



EUROPEAN REPO COUNCIL

Haircuts and initial margins in the repo market

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1 Executive summary

- 1.1 Collateral is intended to hedge default risk. Haircuts/initial margins are usually seen as being intended to hedge the risk on that collateral. From this point of view, they are an adjustment to the quoted market value of a collateral security to take account of the unexpected loss that the repo buyer (seller) in a repo may face due to the difficulty of selling (buying) a collateral security in response to a default by the repo seller (buyer).
- 1.2 However, haircuts/initial margins appear to vary with counterparty credit risk, albeit weakly. But, although the cause of the default that will trigger the sale or purchase of collateral is most likely to be a counterparty credit event, it is not clear whether or how the size of haircuts/initial margins should be a function of the probability of default of the counterparty. There is a case to be made that the identity of a repo counterparty should only affect haircuts/initial margins in extreme circumstances.
- 1.3 Theoretical uncertainty about the calculation of haircuts/initial margins is reflected in the wide range of methodologies applied by market users. These range from the intuitive to adaptations of market risk measurement techniques.
- 1.4 There is also a severe lack of empirical data on haircuts/initial margins. Thus, while the use of haircuts/initial margins has undoubtedly increased since 2008, it is unclear how widespread their use has become.
- 1.5 Regulators are concerned that market practices in setting haircuts/initial margins help to amplify financial market pro-cyclicality. The proposed dynamic is a haircut-asset valuation spiral. In a down-cycle, haircuts/initial margins are increased in response to an initial loss of confidence. In the manner of a credit multiplier in reverse, this reduces the liquidity of market users, who sell assets in response. Asset sales reduce the value of collateral, causing haircuts/initial margins to be increased again. And so on. Each market user is behaving rationally from its point of view but, in aggregate, their individual actions create a negative systemic externality. This type of scenario has given rise to the broader claim that the market crisis of 2007-09 was essentially, if not entirely, a “run on repo” and that repo is an inherently unstable source of funding.
- 1.6 Various ideas are being debated about how to stabilise haircuts/initial margins through a business cycle. It is a matter of concern that the regulatory debate is taking place in the absence of a clear understanding of the constitution of haircuts/initial margins and without sufficient empirical data on their use or potential impact. In addition, the academic literature which is helping to drive the regulatory debate tends to make assumptions about the structure and operation of the repo market which may not be entirely valid for the US and are clearly wide of the mark for Europe. In particular, there is a narrow focus on the use of structured securities, which was not the predominant form of collateral used in the repo market in the US and certainly not in Europe. The

postulated dynamics of this sector of the US repo market have been naively extrapolated onto the global repo market. Estimates of the likely impact of changes in haircuts/initial margins on the liquidity of the European repo market between 2007 and 2009 suggest that their systemic impact may be relatively insignificant in terms of the deleveraging that took place over this period (an order of magnitude smaller). This seriously undermines the argument that repo is, by virtue of haircuts/initial margins, an inherently unstable source of funding.

- 1.7 The current debate also ignores evidence, much of it from official sources, that haircuts/initial margins did not change much during 2007-09 and that market users initially responded to the crisis by reducing or withdrawing credit lines, shortening the terms for which they were willing to lend and narrowing the range of eligible collateral. In this respect, the response was very similar in character to that of the unsecured market, except that the protection offered by collateral can be expected to have mitigated the overall reaction of the repo market.
- 1.8 The suspicion that haircuts/initial margins are the principal driver of deleveraging in a market crisis has thrown up the idea of stable through-the-cycle haircuts/initial margins as a tool to regulate the level and cyclical nature of leverage. Such a proposal has serious flaws. As a matter of principle, one-size-fits-all mandatory haircuts risk distorting the market and creating rigidities that will encourage artificial arbitrages. Concerns about excessive leverage would best be addressed at firm rather than transaction level, by the direct regulation of leverage, whatever its source.
- 1.9 Regulators recognise that stable through-the-cycle haircuts/initial margins would be no panacea for the problem of market pro-cyclicality, and that there would be significant practical difficulties in implementing such haircuts/initial margins. In particular, it has been accepted that, even if haircuts/initial margins are mandated to remain stable over the business cycle, there are other lending terms that could be used to increase the availability of credit during periods of optimism and constrain credit during periods of deleveraging, with potentially some of the same pro-cyclical effects on financial markets as that attributed to free market haircuts/initial margins.
- 1.10 Other proposals under discussion by regulators seem more helpful, such as encouragement of more frequent and efficient margin maintenance to smooth out collateral calls
- 1.11 Market initiatives also have a role to play, including the forthcoming publication by the ERC of revised margining guidelines and continuing industry education. Consideration might be given to the collection of further data on the structure and operation of the European repo market.

2 What are haircuts and initial margins?

- 2.1 A **haircut** is a percentage discount deducted from the market value of a security that is being offered as collateral in a repo in order to calculate the Purchase Price. Thus, the formula for a haircut is:

$$\frac{\text{Market Value of collateral} - \text{Purchase Price}}{\text{Market Value of collateral}} \times 100$$

- 2.2 Haircuts are therefore expressed as the percentage difference between the market value of the collateral and the Purchase Price of the repo. In the ICMA's Global Master Repurchase Agreement (GMRA), a haircut is called a *Margin Percentage*.

- 2.3 An **initial margin** is a percentage premium added to the market value of a security that is being offered as collateral in a repo in order to calculate the Purchase Price. Thus, the formula for an initial margin is:

$$\frac{\text{Market Value of collateral}}{\text{Purchase Price}} \times 100$$

- 2.4 Initial margins are therefore expressed relative to 100%, which means that an initial margin of 100% is a zero margin. In the GMRA, an initial margin is called a *Margin Ratio*. In the ISDA Master Agreement, it is called an *Independent Amount*.

- 2.5 Haircuts/initial margins are usually set such that the Purchase Price of a repo is less than the market value of the collateral, that is, they typically result in over-collateralization. However, where there is exceptional concern over a particular counterparty's creditworthiness against a background of market instability, haircuts/initial margins can be negative, which means that the Purchase Price exceeds the market value of collateral, in other words, there is under-collateralisation.

- 2.6 The haircut/initial margin in an over-collateralised repo represents the share of the price of an asset purchased in the underlying market in that asset which cannot be funded in the repo market and must therefore be funded from a firm's own funds or unsecured borrowing.

3 The purpose of haircuts and initial margins

- 3.1 Collateral is intended to hedge default risk. Haircuts/initial margins are usually seen as hedging the risk on that collateral. From this point of view, haircuts/initial margins are an adjustment to the quoted market value of a collateral security to take account of the unexpected loss that the buyer (seller) in a repo may face due to the difficulty of selling (buying) that security in response to a default by the seller (buyer).¹ By applying a haircut/initial margin, the quoted market value of a collateral security is translated into a probable future liquidation or restoration value.
- 3.2 In practice, a haircut/initial margin must also look backwards and compensate for lack of or inefficiencies in margin maintenance.² Thus:
- 3.2.1 Where there is no margin maintenance, haircuts/initial margins should be sufficient to cover the expected change in the market value of the collateral securities, net of the accrual of repo interest, plus related transactions costs, for the entire period between (1) the transaction date of repo and (2) the event of default, plus the expected and unexpected losses that the buyer (seller) in a repo may realise over the holding period (time to sale or purchase) due to the difficulty of selling (buying) that security in response to a default by the seller (buyer).
- 3.2.2 Where there is margin maintenance, haircuts/initial margins should be sufficient to cover the expected change in the market value of the collateral securities, net of the accrual of repo interest, plus related transactions costs, between (1) the date of the last margin calculation that has been settled or paid and (2) the event of default, plus the expected and unexpected losses that the buyer (seller) in a repo may realise over the holding period due to the difficulty of selling (buying) that security in response to a default by the seller (buyer).
- 3.3 As a hedge for collateral risk, the size of haircuts/initial margins should be a function of:
- 3.3.1 **market liquidity risk** in the underlying collateral securities, in other words, the difficulty of execution (finding buyers or sellers of sufficient quantity) and the price sensitivity of the market to selling or buying (market impact).
- 3.3.2 **operational risk** at the non-defaulting party, in other words:
- pre default, the efficiency of the non-defaulting party in margin maintenance settlement and custody;
 - post default, delays in identifying an event of default and responding to an event of default.

¹ Under the GMRA 2000 and 2011, the liquidation or restoration values of collateral securities for the purposes of calculating default losses actually depend on the prices used to determine the Default Market Value of the securities, subsequent to the service of a Default Notice or the occurrence of automatic early termination. These prices could be the actual sale or purchase prices, but could be quotes or a fair value estimate by the non-defaulting party.

² Margin maintenance is a risk control procedure incorporated into repo contracts under which agreed periodic deliveries of securities or payments of cash are made by one party in response to calls by the other during the term of a repo in order to restore the original balance between the market value of the collateral held by the buyer and the cash owed to the buyer

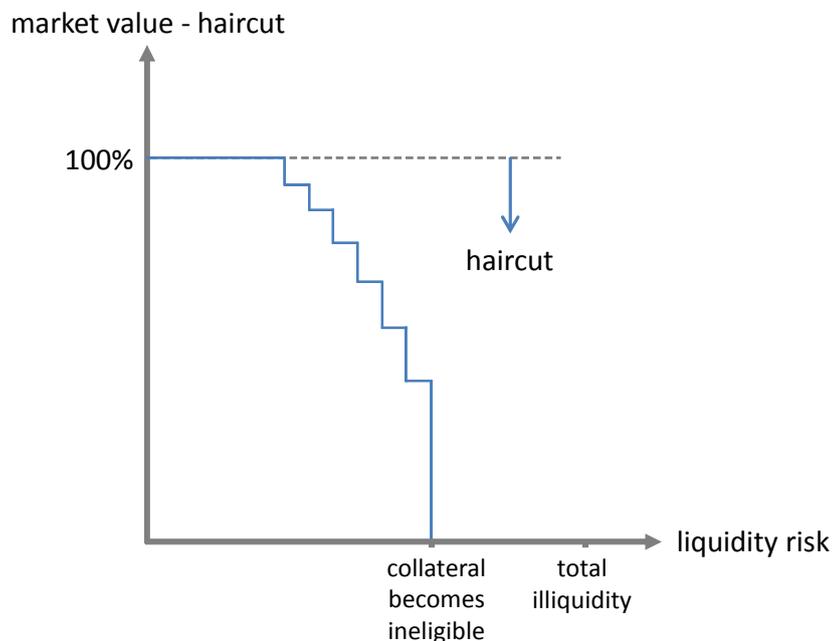
3.3.3 **legal risk**, in other words:

- pre default, the efficiency of the non-defaulting party in ensuring that it has in place a robust legal agreement underpinning its repo transactions with the defaulting party;
- post default, delays in selling or purchasing collateral securities due to challenges in court to the right of the non-defaulter to sell collateral securities or use cash to buy collateral securities.

3.3.4 **default risk** on the collateral securities (in other words, on the collateral issuer).

3.4 The impact of delays caused by some types of operational risk (eg delays in identifying and responding to an event of default) and some types of legal risk (eg delays caused by legal action to claw back collateral) will be a function of the holding period and the normal volatility of the market price for the security is also relevant (that is, price movements not due to the specific market impact of selling or buying particular collateral securities). The normal volatility of the market price will also be a factor in market liquidity risk, at least, where the counterparty or amount of collateral are not exceptional and market conditions are normal.

3.5 In the case of buyers in repo transactions, at some point, depending on their risk tolerance, the appropriate haircut/initial margin for a collateral security may become so large that the margin of uncertainty about its liquidation value becomes comparable to or greater than the probable liquidation value itself, in which case, buyers will completely reject that security as collateral. This evolution might be envisaged as in the diagram below.



- 3.6 What about the role of **counterparty credit risk** in determining the size of haircuts/initial margins? Although the cause of the default that will trigger the sale or purchase of collateral is most likely to be a counterparty credit event, it is not clear that the size of haircuts/initial margins should be a function of the probability of default of the counterparty.³ Any excess collateral/cash remaining after the sale or purchase of collateral securities has made whole the position of a non-defaulting party cannot be retained by that party and so does not represent contingent additional compensation for bearing default risk. This would argue that haircuts/initial margins should not vary with counterparty credit risk. Buyers should instead be compensated for counterparty credit risk by means of a credit premium in the repo rate.
- 3.7 A recent study of repo transactions by US money market mutual funds by Fitch Ratings concludes that “it does not appear that MMF haircuts are particularly sensitive to the identity of the repo counterparty”, although they caution that “determining whether haircuts are sensitive to counterparty risk is difficult to examine statistically, since the most active repo market borrowers are highly rated financial institutions, and it would be difficult to control for the quality of collateral when comparing haircuts across different institutions. Nevertheless, Fitch’s tentative research on this topic does not appear to indicate a link between haircuts and counterparties for MMF repo transactions. This finding is consistent with Fitch’s understanding of the risk-management practices of several MMFs that participate as repo lenders in triparty markets. These funds make a binary “yes/no” decision about whether or not to transact with a particular financial institution... The funds thus calibrate haircuts based on the potential price volatility of the collateral, rather than on the financial strength of the repo counterparty”.⁴
- 3.8 It is easier to see how counterparty credit risk feeds into haircuts/initial margins in exceptional circumstances. Where the probability of default and the likelihood of having to liquidate collateral are remote, no haircut/initial margin is typically imposed. Similarly, where a counterparty is very highly rated, it may be able to repo out collateral that buyers would not accept from lesser-rated counterparties, in other words, the (effective) haircut switches from 100% for lesser-rated counterparties to less than 100% or even zero for highly-rated counterparties. In the diagram above, this would be represented by a shift to the right.
- 3.9 At the other extreme, where there is an element of systemic risk --- either the counterparty is very large and/or market liquidity has already been critically impaired by a loss of confidence --- the selling or buying of collateral is likely to have a market impact far greater than that of normal cash market transactions, which would justify a special haircut/initial margin. In addition, negative haircuts/initial margins (ie under-collateralisation) have been observed for poorly rated buyers in the context of systemic instability.

³ There are other types of event of default but non-credit events are unlikely to be used to trigger a default and lead to the sale or purchase of collateral.

⁴ Fitch Ratings, *Repo Emerges from the “Shadow”*, 3 February 2012, p3.

- 3.10 However, there is empirical evidence to suggest that the size of haircuts/initial margins do vary with counterparty credit risk in normal market conditions. A Study Group of the BIS Committee on the Global Financial System (CGFS) reported, on the basis of bilateral interviews in various financial centres with market users (including banks, prime brokers, custodians, asset managers, pension funds and hedge funds) that, “To control for counterparty risk in secured lending business, repo dealers and prime brokers either increase haircuts or lower available credit risk limits...”⁵
- 3.11 Dang, Gorton and Holmström (2011) note that haircuts for the same type of (structured security) collateral of the same rating differ between types of repo counterparty.⁶
- 3.12 Dang, Gorton and Holmström (2009) appear to dismiss counterparty credit risk as an explanation for haircuts/initial margins in favour of collateral risk.⁷ They argue that a repo haircut amounts to a tranching of the collateral security which is done in order to restore its “information-insensitivity” and thereby its liquidity. Information-insensitivity means that there are no “informed traders” in a market, in other words, parties with better information about the expected value of the asset being traded. Where traders have the same information, or degree of ignorance, they can trade without extensive due diligence, but without fear of finding themselves up against a better informed trader (the problem of “adverse selection”). They are therefore more willing to trade. Symmetric information or ignorance therefore promotes liquidity. But even with adverse selection, the preferential ranking of senior debt securities minimises the loss to the buyer in the event of bad news and the fixed maximum pay-off limits the claim on the seller in the event of good news. These constraints minimise the incentive to acquire private information (that is, perform due diligence). Normally, that incentive is less than the cost of acquiring private information, which makes debt securities the type of instrument which is the least sensitive to public information. But debt is not riskless and a systemic shock can raise levels of risk enough to make debt securities information-sensitive (it becomes worthwhile to acquire private information by performing due diligence), which causes illiquidity. Information-insensitivity might be restored by taking a haircut. It is argued that a haircut corresponds to the junior tranche or equity residual of a debt security, the existence of which means that the repo seller (just like a security issuer) is being forced to hold more equity in the collateral, thereby reducing the risk for the repo buyer (security investor).
- 3.13 Dang et al (2009) regard the impact of counterparty credit risk on haircuts/initial margins as a puzzle, on the grounds that standard finance theory would suggest that, if repo buyers were concerned that the seller might

⁵ BIS Committee on the Global Financial System (CGFS) Paper No.36 on *The role of margin requirements and haircuts in procyclicality* (March 2010).

⁶ Dang, Tri Vi, Gary Gorton, and Bengt Holmström, *Repo, Haircuts and Liquidity*, working paper (July 2011).

⁷ Dang, Tri Vi, Gary Gorton, and Bengt Holmström, *Financial Crises and the Optimality of Debt for Liquidity Provision*, working paper (November 2009).

fail, causing them to have to sell the collateral, their risk aversion and the price risk would simply be factored into the repo rate.

- 3.14 Dang et al (2011) develop a model in which the haircuts/initial margins on (structured) securities offered as collateral are a function of the “information acquisition sensitivity” (IAS) of a security and the probabilities of default of both parties to a repo. IAS measures the “tail risk” of a security, that is, the expected losses on a collateral security when its liquidation (restoration) value has fallen below (or risen above) the outstanding repurchase price. This is equivalent to the incentive of potential buyers to acquire private information about the likely value of the security. The intuition is that higher haircuts/initial margins reduce the amount that a repo seller can borrow, which increases its probability of default, which causes buyers to increase the haircuts imposed on the seller, which reduces the amount it can borrow, and so on, in a negative feedback loop. Increases in the probability of default of the seller increase the risk to the buyer and therefore its probability of default (when it needs to borrow subsequently). The negative feedback loop is triggered by an increase in the IAS of the collateral security due to the arrival of news about the probable value of that security. Dang et al demonstrate (at least for their data sample) that their model explains the weak correlation between haircuts/initial margins on the one hand and default probabilities of the parties and the rating of the collateral on the other hand.
- 3.15 Dang et al (2011) go on to develop a fundamental hypothesis about the nature of repo and role of haircuts/initial margins. First, they argue that the right to repurchase collateral makes repo an inherently attractive way of raising cash compared to temporary asset sales (that is, a cash or outright sale of securities). In an asset sale --- where there is no obligation for the buyer to sell the security back to the seller at the same price at which he initially bought it --- there is a chance that the buyer will have bargaining power and demand a higher price. Borrowers therefore have an incentive to borrow through repo, where the repurchase price is fixed. In this sense, Dang et al see haircuts/initial margins on repo as protecting the borrower. Second, they argue that a haircut/initial margin provides an incentive to lenders to lend through repo rather than through temporary asset purchases, by incentivising borrowers to repurchase collateral and repay lenders (where they are able) because it is in his best interest to repurchase the collateral having sold it at below its market value. Dang et al suggest that the seller’s incentive to repurchase can eliminate the buyer’s incentive to acquire information, which would create adverse selection in subsequent trading, and therefore makes repo inherently more liquid.
- 3.16 A number of other suggestions have been made as to how haircuts/initial margins could take account of counterparty credit risk:
- Haircuts/initial margins could incorporate a special risk premium to offset the uncertainty about the probable liquidation or restoration value of the collateral securities, that is, whether the haircut/initial margin is adequate. The need for such a premium may become more acute as the probability of default by the counterparty and therefore the likelihood of having to resort to the collateral increases.

- Haircuts/initial margins could generate a return (separate from the credit premium in the repo rate) to the party taking the haircut/initial margin that compensates for the default risk. It could be that, during the life of a repo (while there is no default), a haircut/initial margin generates such a return by allowing the profitable re-use of collateral. This might mean that either:
 - Haircuts/initial margins are larger than the amounts required to compensate for collateral risk. It is difficult to determine whether or not, in practice, parties taking haircuts/initial margins do profit from such 'excess' haircuts/initial margins. At first glance, this would appear to happen in securities lending (which is analogous to repo), in that initial margin paid (which is often in cash) is reinvested by the party taking it. However, most of the reinvestment return is rebated to the party giving the initial margin and the spread retained by the first party can be seen as a service fee or compensation for proprietary reinvestment risk.
 - Haircuts/initial margins are no larger than amounts required to compensate for collateral risk, but market users are able to arbitrage their right to re-use collateral by selling collateral securities short into the cash market at the full market quote, thereby monetising the value of haircuts/initial margins, or even reposing on collateral securities to sellers who do not require haircuts/initial margins.
- Haircuts/initial margins could take account of the market impact of the sale or purchase of collateral securities following a default, in other words, counterparty credit risk feeds into market liquidity risk. However, haircuts/initial margins should only vary with counterparty credit risk where the market impact is greater than for normal cash market transactions, in other words, where the counterparty and its holding of collateral securities are atypically large and/or market liquidity has been sufficiently drained by a critical loss of confidence to make the market unusually sensitive to the impact of the sale or purchase of collateral securities. In this case, haircuts/initial margins would be reflecting systemic risk rather than individual counterparty credit risk.

4 The setting of haircuts and initial margins in practice

- 4.1 The key problem with haircuts/initial margins is the difficulty of calculating them, even if they are seen purely as hedges for collateral risk. Market liquidity, operational and legal risks cannot be easily quantified. It is unsurprising therefore that there is no generally-accepted methodology for calculating haircuts/initial margins. They often appear to be calculated using rules of thumb based on intuitive market experience or simple historic measures of price volatility, such as standard deviation. At the other end of the spectrum, haircuts/initial margins are derived from value-at-risk (VaR) models or stress tests. But neither the empirical nor the model-based methodologies incorporate operational, legal and collateral default risks. Nor are they robust in accounting for market liquidity risk, often relying on add-ons, for which the methodology can be unclear.
- 4.2 The study by Fitch Ratings shows that haircuts taken by US money market mutual funds on equity collateral lag market volatility. These data may also be taken to suggest that haircuts change only when relevant conditions breach a certain threshold.
- 4.3 Since the crisis, many market users are reported to have adopted the haircuts/initial margins set by Basel II (standard supervisory haircuts), central banks or central counterparties (CCPs) as benchmarks.
- 4.4 Whichever way market users arrive at estimates for the appropriate size of haircuts/initial margins, these numbers will then be subject to erosion by considerations of market competition and counterparty/customer relationship. On the other hand, haircuts/initial margins may be forced up by market power. In other words, the buyer may be able to exploit its lending capacity to impose a haircut/initial margin that is higher than it might be for reasons solely of risk mitigation, thereby providing the buyer with an indirect return in the form of additional re-usable collateral.

5 Drawbacks to the use of haircuts and initial margins

- 5.1 A fundamental drawback of haircuts/initial margins is that, while protecting one party, typically the buyer, they expose the other party to an unsecured credit risk. This is inherently undesirable in a collateralised transaction. In long-term repo (terms of one year or more), however, where haircuts/initial margins can be very substantial, it is usual to try to mitigate this asymmetrical credit exposure by pledging rather than transferring title to haircuts/initial margins or by pledging-back the haircuts/initial margins.

6 The scope of usage of haircuts/initial margins in the repo market

6.1 There is no authoritative data on the use of haircuts/initial margins in the repo market in either Europe or the US. The data in the table below was gathered by a CGFS Study Group in bilateral interviews in various financial centres with various market users, including banks, prime brokers, custodians, asset managers, pension funds and hedge funds.

Typical haircut on term securities financing transactions (per cent)

	June 2007			June 2009		
	prime	non-prime	Unrated	prime	non-prime	Unrated
G7 government bonds						
short-term	0	0	0.5	0.5	1	2
medium-term	0	0	0.5	1	2	3
US agencies						
short-term	1	2	3	1	2	3
medium-term	1	2	3	2	5	7
Pfandbrief	0	0	1	1	2	8
prime MBS						
AAA-rated	4	6	10	10	20	30-100
AA and A-rated	8	12	25	100	100	100
ABS	10	20	20	25	50	100
structured (AAA)	10	15	20	100	100	100
investment grade bonds						
AAA & AA-rated	1	2	5	8	12	15
A & BBB-rated	4	7	10	10	15	20
high-yield bonds	8	12	20	15	20	40
Equity						
G7	10	12	20	15	20	25
Emerging	15	20	35	20	25	40

Source: CFGS Study Group (March 2010)

6.2 Fitch Ratings offer a survey of haircuts imposed by US money market mutual funds. The gap in the series for structured finance in H1 2009 reflects the (temporary) refusal of their sample of money market mutual funds to accept structured securities as repo collateral.

	H1 2007	H1 2009
US Treasuries	2.0	3.0
US Agencies	3.0	2.0
corporate	3.2	5.0
structured finance	4.2	n/a
equity	5.0	10.0

Source: Fitch Ratings (February 2012)

- 6.3 In addition, anecdotal evidence suggests:
- 6.3.1 Pre crisis, the use of haircuts/initial margins in the interdealer market was more common in the US than Europe, in part, because of the larger size of the credit repo market in the US, not least MBS.
- 6.3.2 In pre-crisis Europe, the use of haircuts/initial margins was largely limited to:
- CCP-cleared repo, which also tended to be electronically-traded, but here, the haircut/initial margin is imposed by the CCP, not the repo counterparty.
 - tri-party repo (initial margin is a standard tri-party business term)
 - term repo
 - customer business (including smaller banks)
 - credit repo
- 6.3.3 In pre-crisis Europe, haircuts/initial margins were not usual in:
- interdealer repo
 - government bond repo
 - short-term repo
 - voice-brokered repo
- 6.3.4 During the first phase of the crisis in Europe (pre-Lehman), the use of haircuts/initial margins did not become significantly more widespread. The first line of defence was actually the reduction of credit lines, the shortening of terms and the removal of certain types of collateral (particularly ABS, MBS and other structured products) from lists of eligible collateral. But where haircuts/initial margins were already in place, they may on average have tripled. Increases were applied either ad hoc on a transaction-by-transaction basis or across the board by the blanket application of multipliers.
- 6.3.5 In the tri-party repo market in Europe, activity almost came to a standstill in August 2007 as many buyers temporarily, albeit briefly, withdrew in order to reassess and revise their schedules of collateral eligibility, limits and initial margins. However, tri-party initial margins have been more stable subsequently.
- 6.3.6 During the second phase of the crisis in Europe (post-Lehman), the use of haircuts/initial margins became more widespread and was successively extended to wider ranges of collateral and counterparty as collateral market liquidity dried up, asset values dropped, prices became more volatile and counterparty credit risk deteriorated. The European sovereign debt crisis further narrowed the pool of eligible collateral.

7 Regulatory proposals on haircuts and initial margins

- 7.1 Regulators are concerned that current market practices in setting haircuts/initial margins have helped to amplify financial market pro-cyclicality. They argue that the erosion of haircuts/initial margins (and other credit terms) in times of ample liquidity, low volatility, rising asset values, high credit ratings and strong competition for business contributed to the growth in leverage (from 2002) but also to its abrupt and disruptive reversal (in 2007). Regulatory concern is focussed on structured products, whose mark-to-market values are dependent on the modelling of complex contingent cash flows. Regulators contend that, as asset values fell, valuation uncertainties increased. In response, credit terms were tightened, including the haircuts/initial margins on these assets. And when valuation uncertainties exceeded the over-collateralisation secured through haircuts/initial margins, such assets became ineligible as collateral. Both effects led to a contraction of the supply of secured financing, particularly to highly-leveraged market users, and exacerbated deleveraging pressures.
- 7.2 The CGFS Study Group has made the following recommendations to policy-makers:
- 7.2.1 To encourage the adoption of policies by dealers to relate credit terms, including haircuts/initial margins for secured financing such as repo, to the strength of the valuation process for a particular type of collateral, counterparty or contract, and the frequency with which key components of the valuation process occur. Where valuation and related governance practices are weaker, less frequent or less developed, additional buffers would be required. It is suggested that the implementation of adequate valuation practices should be a condition for the credit risk mitigation benefits of collateral to be recognised in capital requirements. However, it is recognised that supervisory assessment of internal capabilities will be difficult.
- 7.2.2 To consider giving macroprudential authorities the discretion to impose a countercyclical add-on to capital charges on secured lending to boost haircuts/initial margins during up-cycles, in order to dampen pro-cyclicality.
- 7.2.3 The add-on could be imposed across the board or selectively against specific asset classes. At the moment, if market users set haircuts/initial margins below supervisory haircuts, the differences are treated as unsecured credit and attract capital charges. An add-on would increase these charges. The imposition of an add-on would also signal supervisory concern to the market about the valuation of particular asset classes.
- 7.2.4 The CGFS Study Group see their proposals as complementary to the revisions proposed in 2009 by the Basel Committee on Banking Supervision to the methods of calculating existing supervisory haircuts, also with the objective of reducing pro-cyclicality by ensuring that secular (that is, through-the-cycle) haircuts/initial margins under the Basel regime are conservative and calibrated to include periods of market stress, that is based on measurements of market volatility measured in terms of the long-term average volatility of the mid-market

price of assets and liquidity measured in terms of the volatility of bid/offer spreads. The CGFS add-on differs from the Basel haircut in that it is aimed at taking into account negative externalities, that is, systemic risks.

- 7.2.5 It is also hoped that more conservative and stable haircuts/initial margins would make it unnecessary for market users to cut credit lines so rapidly in a downturn and indirectly constrain leverage in an upturn by increasing the cost of capital employed by banks and other financial institutions.
 - 7.2.6 It is proposed to exempt interbank repo which “contribute positively to market efficiency and where the financing of the collateral is *not* the motivation for the transaction”. This would include overnight interbank lending collateralised by very high-quality liquid assets (typically those recognised as core liquidity in microprudential liquidity standards), as the purpose of the transaction is the rebalancing of short-term payment flows, and the collateral is *solely* serving the purpose of supporting the creditworthiness of the borrower. Moreover, to avoid discouraging the use of collateral solely to support creditworthiness, or impairment of payment systems, national authorities would have discretion to exempt such transactions, which would typically be secured against the highest-quality collateral.
 - 7.2.7 To commission macroprudential authorities to regularly conduct and publish a predominantly qualitative survey of credit terms used in secured lending and OTC derivatives markets, to provide policymakers and others with a useful indication of broad trends in aggregate leverage, competitive pressures and risk appetite in the financial system, as well as some insight into the drivers of such changes. The survey would solicit qualitative assessments from senior credit officers. Data gathered would include haircuts/initial margins, eligible pools of collateral assets, maturities and other financing terms. At its January 2010 meeting, the CGFS requested a small group of central banks to develop a set of core questions to assess financing conditions in secured financing and OTC derivatives markets, which central banks could choose to administer in their own jurisdictions if they so desired.
- 7.3 A minimum mandatory haircut for collateral was recommended in the FSA review of March 2009 (the Turner Review). It has more recently been promoted by Andrew Haldane, Executive Director, Financial Stability, at the Bank of England. And minimum standards for margins on derivatives (which many regulator see, along with repo, as a problematic source of leverage) have been proposed by US Secretary of the Treasury Geithner.

8 The likely impact of haircuts and initial margins on deleveraging

- 8.1 In a review of the academic literature on haircuts/initial margins, the CGFS Study Group argues that recent studies have formalised long-standing insights about the potentially destabilising influence of secured lending and how, in particular, haircuts and initial margin may contribute to a pro-cyclical expansion of leverage and liquidity during boom times and accelerate the contraction of leverage and liquidity during downturns through mechanisms such as asset price spirals. However, the Study Group notes the highly simplified and stylised nature of the models explored by academics. While the models focus on haircuts/initial margins, many other credit terms are also relevant in determining the effective supply of leverage to market participants. To control for counterparty credit risk, repo market users also reduce or cut credit limits and/or shorten the term of lending. Indeed, anecdotal evidence suggests a contraction of credit limits and terms is often the first line of defence. Where haircuts/initial margins were raised during the crisis, this varied considerably across financial instruments, business lines and type of counterparty. The Study Group therefore concedes that, while in the models, credit supply invariably responds to adjustments in haircuts, the effects may be less clear in the presence of other credit terms which are simultaneously adjusting.
- 8.2 The Study Group also recognises the paucity of empirical evidence on margining practices and the failure to directly examine the causality between haircuts and asset prices. They observe that there is some indirect empirical support of the hypothesis that there is a negative relationship between haircuts and asset prices. They suggest that the pro-cyclical nature of secured lending terms provides some support for the assumptions made in more recent models that study the interaction between margin requirements and asset price dynamics, but note that these models do not capture all the relevant market mechanisms (that is, they assume that changes in haircuts/initial margins are the sole response to a deterioration in counterparty credit risk).
- 8.3 A forthcoming paper by Andrew Haldane of the Bank of England and others constructs a theoretical model of a banking network, interconnected through unsecured interbank lending and secured funding markets.⁸ Although the purpose of the model is to look at the link between systemic liquidity crises and interconnectedness as measured by the structural characteristics of concentration and complexity, the motive force of the model is changes to haircuts/initial margins. One of the key channels for the contagion that propagates a crisis is the hoarding of liquidity in the secured funding market when haircuts/initial margins rise. The model is used to test various policy options, in particular, the imposition of a minimum haircut. A haircut of 20% is found to reduce the probability of a liquidity crisis to very low levels, but even a low mandatory haircut is shown to have a dramatic effect on market stability.

⁸ Haldane, Andrew, Prasanna Gai and Sujit Kapadia, *Complexity, Concentration and Contagion*, forthcoming in the *Journal of Monetary Economics*, Vol.58(5) (2012).

- 8.4 However, Haldane does concede that “we have little theoretical understanding of how haircut-based policies might affect banks’ behaviour. And we have little empirical case law on the implementation of these policies. For example, haircuts policy might be circumvented by banks substituting towards unsecured finance. So any quantitative calibration of the effects of a haircut-based policy rule is necessarily tentative.”
- 8.5 One of the most influential academic papers in the regulatory debate on the pro-cyclicality of haircuts/initial margins has been that by Gorton and Metrick (November 2010).⁹ They argue that the financial crisis of 2007-08 was akin to a traditional banking panic but was precipitated by a run on the repo market, which they describe as being part of the “securitised banking” market. Securitised banking is the business of packaging and re-selling loans, with repo as the source of funding. Gorton and Metrick propose that deepening haircuts (in response to collateral securities becoming information-sensitive due to an unspecified shock --- see 3.12 above) reduced the value of collateral to such an extent that it enforced massive deleveraging in the financial system. Firms from which repo funding was progressively withdrawn by the imposition of higher and higher haircuts/initial margins were forced to deleverage by selling assets. The resulting fire sales amplified the crisis and aggravated the crisis. The importance attached to Gorton and Metrick derives in large part from the empirical evidence they employ in the form of a set of data series on collateral haircuts taken on 10 classes of structured securities by a large but anonymous US broker-dealer between 2007 and 2009.
- 8.6 One shortcoming with Gorton and Metrick’s data is that it only includes structured securities (ABS, RMBS, CMBS, CLO and CDO). Gorton and Metrick mistakenly believe that the collateral used in the US repo market “very often” is securitized bonds. They offer no data on US Treasuries, which constitutes the largest pool of repo collateral in the US, and ignore evidence from the tri-party market, which may have accounted for 50-60% of outstanding US repo.¹⁰ This is significant because, although the Task Force on Tri-Party Repo Infrastructure (2009) concluded that “tri-party repo arrangements were at the center of the liquidity pressures faced by securities firms at the height of the financial crisis”, they concluded that the available data suggested that margins in the tri-party repo market did not increase much during the crisis, if at all. They observed that, “It appears that some tri-party repo investors prefer to stop financing a dealer rather than increase margins to protect themselves”. This point was also made by the CGFS Study Group. Gorton and Metrick ignore the reduction or closing of credit limits and the shortening of lending. There is also no recognition of the evaporation of unsecured credit. They are therefore simply incorrect to attribute the entire deleveraging of the US financial system and loss of liquidity in the US money market to the dynamics of the repo market in form of deepening haircuts.

⁹ Gorton, Gary, & Andrew Metrick, *Securitized Banking and the Run on Repo*, 9 November 2010. They represented default risk with two measures: the LIBOR-OIS spread; and the average spread between overnight borrowing rates for high and low-risk banks.

¹⁰ In assessing the share of tri-party settlement in the US repo market, account needs to be taken of the fact that many repo transactions are netted across central clearing counterparties before settlement.

8.7 While Gorton and Metrick's analysis may have overestimated the impact of haircuts/initial margins in the US market, it also says little about the European repo market, which has a very different structure to the US market.

- Over 80% of collateral in the European repo market is government securities. Structured securities are a small component. Most structured securities in the European market are managed as tri-party repos. ICMA data suggests such collateral accounts for no more than 10% of tri-party repo, which itself is less than 12% of the wider European repo market.
- The US market is largely overnight, whereas in Europe, only 18.3% of outstanding contracts were one-day maturities in June 2007 (ICMA survey). In a market dominated by one-day maturities, margin maintenance is redundant. Valuation changes will be reflected entirely in adjustments to haircuts/initial margins, which also factor in forward-looking risks, making for potentially more abrupt changes in collateral value than margin calls. In a market like Europe, the extended maturity distribution means margin maintenance is more significant and will mute the impact of margin calls.

It is therefore a serious mistake to extrapolate certain events in one part of the US credit repo into the European repo market. This can be demonstrated by quantifying the impact of changes in haircuts/initial margins in the European market.

8.8 The problem with all the models of haircut-imposed pro-cyclicality is that they have not been calibrated against reality. It is possible to make a rough estimate of the likely impact over 2007-09 of changes in haircuts/initial margins in the European repo market using the results of the ICMA's semi-annual European repo market survey for June 2007 and June 2009, and the CGFS Study Group survey of haircuts. The following conservative assumptions are made:

- Government securities accounted for 83.7% of EU-originated collateral in June 2007 and 81.2% in June 2009. We assume that these proportions are representative of the whole market. We also assume that the split between short and medium-term government securities is 50:50. The proportion of government securities in tri-party repo collateral was 43.6% in June 2007 and 53.0% in June 2009, while the overall share of tri-party was 11.8% and 11.1%, respectively. This component has been deducted from the 83.7% and 81.2%. Thus, the following division of holdings of government securities are assumed for June 2007 and June 2009:
 - short-term government securities settled bilaterally: 36.7%, 34.7%
 - medium-term government securities settled bilaterally: 36.7%, 34.7%
 - government securities settled tri-party: 5.1%, 5.9%
- Pfandbrief accounted for 2.3% of all bilaterally-settled collateral in June 2007 and 1.6% in June 2009.
- Equity accounted for 1.6% of all bilaterally-settled collateral in June 2007 and 0.7% in June 2009.
- Equity was 21.0% of tri-party collateral in June 2007 and 8.6% in June 2009.
- All tri-party government collateral is assumed to be medium-term.

- All tri-party non-government fixed-income collateral (35.4% in June 2007 and 49.9% in June 2009) is assumed to be A or BBB-rated.
- Non-government bilaterally-settled collateral (5.7% in June 2007 and 11.3% in June 2009) is assumed to be A or BBB-rated.
- Equity is assumed to have been issued by G7 firms.
- All counterparties are assumed to be non-prime.

8.9 The estimates are shown in the table.

	Jun-07			Jun-09		
	haircut	% market share	after haircut	haircut	% market share	after haircut
bilateral short-term govts	0%	41.9%	41.9%	1.0%	40.6%	40.2%
bilateral medium-term govts	0%	36.7%	36.7%	2.0%	34.7%	34.0%
bilateral covered bonds	0%	2.3%	2.3%	2.0%	1.6%	1.6%
bilateral equity	12%	1.6%	1.4%	20.0%	0.7%	0.6%
other credit repo	7%	5.7%	5.3%	15.0%	11.3%	9.6%
tri-party govts	0%	5.1%	5.1%	2.0%	5.9%	5.8%
tri-party fixed income	7%	4.2%	3.9%	15.0%	4.3%	3.6%
tri-party equity	12%	2.5%	2.2%	20.0%	1.0%	0.8%
total		100.0%	98.8%		100.0%	96.1%
change						-2.7%

8.10 It can be seen that, even on the basis of conservative assumptions, the impact on the value of collateral of changes in haircuts/initial margins is less than 3%, which is insignificant in terms of the scale of deleveraging seen over the same period (eg the headline totals of the ICMA survey dropped by 28.1%, from a peak of EUR 6,775 billion in June 2007 to EUR 4,868 billion in June 2009, and the maximum fall was 31.6% to December 2008). Although the estimations are necessarily approximate, the difference is of an order of magnitude, which seriously calls into question haircut spiral models such as Gorton and Metrick's as a feasible explanation for the market crisis of 2007-09.¹¹

¹¹ The impact of increases in haircuts/initial margins could be amplified if one assumes that the initial haircut/initial margin absorbs the entire equity of the seller and therefore cannot be increased to fund the increase in haircut/initial margin. However, this constraint is unlikely to be binding in practice on most institutions.

9 Conclusions

- 9.1 The use of haircuts/initial margins in the European repo market has become more commonplace since the collapse of Lehmans in 2008. However, it is not clear how widespread is their application. There is a serious paucity of data on the subject. Nor is the theoretical construction of haircuts/initial margins well understood, particularly in respect of the role of counterparty credit risk. The academic literature is thin and not well informed about the structure and operation of the repo market.
- 9.2 Haircuts/initial margins are widely seen among regulators and academics as contributing to the perceived instability of the supply of repo financing. There is a debate as to whether larger and more stable haircuts/initial margins should be imposed on the repo market, in order to dampen valuation-induced pro-cyclicality in stressed market conditions, particularly for collateral assets that are prone to valuation uncertainties. This could be done directly or by the imposition of a countercyclical add-on to capital charges on secured lending to boost haircuts/initial margins during up-cycles.
- 9.3 It is a matter of concern that the regulatory debate is taking place in the absence of a clear understanding of the precise function of collateral haircuts/initial margins but also without sufficient empirical data to confirm the scale of the role they may or may not have played in the recent crisis. Much of the data that is available comes from the US market. It is also very narrowly based, so that it is not necessarily representative even of that market. The academic literature based on this data therefore makes assumptions which may not be valid for even the US market and are arguably well wide of the mark for the European market. Nevertheless, the conclusions which have been derived have been uncritically accepted, possibly for want of anything else. But attempts to estimate the likely impact of changes in haircuts/initial margins on the liquidity of the European repo market between 2007 and 2009 suggest that they could have been only a minor cause of the deleveraging that took place over this period. This result seriously undermines the argument that repo is, by virtue of the dynamics of haircuts/initial margins, an inherently unstable source of funding.
- 9.4 On the other hand, it is reassuring that some regulators recognise that stable through-the-cycle haircuts/initial margins would be no panacea for the problem of market pro-cyclicality, and that there would be significant practical difficulties in implementing such haircuts/initial margins. In particular, it has been accepted that, even if haircuts/initial margins are mandated to remain stable over the business cycle, there are other lending terms that could be used to increase the availability of credit during periods of optimism and constrain credit during periods of deleveraging, with potentially some of the same pro-cyclical effects on financial markets as that of variable haircuts/initial margins.
- 9.5 Regulators also need to consider whether mandated minimum haircuts/initial margins can be sufficiently flexible to efficiently encompass the wide range of combinations of collateral, contract and counterparty that are possible in repo.

A policy of one-size-fits-all mandatory haircuts risks distorting the market and creating rigidities that will foster artificial arbitrages. As a matter of principle, concerns about excessive leverage would best be addressed at firm rather than transaction level, by the direct regulation of leverage, whatever its source.

- 9.6 Other proposals under discussion by regulators seem more helpful, such as encouragement of more frequent and efficient margin maintenance to smooth out collateral calls.
- 9.7 Market initiatives also have a role in play. These include the forthcoming publication by the ERC of revised margining guidelines and continuing industry education. Consideration might be given to the collection of further data on the structure and operation of the European repo market.

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