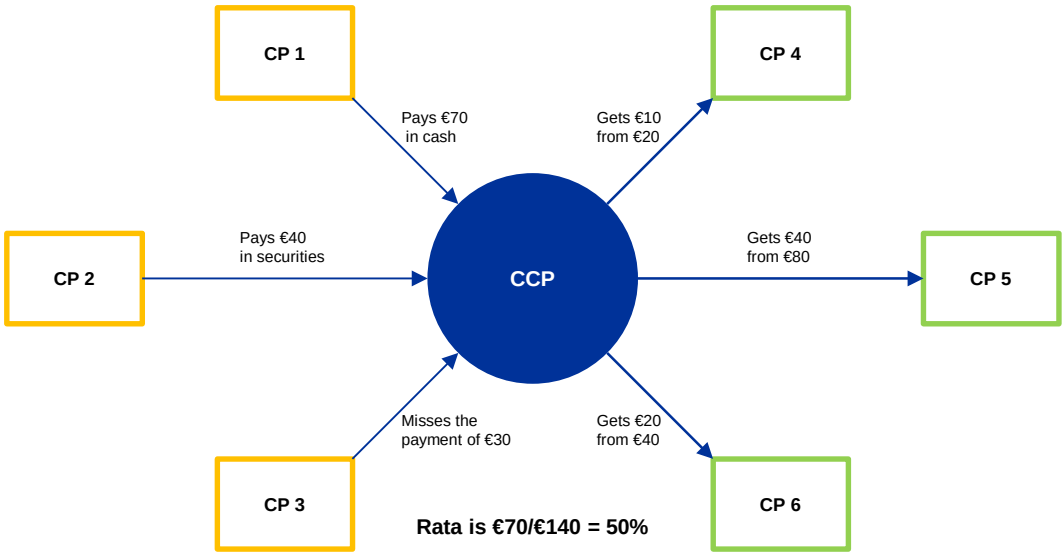


Source: ESRB.

If this policy option is implemented, it must be ensured that CCPs are always fully collateralised. The EMIR rules for calibrating initial margin and default fund contributions are designed to ensure that a CCP can withstand the default of its two largest clearing members. They are also computed to cover the liquidation risks from the last variation margin collection onwards with respect to those two largest clearing members. This means that from a risk management perspective, CCPs would remain fully collateralised when passing through intraday variation margin they have collected the same day. The policy option could be adapted to avoid intraday liquidity risk for CCPs that accept different currencies and/or non-cash collateral for intraday variation margin. They would be required only to pass through the cash collected in currencies in which variation margins have to be paid out to the other counterparties on a pro rata basis. The remaining margin gains would be passed through during the next morning, as is the current practice. This is illustrated in Figure 8, where out of an intraday margin call of €140 million, the CCP collects €70 million in cash. Reflecting this, any counterparty that should receive intraday variation margin gains from the CCP would receive only 50% of these gains. Alternatively, CCPs could adapt their operational practices to cover intraday movements through a variation margin call in cash. When implementing such policy option, any additional operational concerns – e.g. caused by unreliable intraday prices and the challenge in differentiating between initial and variation margin – that could otherwise challenge CCPs’ risk methodologies and ultimately undermine their resilience against market shocks should be further considered and avoided.

Figure 8

Variation margin collection and distribution at CCPs; pro rata option



Source: ESRB.
Note: "CP" stands for counterparty.

CCPs would pass through the collected intraday variation margin; price movements after the intraday call could be handled with the next variation margin call. Market efficiency – the degree to which all relevant information is incorporated into prices – depends on a number of factors. These include the liquidity of the asset that is traded, which in turn depends on the degree of standardisation, the bargaining power of market participants and the market microstructure in general. For example, some market participants favour end-of-day auctions for the execution of client business on transparency grounds. Consequently, the price discovery process in trading activity can be more efficient at the end of the day than during the day. CCPs are aware of these properties and can account for asset-specific pricing features if and when they call intraday margin. As such, CCPs would pass through the collected intraday variation margin independently of the quality of intraday prices, and further price movements after the intraday call could be handled with the next variation margin call.

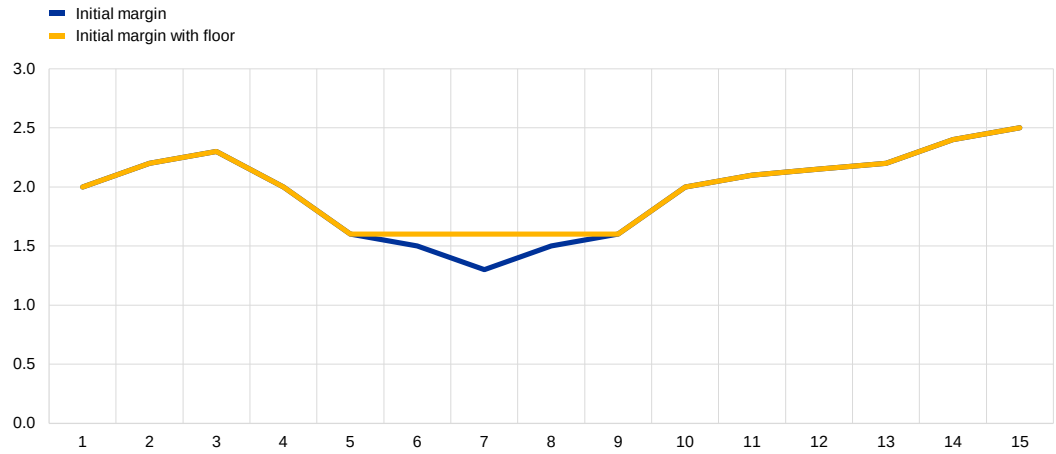
4.2 Initial margin floors

The ESRB identified the introduction of initial margin floors in both centrally and non-centrally cleared derivatives markets as a policy option. For centrally cleared derivatives markets, the initial margin floors could supplement, rather than replace, the existing EMIR anti-procyclicality framework. The ESRB has identified several options to calibrate and implement such initial margin floors, which should be discussed further with relevant stakeholders.

From a macroprudential perspective, there may be a need for measures that prevent initial margins from falling to excessively low levels. Such limits would ensure conservative system-wide initial margins and limit the need for market participants to abruptly raise initial margins in a

downturn (see Chart 7). Furthermore, an initial margin floor would interact with the functioning of the cash collateral buffer presented in Section 4.5. As the cash collateral buffer uses CCPs' estimates of total initial margin requirements for a portfolio as its basis and adds on a fixed percentage rate, lower initial margins translate directly into a lower cash collateral buffer. Limits on initial margins would therefore create a floor for the cash collateral buffer as well.

Chart 7
Initial margin floor



Source: ESRB.

The current EMIR framework might be appropriate from a microprudential perspective but does not dispel the macroprudential concerns. As described in Section 2.2.1, the EMIR framework requires CCPs either (i) to apply a 25% buffer to calculated initial margins, (ii) to assign at least a 25% weight to stressed observations in the lookback period or (iii) to use volatility estimated over a ten-year historical lookback period.[29] The ESRB has previously presented suggestions for improving the current EMIR framework, in order to better address macroprudential concerns (ESRB, 2015; ESRB, 2017; ESRB, 2018). A key reason for this assessment is that the framework is designed to give discretion to CCPs over which anti-procyclicality tool(s) they choose and how they implement them. In addition, under the recently introduced ESMA guidelines (ESMA, 2018d), CCPs are required to define the level of cyclicality they deem appropriate, define the appropriate cyclicality metrics and assess the performance of their models themselves. From a microprudential perspective, this approach is deemed to be appropriate, since CCPs are thought to be best placed to tailor the anti-procyclicality tools to the specifics of the derivatives markets they clear and to their individual sets of clearing members. However, from a macroprudential point of view there is a considerable risk that CCPs' initial margin models might (in aggregate) become too cyclical, as CCPs lack an overview of the whole market. In principle, there could be two distinct regulatory approaches to take these macroprudential concerns into account: the EMIR framework could be made more prescriptive, or it could be supplemented by an additional, system-wide initial margin floor, which may be preferable. As stated earlier, there are several arguments why the

[29] See Article 28 of the relevant RTS (Commission Delegated Regulation (EU) No 153/2013 of 19 December 2012). ESMA (2015) includes a detailed description of these three tools.

current flexible, CCP-driven approach is appropriate from a microprudential perspective. In addition, since CCPs have already integrated their anti-procyclicality tools into their margin models and overall risk management, it might be less burdensome to implement additional safeguards than to overhaul existing models.

Initial margin floors could also be implemented in non-centrally cleared derivatives markets. As argued above, the ISDA SIMM model shows limited cyclical properties, since volatility spikes do not immediately feed into the model. The ESRB recognises that there are concerns on the transparency of the governance process with regard to changes in the SIMM parameters (see Section 2.2.1). However, it is important that the implementation of initial margin floors in centrally cleared derivatives markets does not lessen the incentives to clear centrally, as set by the current regulatory framework. An option to introduce initial margin floors in centrally cleared markets must therefore be examined, together with its interaction with the framework for non-centrally cleared derivatives markets. The ESRB is aware of the international dimension of this policy option and will engage with relevant stakeholders and international bodies to discuss related issues.

There are several options for how to implement initial margin floors, which require further analysis. Initial margin floors should not replace the use of margin requirements according to market participants' own risk management models at normal times, but should serve as a backstop in times of low market volatility. Currently, the ESRB considers three calibration methods for such hard floors. First, along similar lines to the output floor in the Basel credit risk framework, one could consider using a conservative, standardised model as a reference to define minimum initial margin levels. Second, after obtaining the distribution of volatility realisations across a time span covering at least one full business cycle including stress episodes (without volatility scaling), a desired quantile could be chosen. This quantile would represent the minimum volatility level that can be inputted into the initial margin model. Third, one could use a VaR model to obtain the distribution of initial margin across time. The desired quantile of this distribution would represent the minimum initial margin that can be applied. In addition to the calibration model, a decision is needed on how granular the calibration of the floors and their desired levels should be. Given that different classes of derivatives (e.g. interest rate swaps and equity futures) have different volatility dynamics, there are good arguments for defining dedicated floors for each class. However, ways to make such a granular approach compatible with portfolio margining remain to be found.

4.3 Addressing procyclicality in client clearing

One policy option is to reduce risks of procyclicality in client clearing by limiting the discretion of client clearing service providers towards their clients. Client clearing contracts are not standardised and include bespoke elements that give clearing members a high degree of discretion towards their clients. Areas that can differ include contract termination rights, initial margins, add-on changes and notice periods (see Section 2.4). In particular, there is insufficient disclosure on the risk-related aspects considered by client clearing service providers and there are no rules that prevent initial margins or add-ons being suddenly increased or the collateral provided being rendered ineligible. Since market participants that access central clearing as clients have restricted access to interbank markets, less sophisticated operational platforms and less planning capacity and might use lower-quality collateral than clearing members, this could lead to severe

liquidity strains and the forced liquidation of positions. This could be amplified by the fact that client clearing is highly concentrated, and a sudden tightening of standards by a major client clearing provider can affect many market participants at once. Moreover, the lack of transparency for clients could spur uncertainty and increase market turbulence in stressed conditions. Introducing standardisation of contractual terms would make commercial terms fairer, more reasonable, non-discriminatory and transparent, which could reduce the risk of procyclical developments. Such standard contractual terms could include, for instance, minimum notice periods for changes to collateral eligibility, initial margin calculation, the setting of add-ons in client clearing and termination of client clearing contracts. This would help clients to better manage their liquidity, including in stressed market conditions, and give them certainty in accessing central clearing services. Given that access to client clearing services in some smaller and less developed local markets is already constrained, such provisions need to be mindful of the overarching objective of not discouraging clearing members from providing a broad variety of clients with indirect access to CCPs.

Provisions to strengthen client clearing could be incorporated into the existing legal framework. There are a number of ways in which changes to client clearing could be incorporated into the existing legal framework. For example, Article 4(3a) of EMIR, introduced by EMIR Refit, empowers the Commission to adopt a delegated act related to client clearing, including on "risk control criteria for the clearing member or client connected to the clearing services offered". This would provide an opportunity to introduce provisions that would increase transparency and reduce risks from procyclicality by constraining the discretion that client clearing service providers can exercise towards clients. This would also provide clarity on the onboarding process (steps and requirements), by increasing counterparties' trust via the use of standardised documentation, and by introducing transparency on price calculation and risk categorisation.

4.4 Minimum notice periods for haircut increases and changes to collateral eligibility

As a policy option, CCPs and other market participants could give counterparties adequate notice before changing collateral haircuts and collateral eligibility. As outlined in Sections 2.2 and 2.4, market participants in derivatives transactions can change collateral requirements at short notice, for example by increasing haircuts or by rendering certain collateral ineligible. Introducing notice periods would provide greater transparency and planning certainty to market participants and could thereby reduce liquidity risk and the likelihood of fire sales. For example, if clearing members were required to provide their clients with one week's notice before a type of collateral is no longer accepted, it would give them time to replace this.

For market participants in bilateral transactions, notice periods might be introduced in the form of binding provisions. The benefits of binding notice periods need to be weighed against the risk of undercollateralisation. Collateral takers would be likely to internalise binding notice periods through more conservative haircuts and collateral eligibility criteria. In extreme cases, however, binding notice periods could result in temporary undercollateralisation of collateral takers. However, since most market participants have sufficient own resources (equity) to absorb losses arising from temporary undercollateralisation, this might be acceptable. Deciding on the scope, length and interaction with existing regulation requires further reflection. In non-centrally cleared derivatives

markets, binding minimum notice periods for cases where collateral is rendered ineligible would build on Article 7 of Commission Delegated Regulation (EU) 2016/2251. This article already obliges bilateral counterparties to establish a schedule under which assets that no longer meet specific credit quality criteria are replaced over a period of time. It specifies a maximum of two months for this, but not a minimum period.

For CCPs, such notice periods could take the form of guidance and thus ensure that CCPs are always fully collateralised. Given that CCPs have become critical nodes in the post-crisis financial system and have few "own" resources to rely on, the ESRB believes that for CCPs, notice periods should only take the form of non-binding guidance, avoiding the risk of CCPs becoming undercollateralised. Such guidance could refer to best market practices in communicating changes in collateral requirements and hence build on existing practices. For example, Article 41(3) of Regulatory Technical Standards 153/2013 already obliges CCPs to "avoid as far as possible disruptive or big step changes in haircuts that could introduce procyclicality".

4.5 Cash collateral buffers

The ESRB is considering the option of a cash collateral buffer for market participants active in centrally and non-centrally cleared derivatives markets that can be used to meet margin calls. The buffer is designed to increase the resilience of market participants active in derivatives markets against sudden demands on their liquidity arising from margin calls. These can arise from centrally and non-centrally cleared transactions and include initial and variation margin calls. Indeed, once a transaction has been entered into, liquidity demands from variation margin calls are typically larger than those from initial margin calls and can be more sudden (see Section 2, in particular Figure 1, and estimates of collateral absorption in Grandia et al., 2019). This has implications for the design of the buffer. First, the buffer should apply whether transactions are centrally cleared or not. This would also ensure that the buffer would not reduce the incentives to clear centrally. Second, the decision to use the buffer would rest with market participants facing margin calls and would not require supervisory approval. Third, as variation margin typically has to be provided in cash, the buffer should be held in cash. Fourth, even though the buffer also protects against initial margin calls, its main purpose is to dampen the negative side effects of variation margin calls resulting from large price movements. Nevertheless, initial margin is the natural basis for the buffer calibration, as it is calibrated to capture future price changes (see Section 2). The buffer aims to ensure that market participants are better equipped to meet margin calls at short notice, which could reduce the risk of technical defaults, fire sale externalities and, ultimately, illiquidity spirals.

The cash collateral buffer under consideration differs, and is distinct, from the 25% buffer that CCPs can implement according to EMIR's anti-procyclicality tools. One of the anti-procyclicality tools in EMIR is that CCPs can increase initial margin requirements applicable to clearing members by a 25% add-on buffer that can be exhausted when CCPs have to increase their initial margin calibration suddenly (see Section 2). The ESRB's idea of a cash collateral buffer differs from this tool in a number of ways. These are summarised in Table 3.

Table 3

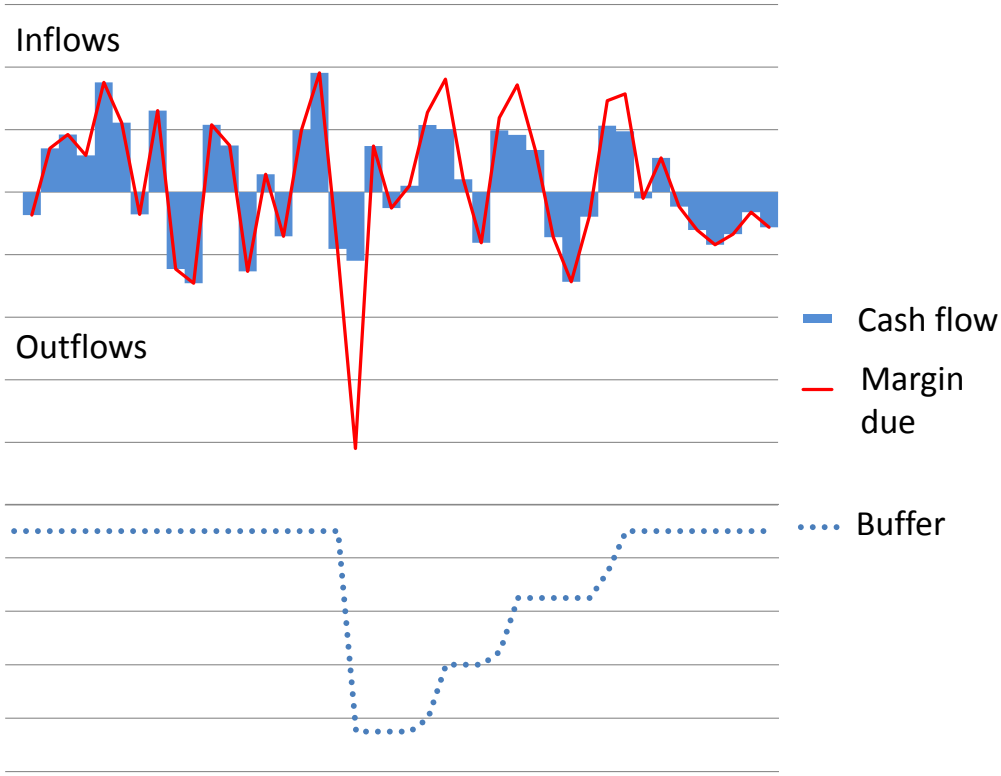
Differences between the cash collateral buffer and the EMIR 25% buffer

	Cash collateral buffer	EMIR 25% buffer
Required by	Would be required by legislation	EMIR
Calibrated by	Would be set out in legislation	CCPs
Calibrated	As a percentage of initial margin, including any counterparty-specific add-ons	25% add-on to initial margin or input parameters in margin calculation
Scope of application across market participants	All market participants transacting in derivatives (cleared and uncleared)	CCPs' clearing members only
Use of buffer	To meet unexpected initial margin and variation margin calls	To dampen sudden increases in initial margin
Decision to release the buffer	Market participant faced with large margin call	CCP

There are several options to ensure that market participants can use the buffer during times of liquidity stress and replenish it in time. Figure 9 provides a simple example of how the buffer might be used and replenished. The red line shows the daily variation margin paid and received as a result of price movements. Values above the baseline show profits, and therefore inflows of cash from the other counterparty; those below the baseline show losses, and therefore payments due to the other counterparty. The cash buffer is shown by the blue dotted line at the bottom. It can be used by the counterparty in instances when a daily payment is exceptionally high, putting strain on its liquidity resources. This is shown as a dip in the dotted line. In this example, the buffer is subsequently replenished using variation margin inflows from price gains in the following trading sessions (shown by the rises in the dotted line). The use of the buffer and its replenishment are also reflected in the difference between the blue bars showing cash flows and the red line showing the variation margin calls. While the use of the buffer would be at the discretion of the market participant, a mechanism ensuring that the buffer is replenished within an adequate period is needed. One option could be to specify the cash collateral buffer in such a way that it does not have to be met at all times, but only on average over a certain period. Another option could be to give the counterparty full flexibility to use the buffer at short notice when liquidity is needed most, but to require it to present a plan for the replenishment of the buffer to its supervisor. Ways to avoid use of the buffer becoming stigmatised, thereby rendering the buffer ineffective, should also be analysed – although this concern should be eased by use of the buffer not being made public.

Figure 9

Release and rebuilding phases of the cash collateral buffer



Source: ESRB.

Note: The figure shows the flows from the perspective of a margin call recipient (i.e. clearing member or counterparty in a bilateral trade). The vertical axis has a currency dimension and the horizontal axis has a time dimension.

The treatment of CCP-cleared transactions by EU counterparties at non-EU CCPs and of transactions of non-EU counterparties cleared by EU CCPs is an important consideration. In designing the legal basis for this buffer, a particular focus should be on how to address counterparties located in third (i.e. non-EU) countries. This is particularly important for centrally cleared transactions, where some third-country CCPs are among the most relevant for the European financial system. Asymmetric application of the tool – applying only to transactions cleared by EU CCPs – may impair the global level playing field to the detriment of EU CCPs. Moreover, the distress of a non-EU clearing member at one or more EU CCPs as a result of a large margin call could negatively impact financial stability in the EU. Efforts should therefore be made to include both CCP-cleared transactions by EU counterparties at non-EU CCPs and transactions of non-EU counterparties at EU CCPs. One apparent solution is for EU CCPs or EU-based intermediaries to be responsible for the deposit of the buffer for non-EU clearing members[30]. EU clearing members would also have to deposit the buffer for non-EU-CCPs on their own accounts or with EU-based intermediaries.

[30] The rule would, in essence, demand that the CCP collect x% more margin, in cash, from counterparties than it would collect under to its own models.

The cash collateral buffer should be applied to all types of counterparties, including banks, for which it has to be integrated into the existing liquidity coverage ratio (LCR) regulation. The cash collateral buffer should be required from all types of counterparties. In the ESRB's preferred solution, the buffer is at the same level for all market participants, to keep implementation simple and reduce the risk of regulatory arbitrage. While there are no specific rules for non-banks that capture liquidity risks stemming from the derivatives business[31], the LCR already contains such elements for banks. However, while both the LCR and the cash collateral buffer have a similar objective – establishing a sufficiently high liquidity reserve – the crucial difference lies in the time horizon for which the tools are calibrated. The LCR accounts for a large variety of liquidity outflows – including outflows from derivative margin calls – and is calibrated on a 30-day horizon. Consequently, it can be met by a broad range of HQLAs. The cash collateral buffer, in contrast, aims to increase resilience to large margin calls that require liquidity at short notice, possibly within 30 minutes. Based on these observations, the ESRB believes that there are good reasons to apply the cash collateral buffer as a backstop to banks as well. Compared with the LCR, the cash collateral buffer would be small: research by ECB staff shows that in 2017, an estimated €3 trillion of HQLAs would have been needed to establish an LCR of 120% in the euro area banking sector, whereas estimates put the maximum collateral requirements for initial and variation margin at €121 billion and €579 billion respectively (Grandia et al., 2019). Even a 50% buffer on initial margins would result in a collateral requirement of just 2% of liquid assets held for the LCR. Nevertheless, to avoid duplicating requirements, the ESRB is considering various ways in which the macroprudential cash collateral buffer could be integrated into the LCR framework. Here are some examples.

- Liquidity outflows due to derivative margin calls could be excluded from the list of LCR outflows. This would make the two tools complementary, as the cash collateral buffer would focus on liquidity needs stemming from the derivatives business while the LCR would cover all other liquidity needs. However, the cash used to fulfil the buffer requirements would not be recognised in the LCR and could not be used when liquidity needs arise from other sources. This could result in fragmentation of liquidity pools.

- The cash collateral buffer could be implemented in parallel to the LCR such that liquidity deposited to fulfil the buffer would count towards the LCR and would be usable for liquidity needs that arise from non-derivatives business. Thus, even when the buffer liquidity is held at the CCP or other counterparties, there would be no encumbrance of the corresponding cash collateral. A similar solution was recently established with regard to the covered bond liquidity buffer, where the Commission will amend LCR rules (Delegated Regulation (EU) 2015/61) to address the overlap and make covered bond liquidity buffers count towards the LCR[32].

There are several options regarding the deposit arrangements for holding the buffer. A first option is to design the buffer as a pre-positioned buffer at CCPs for centrally cleared transactions or segregated with a third party in the bilateral space. A second option could be that the buffer stays directly with the entity that is subject to initial and variation margin calls, i.e. the respective clearing

[31] For insurers, there is no quantitative requirement capturing liquidity risks stemming from the derivatives business. There are, however, qualitative requirements on liquidity, the risk management system and liquidity management under Directive 2009/138/EC. Some qualitative requirements exist for funds, e.g. stress tests; see the following **example**.

[32] The covered bond liquidity buffer has to cover the net liquidity outflows of a covered bond programme for 180 days.

member, client or counterparty in a bilateral trade. Each option has advantages and drawbacks that would need to be considered and weighted when further specifying the buffer. For example, for centrally cleared transactions, holding the buffer at a CCP would make the buffer instantly available to meet a margin call without the need for the counterparty to transfer funds to the CCP. Also, implementation of the buffer would be easiest if held at the CCP, which has the operational capacity (i.e. its margin model) already in place to calculate the buffer. In addition, there might be advantages with regard to the international reach of the policy, in that an EU CCP could potentially also collect the buffer from non-EU clearing members. However, holding multiple buffers at different CCPs and bilateral counterparties could complicate liquidity management for market participants. If the release rules are not designed appropriately, it might lead to a situation where cash deposited at a CCP or at another counterparty is not readily available for liquidity needs stemming from margin calls not connected to that CCP/counterparty. Irrespective of the chosen option, rules on how the buffer has to be held must be introduced to ensure that the buffer is readily available when needed.

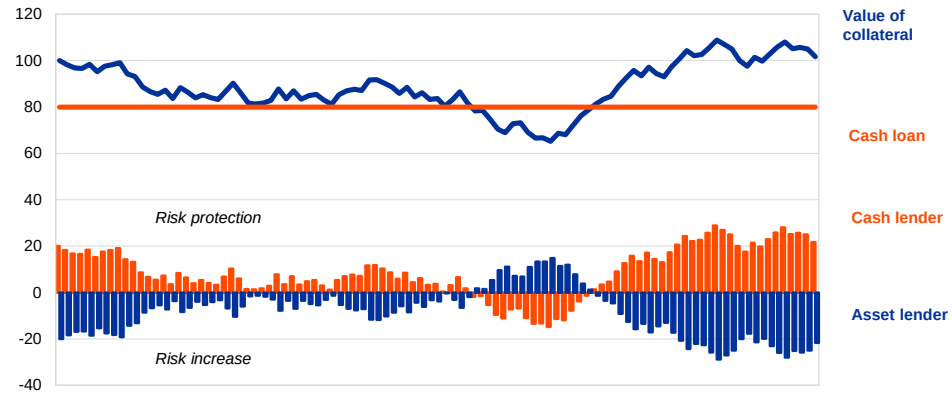
4.6 Monetary initial and variation margins in SFT markets

One option the ESRB has identified is the mandatory use of initial and variation margins as risk mitigation techniques in non-centrally cleared SFT markets. The use of haircuts in SFT markets creates two types of risk. First, haircuts in non-centrally cleared SFT markets typically include counterparty-specific add-ons to mitigate counterparty credit risk (see Section 2.3). This can be a major source of cyclicality, as a deterioration in the perceived creditworthiness of the counterparty could trigger a generalised tendency to self-protect by raising haircuts. Second, while protecting the cash lender, haircuts expose the asset lender (cash borrower) to counterparty credit risk. Therefore, it is impossible to satisfy the need to reduce credit risk exposure for both counterparties at the same time by using haircuts. This mechanism is illustrated in Figure 10. The solid blue line in panel A shows an asset that is used as collateral in a one-month repo transaction to secure cash funding. The solid red line in the top panel shows the cash funding of €80. At initiation of the repo transaction, the asset is worth €100, implying a haircut of 20%. While protecting the cash lender, the haircut represents a credit risk exposure of €20 for the asset lender if the cash lender were to default and be unable to return the collateral (shown by the solid blue bars). The mandatory use of initial and variation margin as counterparty credit risk mitigation techniques in non-centrally cleared SFT markets would better mitigate these risks and significantly compress the overall size of the counterparty credit risk outstanding in the system at any time.

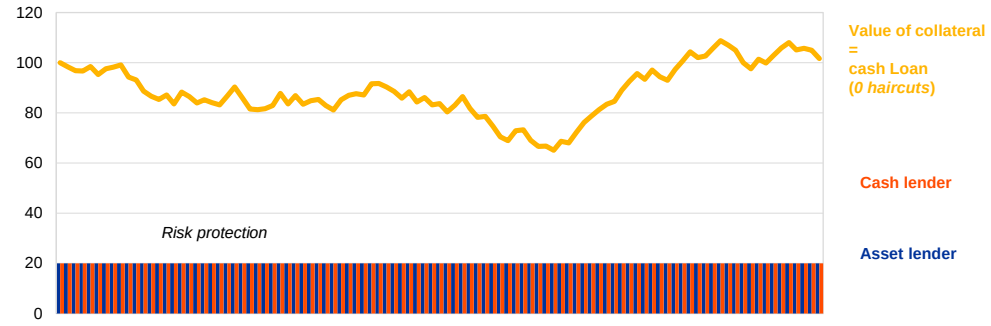
Figure 10

Stylised example for mandatory initial margin and variation margin in SFTs

Panel A – Repo transaction using haircuts as risk mitigation techniques without variation margin



Panel B – Repo transaction using initial margin and variation margin as risk mitigation techniques

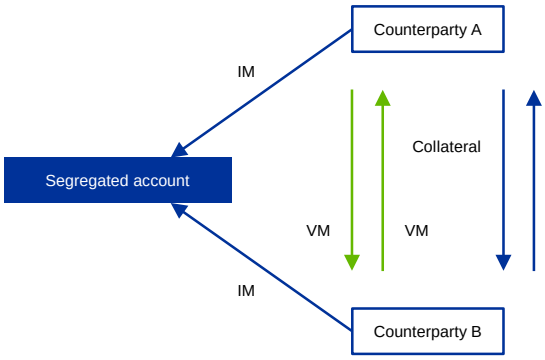


Source: ESRB.

Replacing haircuts with initial margins paid to default remote entities would disconnect collateral payments from counterparty credit risk. As shown in Panel B of Figure 10, the counterparties would exchange an equal value of cash and collateral, with the daily exchange of variation margin ensuring that there is no build-up of unsecured exposures. The repo transactions would then always be at a zero haircut, and initial margins would instead protect both counterparties against the default of the other counterparty. This means that initial margins would need to be held in segregated and bankruptcy-remote fashion, separated from the assets of the counterparties collecting the collateral, as illustrated in Figure 11. This procedure still allows the reuse of SFT collateral assets, other than those posted for margining purposes. The daily exchange of variation margin entails that the initial margins would only need to protect the cash lender for the period it takes to sell the collateral after a counterparty default. In long-term repos, the initial margin required would therefore be lower than the corresponding haircut, while achieving the same level of protection for the cash lender (collateral taker).

Figure 11

Stylised example for SFT markets that operate without haircut



Source: ESRB.
Notes: "IM" stands for intitial margin and "VM" for variation margin.

The mandatory use of initial and variation margins for SFT is consistent with market practices and would align and reinforce a number of regulatory initiatives. The daily repricing of collateral and the exchange of cash to reflect this repricing is already common practice in some segments of the repo market, such as between large banks and broker-dealers (Section 2). Complementing this market practice of exchanging variation margin with the mandatory exchange of initial margin would more closely align the operational cost of bilateral repos with cleared repos and therefore incentivise central clearing. It mirrors the approach that was taken to align the risk mitigation techniques for centrally and non-centrally cleared derivatives transactions to incentivise central clearing of derivatives. This means that a significant part of the infrastructure required to collect, value and segregate initial margins already exists, and a phasing-in period under such a proposal would enable market participants to customise this infrastructure for SFTs. Overall, this policy option would align non-centrally cleared SFT markets not only with centrally cleared SFT markets, but also with practices in non-centrally cleared derivatives markets (Figure 12).

Figure 12

Closure of the current "alignment gap" across regulatory initiatives

	Centrally cleared	Bilateral
Derivatives	✓	✓
SFTs	✓	Alignment gap

But: Infrastructure same as for bilateral derivatives

Potential side effects of this option need to be further assessed. While the ESRB considers this option to be conceptually sound and appealing, it could also have side effects that are not well understood at this stage. These could stem from increased costs to market participants, which could, for instance, translate into less market liquidity on European repo markets. However, if

introduced consistently with the phasing-in of the requirements for non-centrally cleared derivatives, the infrastructure to collect, value and segregate initial margins needed to implement this option would be widely available to counterparties, which would help in limiting such costs.

Any change to the way in which SFTs would operate has a global dimension and requires interaction with and discussion in standard-setting fora beyond the EU. The mandatory use of initial and variation margins for SFTs could be made consistent with the FSB minimum haircut framework by translating minimum haircuts into minimum initial margins to be applied to SFTs between banks and non-banks, and to collateral other than government bonds. A challenge would arise when the initial margin is paid on a portfolio basis, as the FSB framework applies at trade level: for each in-scope transaction there is a defined haircut floor, depending on the collateral used. Such a change in the way SFTs operate would require changes to the main global master agreements currently used in SFTs. This could – if unilaterally applied in the EU – lead to fragmentation of the global SFT market and reduce liquidity. As such, this policy option has a global dimension that requires interaction with and discussion in standard-setting fora beyond the EU.

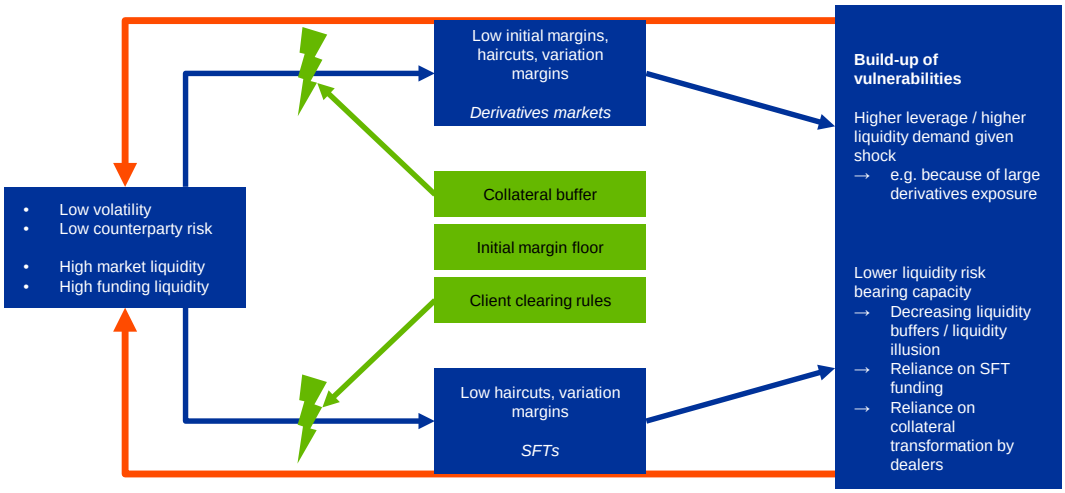
4.7 Interaction of policy options

The policy options described above would target the sources of risk in a comprehensive way. Three of the options specifically aim to increase resilience during good times. Other options aim to reduce amplifying effects in times of stress. The cash collateral buffer would ensure that participants in derivatives markets build up sufficient liquid resources in good times to meet a range of margin calls during times of stress. The available tools include increases in initial margin, add-ons, variation margin and collateral haircuts, and combinations of these. A buffer could thus increase resilience in good times and reduce amplifying effects in times of stress. Initial margin floors could also contribute to resilience, by providing a backstop to initial margin decreases in good times. The policy option on client clearing would aim both to increase resilience ex ante by enhancing planning capacity and to limit amplifying mechanisms in downswings by reducing uncertainty. The policy options on variation margin pass-through prevent liquidity being trapped in CCPs during times of market volatility, reducing the amplification of liquidity stress in the financial system. The removal of haircuts in the SFT markets also sets stabilising incentives by avoiding counterparty risk impairing SFT markets. The introduction of notice periods could reduce amplifying effects stemming from increases in haircuts and tightening of collateral eligibility. Figures 13 and 14 link these policy options back to the risk description above.

The policy options would complement each other. They interact in numerous ways. For example, initial margin floors ensure an adequate basis for the calculation of the collateral buffer. And all options aimed at removing amplifying mechanisms (such as the obligation to pass through collected variation margins and the introduction of adequate notice periods) decrease the size of the collateral buffer that is needed.

Figure 13

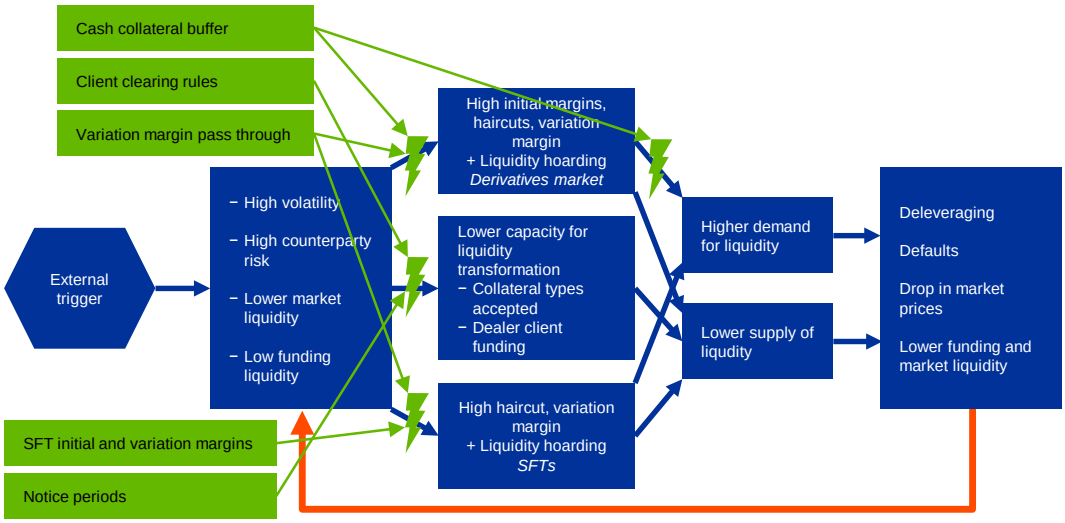
Upswing



Source: ESRB.

Figure 14

Downswing



Source: ESRB.

5 Conclusion

This report confirms key findings set out in ESRB (2017) on the risks from procyclicality associated with margin and haircut practices and the need to address them. ESRB (2017) sets out how increases in asset prices enable the build-up of leverage, as fewer securities are required to collateralise a given exposure, and how a fall in asset prices triggers automatic calls for more collateral, which might force deleveraging. These dynamics may be aggravated by the characteristics of risk-based models that market participants use to compute initial margin and haircuts. As these models use volatility as a key input, margin and haircut requirements will tend to decrease in stable market conditions and increase when volatility rises. If market participants use the collateral freed up by higher asset prices and lower margin and haircut requirements to increase their borrowing and contingent commitments from derivatives, thereby accumulating financial and synthetic leverage, this can exacerbate leverage cycles. When asset prices fall, market participants are exposed to higher margins and haircuts at the very moment that the value of their collateral declines or the collateral is rendered ineligible by the collateral taker. This process can lead to a destabilising deleveraging mechanism if market participants have to close out positions, triggering asset fire sales.

The ESRB's thinking has evolved in the light of new findings set out in this report, particularly concerning the centrality of SFT markets and liquidity strains arising from variation margin. Analytical work and market intelligence have closed knowledge gaps and confirmed the central importance of SFT markets in sourcing collateral and transforming it into cash. This has had an influence on the ESRB's assessment of the transmission of margins and haircut changes and its interlinkages with SFT markets. First, during booms, well-functioning SFT markets enable market participants to source and transform a broad range of collateral at low cost. This makes it difficult to design margin and haircut policies that would effectively constrain the build-up of leverage. Second, during times of stress, impairment of SFT markets means that variation margin calls can cause substantial strains on any individual counterparties that cannot quickly and easily transform collateral into cash. The dynamics between impaired SFT markets, liquidity demands stemming from variation margin and initial margin calls, and increases in haircuts and/or counterparties rendering collateral ineligible can lead to liquidity stress in the financial system and endanger financial stability.

The ESRB now places greater emphasis on policy options aimed at reducing liquidity strains during times of market stress than on those that constrain the build-up of leverage during booms. Reflecting the centrality of SFT markets, the policy options identified in this report aim to reduce liquidity strains from variation margins, initial margins and haircuts during times of stress. They might, however, also have a desirable side effect as they also contribute to reducing the build-up of leverage during booms. Moreover, the policy options would be designed to support and strengthen key elements of the post-crisis reforms of the financial system. Accordingly, they would preserve or enhance incentives to use central clearing, would not lead to regulatorily-induced undercollateralisation of market participants (with particular emphasis on CCPs) and would not restrict the use of variation margins.

The six policy options identified in this report aim to either limit the cyclicality of margins and haircuts or increase the resilience of market participants to withstand it. First, requiring that CCPs pass through intraday variation margin gains they collect could prevent variation margin gains collected intraday becoming trapped in CCPs and depriving the financial system of liquidity during times of stress. Second, introducing initial margin floors in centrally and non-centrally cleared derivatives markets to supplement existing EMIR tools could ensure that initial margin levels do not fall to excessively low levels during prolonged periods of low volatility. Third, addressing risks from procyclicality in client clearing could ensure that the margin and haircut practices of clearing members towards their clients do not unduly transmit procyclicality through the financial system. Fourth, developing guidance on the use of notice periods so that changes to haircuts and collateral eligibility do not occur suddenly could reduce procyclicality risks stemming from increases in haircuts and from tightening of collateral eligibility criteria. Fifth, introducing a cash collateral buffer for centrally and bilaterally cleared derivatives could ensure that market participants transacting in derivatives markets are better equipped to meet margin calls during times of stress. Finally, extending the risk mitigation techniques used (and mandated by EMIR) in non-centrally cleared derivatives markets to non-centrally cleared SFTs could – as is already the case for centrally cleared SFTs – replace the use of haircuts by the use of initial and variation margins as counterparty credit risk mitigation techniques.

The ESRB intends to carry out further analyses and to reflect how the policy options could be incorporated into existing regulatory frameworks. The ESRB intends to carry out further work to analyse the functioning and impact of the options identified in this report. This could include (i) an assessment of the policy options (potentially using new data sources), (ii) analyses of side effects of the options and (iii) a further assessment of the interaction between the options and existing regulations, for example the anti-procyclicality regime set out in EMIR. Four of the policy options, i.e. the mandatory pass-through of intraday margin, initial margin floors, the strengthening of client clearing and guidance on notice periods, could be addressed through changes in the regulatory framework for centrally cleared and non-centrally cleared derivatives. By contrast, the option to introduce cash collateral buffers for market participants engaging in derivatives transactions might require changes to the prudential rules for banks, insurers and other financial entities. The sixth policy option on the use of initial and variation margins as counterparty credit risk mitigation techniques in the SFT market is an extension of the globally agreed safeguards applied to derivatives transactions.

In setting out these policy options, the ESRB is mindful that their eventual implementation would require further work and engagement with market participants and international fora. Although the ESRB is not charged with developing detailed regulatory standards, it is conscious that some of these policy options may entail increased operational complexities and costs for EU market participants, with potential implications for the competitive position of the EU financial system. Regulatory standard-setters are well-placed to take account of these considerations through their public consultations and cost-benefit analyses. As such, the ESRB could contribute to identifying these complexities and costs from a financial stability perspective in its forthcoming work. The ESRB is also mindful that in a global financial system where market activities can cross national borders, the sixth policy option in particular has a global dimension and would need to be consistent with other international regulatory initiatives in this area. These include the minimum haircut framework for non-centrally cleared SFTs designed by the FSB. Reflecting these

considerations, the ESRB will engage with stakeholders, including market participants and international standard-setting bodies, and continue analysis on the functioning and implementation of the policy options identified in this report.

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Abbreviations

CCP	Central counterparty
CDS	Credit default swap
CSA	Credit support annex
CSDB	Centralised Securities Database
ECB	European Central Bank
EEA	European Economic Area
EMIR	European Market Infrastructure Regulation
ESCB	European System of Central Banks
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
EU	European Union
G20	Group of Twenty
HQLA	High-quality liquid assets
IRS	Interest rate swaps
MMSR	Money market statistical reporting
MPOR	Margin period of risk
NCB	National central bank
OIS	Overnight index swap
OSA	Omnibus segregation account
OTC	Over-the-counter
SFT	Securities financing transaction
SIMM	Standard initial margin model

Imprint and acknowledgements

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