repo workshop

risk management

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THE BUSINESS SCHOOL FOR FINANCIAL MARKETS

risk management

- key policies for dealers
- initial margin v haircut
- margin maintenance (variation margining)
- default procedures
- failure to deliver

key policies for dealers

- legal analysis & robust up-to-date documentation
- accounting policy
- tax analysis
- credit risk management
  - counterparty eligibility
  - netting by bilateral or central clearing
  - confirmation/affirmation & exceptions management
  - credit monitoring, default & liquidation procedures
- collateral
  - collateral selection --- default risk, liquidity, wrong-way risk of collateral
  - inhouse or delegated (tri-party) management
  - initial margin/haircut & exposure thresholds --- potential future exposure (largely potential liquidation loss)
  - marking-to-market/model & variation margining --- current exposure
  - margin dispute management
  - income management
  - corporate event management

key policies for dealers

key policies

- transaction management
  - re-rating, variation & termination of open repos
  - substitution of collateral
- regulatory compliance
  - leverage limits
  - LCR & NSFR limits
  - short-selling requirements
  - best execution requirements
  - trading restrictions
- regulatory reporting
  - trade & general regulatory reporting
  - large exposures
  - transaction reporting
  - record-keeping & access

key policies for dealers

key policies

- settlement infrastructure
  - collateral & cash management
  - trade matching & exceptions management
  - fails monitoring & management
  - claims management
- dealing technology
  - order management
  - manual, automated or automatic execution
- revenue management

initial margin v haircut

- what makes good collateral?
  - default risk-free
  - liquid
    - easy to value
    - easy to liquidate
  - low wrong-way risk

usually government securities

- what if collateral is not so good?

initial margin v haircut

- initial margin/haircut is a risk adjustment to market value to fix a prudent purchase price by taking account of potential future losses due to liquidation of total holding of collateral, possibly in stressed market conditions

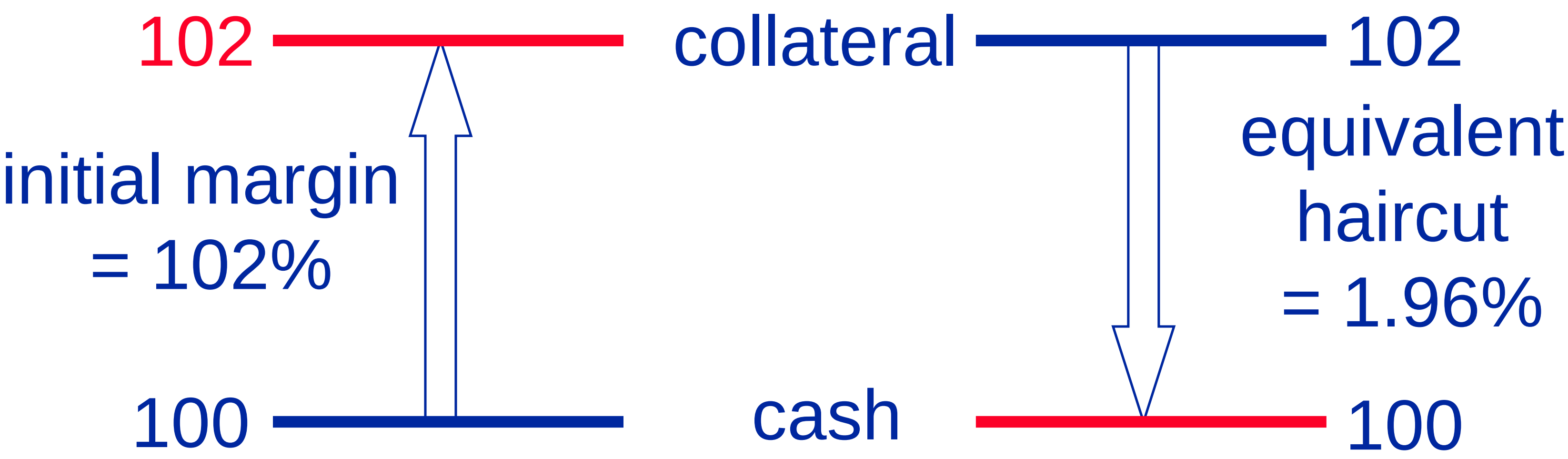
purchase price = market value – initial margin/haircut

- usually in favour of buyer --- overcollateralisation --- but undercollateralisation for high-quality sellers
- exposes other party to unsecured credit risk

initial margin v haircut

- initial margin --- if the collateral is calculated as a premium over the cash value
- haircut --- if the cash is calculated as a discount under the collateral value

initial margin v haircut



measured relative to 100 measured relative to 102

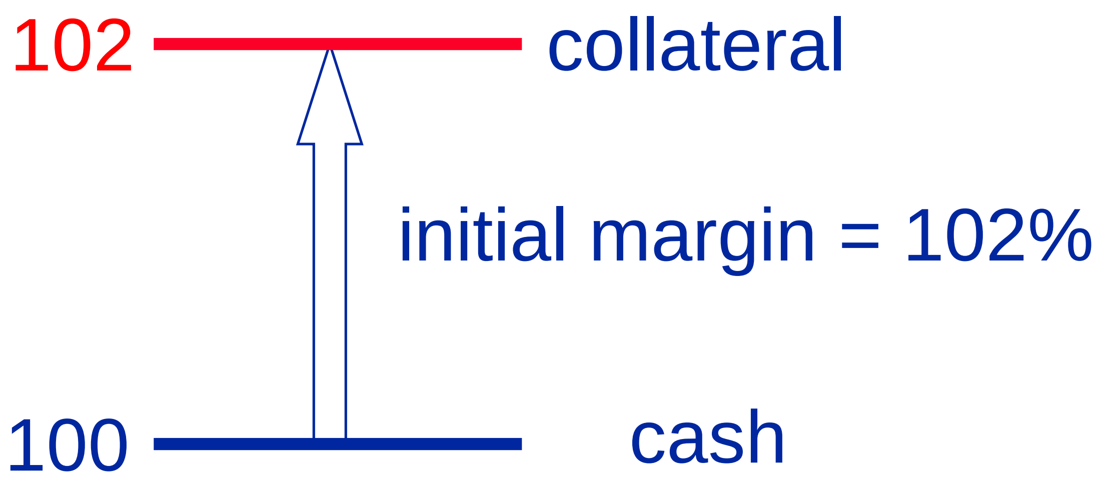
initial margin v haircut

initial margin in GMRA = Margin Ratio

$$\text{Margin Ratio} = \frac{\text{Market Value of Purchased Securities on T}}{\text{Purchase Price}}\ 100$$

$$\text{Margin Ratio} = \frac{102}{100}\ 100 = 102\%$$

collateral = cash x Margin Ratio = 100 x 102% = 102

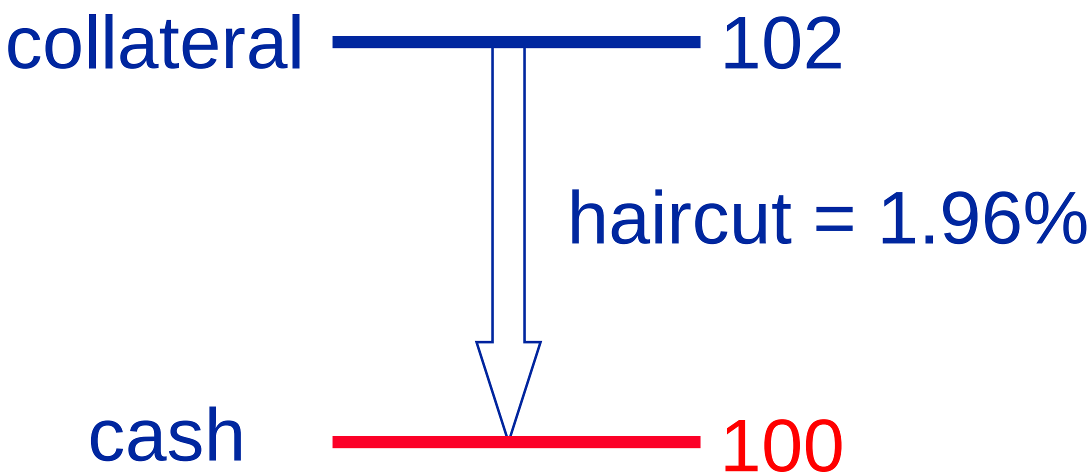


initial margin v haircut

haircut in GMRA 2011

$$\text{haircut} = \frac{\text{Market Value of collateral on Purchase Date – Purchase Price}}{\text{Market Value of collateral}}$$

$$\text{haircut} = \frac{102 - 100}{102} = 1.96\%$$



$$\text{cash} = \text{collateral} \times (1 – \text{haircut}) = 102 \times \left(1 - \frac{1.96}{100}\right) = 100$$

initial margin v haircut

definition of Transaction Exposure in GMRA

2(xx) --- two options:

- using Margin Ratio:
  option (A) $E = (R \times MR) - MV$
  where E = Transaction Exposure
  R = Repurchase Price
  MR = Margin Ratio
  MV = Market Value of Equivalent Securities
- using haircut:
  option (B) $E = R - V$
  where V = Adjusted Value of Equivalent Securities = MV (1 – H)

initial margin v haircut

initial margin --- application

Transaction Exposure = (RP x MR) – MV

RP = Repurchase Price on day of calculation
MR = Margin Ratio
MV = Market Value of collateral

- initial margin/Margin Ratio is applied to current value of <u>cash</u>

initial margin v haircut

initial margin --- application

Transaction Exposure = (RP x MR) – MV

RP = Repurchase Price on day of calculation = 101
MR = Margin Ratio = 102%
MV = Market Value of collateral = 99

Transaction Exposure = (101 x 102%) – 99 = 4.02

what collateral should be worth (103.02)

what collateral is actually worth

initial margin v haircut

haircut --- application

Transaction Exposure = RP – [MV x (1 – H)]

RP = Repurchase Price on day of calculation
MV = Market Value of collateral
H = Haircut

- haircut is applied to current value of <u>collateral</u>

initial margin v haircut

haircut --- application

Transaction Exposure = RP – [MV x (1 – H)]

RP = Repurchase Price on day of calculation = 101
MV = Market Value of collateral = 99
H = Haircut = 2%

Transaction Exposure = 101 – [99 x (1 – 2%)] = 3.98

what cash is actually worth

what cash should be worth (97.02)

initial margin v haircut

haircut

- GMRA 2000 only envisages initial margin (Margin Ratio)
- GMRA 2011 introduced as alternative to initial margin (Method A = initial margin; Method B = haircut)
- haircuts not extended to forwards under GMRA 2011

initial margin v haircut

- initial margin/haircut protects buyer against:
  - market liquidity risk of collateral when liquidating
    - price volatility between margin calls
    - market impact of liquidation
  - credit risk of issuer of collateral
  - wrong-way risk
  - exchange rate risk of cross-currency repos
  - operational risk (eg margining lag, margin delivery period, efficiency & speed of default procedure)
  - legal risk (eg legal challenges to liquidation)
  - inconsistency between variation margin & default valuation methodologies
- what about credit risk of counterparty?
- competition may erode or switch initial margin/haircut
- market power of buyer may increase initial margin/haircut
- market power of seller may reverse initial margin/haircut
- FSB/Basel minimum haircuts for uncleared repos in non-government securities with non-banks

margin maintenance (variation margin)

- repeated realignment (at least daily for banks) of market value of collateral & cash to restore initial margin/haircut
- if adjustment is by transferring additional cash or collateral to exposed party = variation margining
- primary aim is to eliminate current exposure (mark-to-market exposure)
- two-way process

margin maintenance (variation margin)

- party has right to call margin equal to or greater than its Net Exposure to other party
- oral or written notice
- no grace period (cf ISDA)

margin maintenance (variation margin)

- Net Exposure is the difference between the sum for each party of:
  - aggregate Transaction Exposure

    plus
  - Income due but unpaid

    minus
  - Net Margin
- all amounts to be converted to Base Currency

margin maintenance (variation margin)

Transaction Exposure [2(ww)]

- for example, assume:
  - Purchase Price = 100
  - original Market Value of Purchased Securities = 102
  - Margin Ratio = 102/100 = 102%
  - repo rate = 4%
  - original repo term = 31 days
  - remaining repo term = 7 days
  - Repurchase Price on day 24 = 100.267
  - current Market Value of Equivalent Securities = 101.50
- TX = (100.267 x 102%) - 101.50 = 0.77234 (Buyer exposed)

what collateral
should be worth
(102.27234)

margin maintenance (variation margin)

Market Value of collateral

- value at "generally recognised source agreed to by the parties"
- convert to Contractual Currency at Spot Rate
- convert to Base Currency at Spot Rate
- Market Value of suspended securities
  - zero for margin maintenance
  - otherwise, close on S-1
- particular transactions can be carved out from global calculation and margined separately

margin maintenance (variation margin)

Income

- due but unpaid compensatory payments
- does not include outstanding interest on cash margin

margin maintenance (variation margin)

Net Margin

- Net Margin = aggregate margin$_A$ - aggregate margin$_Z$
- both parties can beholding margin at the same time
- margin is usually calculated net for all repos outstanding between two parties & is not attributed to individual repos
- consequently, cash margin & margin securities held by one party are not automatically returned to other party on repurchase dates
- second party has to request return of previous margin when subsequently making margin call on first party
- need to monitor margin to ensure roll over

margin maintenance (variation margin)

Net Exposure

	A (your exposure)	**Z** (my exposure)
TX_1	0.772	
TX_2		0.359
TX_3	0.053	
aggregate TX	0.825	0.359
Income due	+0.010	+0.475
Net Margin		-0.150
gross exposures	0.835	0.684
Net Exposure	0.151	

- $gross_A$ = aggregate(TX_A) + Income due to A - Net Margin with A
- $gross_Z$ = aggregate(TX_Z) + Income due to Z - Net Margin with Z
- Net Exposure = $gross_A - gross_Z$

margin maintenance (variation margin)

making margin transfers & payments

- Margin Transfers can be in cash or securities or both
- decision usually at discretion of margin transferor
- except that caller can ask for return of previous margin transferred to other party but not returned
- cash margin paid in Base Currency, unless otherwise agreed in writing
- non-cash margin must be ‘reasonably acceptable’ to caller
- interest due on cash margin

margin maintenance (variation margin)

margin deadlines

- need to agree deadline for margin calls
- need to agree deadline for decision about margin allocation to be given
- agree delivery period for margin or it defaults to 'minimum customary period':
  - best practice for cash margin is T+0
  - best practice for collateral margin is also T+0 but most common European practice is T+1 or T+2

margin maintenance (variation margin)

special cash margin

- if seller fails to deliver on purchase date, he has to pay cash margin on Transaction Exposure of failed transaction
- if buyer fails to deliver on repurchase date, he has to pay cash margin on Transaction Exposure of failed transaction
- special cash margin would appears to be separate from calculation of Net Exposure in order to allow payment in cash

margin maintenance (variation margin)

Margin Percentage

2(aa) --- with respect to any Margin Securities or Equivalent Margin Securities, the percentage, if any, agreed by the parties acting in a commercially reasonable manner.

- haircut/initial margin on margin securities
- not possible in GMRA 2000

margin maintenance (variation margin)

what if receiver disputes margin call?

- no dispute resolution procedures in GMRA
- can you avoid disputes by listing acceptable or unacceptable securities?
- any implied term to act reasonably?
- could consider negotiating terms governing basis of valuation, eg requirement to act in commercially reasonable manner
- regulatory risks if margin disputes become frequent or protracted
- need efficient procedures:
  - send queries out promptly with grounds explained;
  - respond urgently with calculations;
  - rapid cross-checking;
  - if necessary, escalation to senior management

margin maintenance (variation margin)

common causes of margin disputes

- simple calculation errors
- differences in the internal rules being applied to margin calculations
  - parties may be using difference price sources to value securities
  - one party may include accrued interest in the Market Value of collateral only up to the margin calculation date, while the other may include accrued interest up to the margin delivery date (the latter is best practice
  - parties may differ in when they introduce new transactions into the margin calculation or when they drop maturing transactions

margin maintenance (variation margin)

when should transactions be added/removed to/from Net Exposure?

- current bilateral market practice in Europe is variation margining from purchase date: based on principle that collateral should hedge principal risk, whereas risk between transaction date & purchase date is replacement cost (market risk)
- GMRA provides for variation margin from purchase date:
- for forward repo, GMRA Annex I provides for variation margin or adjustment to purchase price or collateral to eliminate Transaction Exposure --- both from forward purchase date
- US & CCP practice is valuation from transaction date
- ICMA now recommends margining from transaction date: aspirational due to operational challenges facing firms
- requires amendment to GMRA

margin maintenance (variation margin)

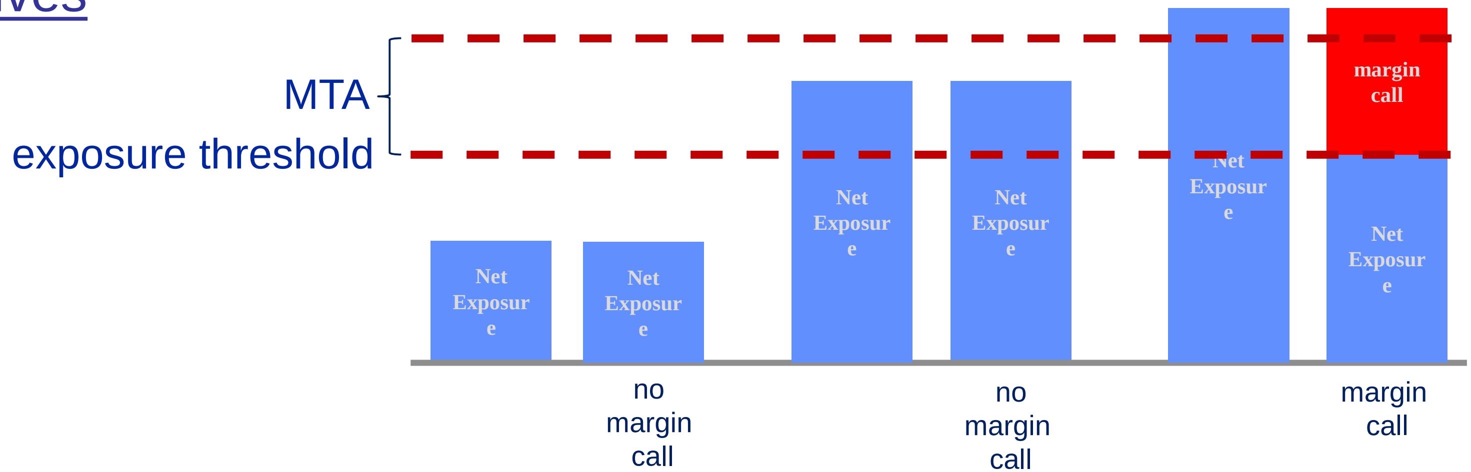
reducing operational burden of margining

- margin maintenance on repo documented under the same master agreement are made net
- margin calls can be limited to material changes in Net Exposure --- excess of an agreed amount called exposure threshold/minimum transfer amount --- when Net Exposure touches/passes threshold, margin call should eliminate whole exposure (different to threshold/MTA in derivatives)
- should be trade off between credit exposure & operational cost
- not in GMRA
- usually agreed reciprocal limit recorded in Annex I but consider ‘soft’ threshold/MTA
- include exposure under threshold in unsecured credit limits

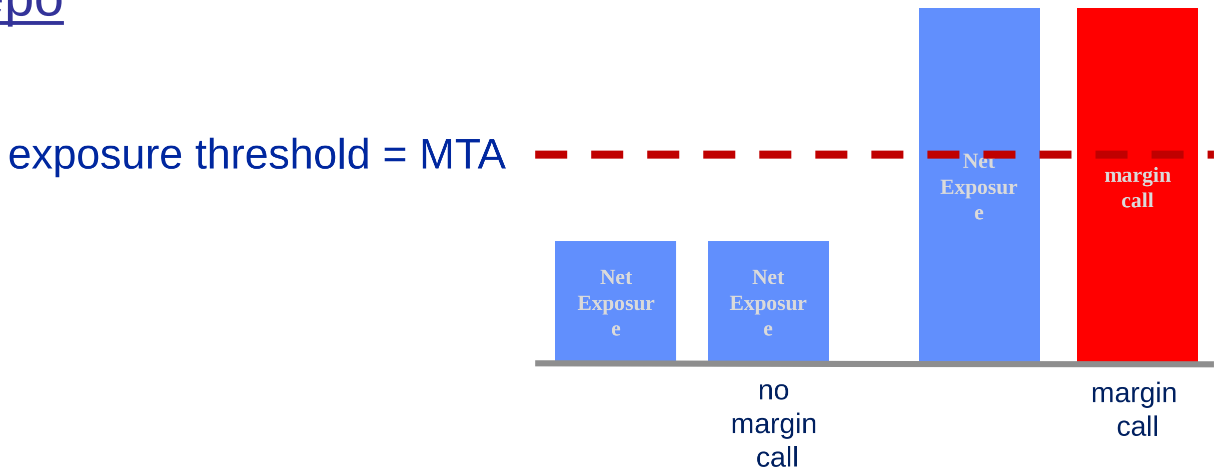
margin maintenance (variation margin)

exposure thresholds & minimum transfer amounts

derivatives



repo



default procedures

Events of Default

- occurrence of event of default releases non-defaulting party from having to perform its obligations to defaulting party when latter has or is about to become incapable of performing its mutual obligations

default procedures

Events of Default

standard events

(i) failure to pay purchase/repurchase price
(ii) failure to deliver collateral (optional)
(iii) failure to pay termination/mini close-out sums
(iv) failure to pay margin
(v) failure to pay compensatory payment
(vi) Acts of Insolvency
(vii) materially incorrect or untrue representations
(viii) admission of inability/intention not to perform
(ix) suspension/expulsion from self-regulatory organisation; suspension from dealing by regulator due to failure to meet any requirements relating to financial resources or credit rating
(x) failure to perform other obligations not remedied after 30 days notice by non-defaulting party

- all failures to pay cash or margin are Events of Default
- no cross-default clauses or credit triggers
- no illegality, disruption event, force majeure or merger clauses

default procedures

Acts of Insolvency

- making a general assignment to or entering into an arrangement with creditors
- action by a secured party not dismissed within 15 days
- becoming insolvent, being unable to pay or admitting in writing inability to pay
- not opposing the appointment of liquidator
- appointment of liquidator (optional Automatic Early Termination)
- winding-up petition (optional Automatic Early Termination)
- other petition for winding-up or relief not stayed within 15 days or proceedings by any Competent Authority
- convening meeting about voluntary arrangements

default procedures

Events of Default

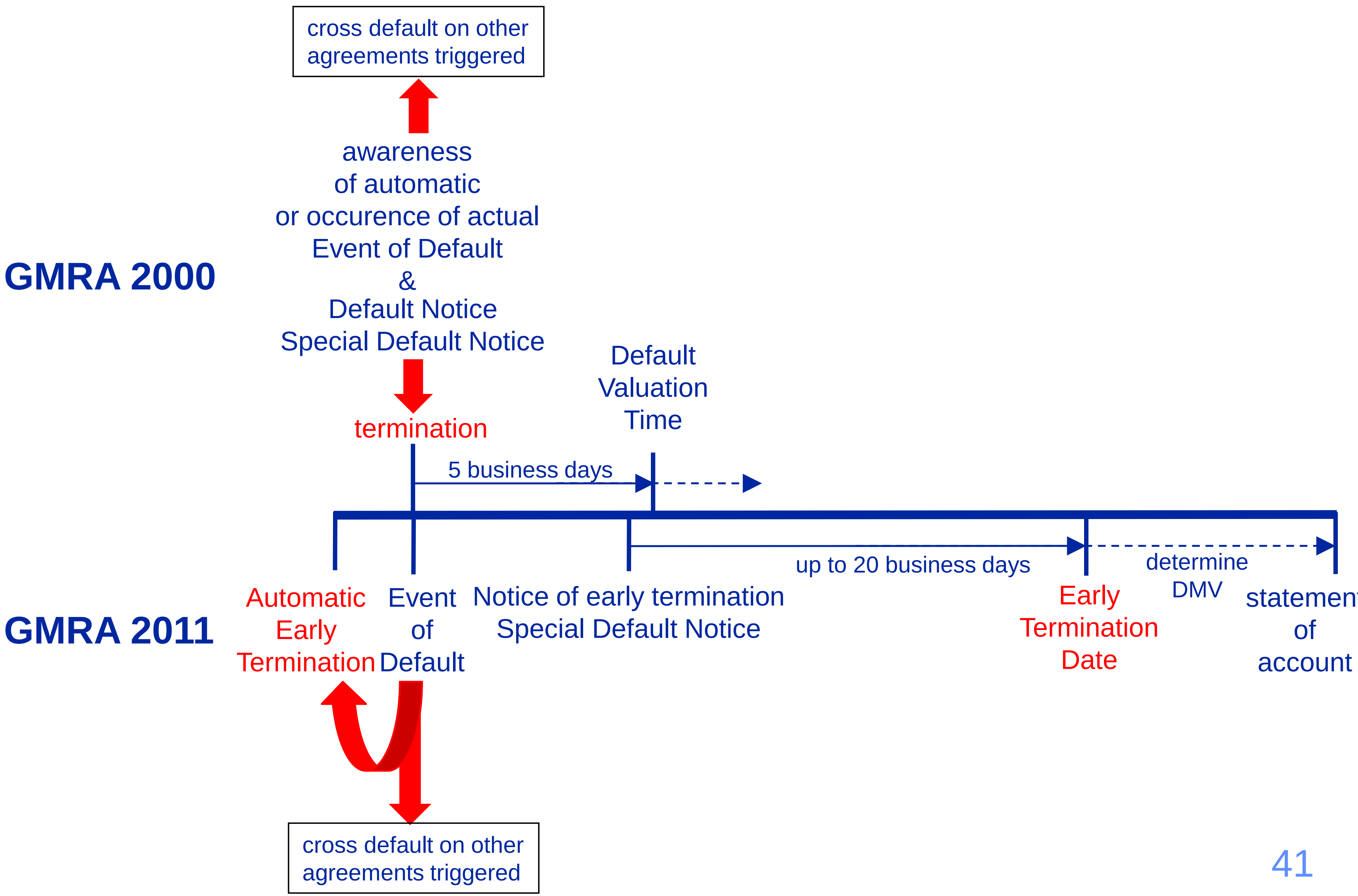
- **condition precedent**
  - you can opt to suspend performance of the contract if, but for service of Default Notice, counterparty would be in default ("flawed asset")
  - tested in ISDA dispute over whether one party could decline to put other in default but suspend performance to avoid having to pay close-out amount: courts allow indefinite suspension of performance
  - "long stop" clause adopted by ISDA & being considered by ICMA & ISLA
  - similar effect to "walk-away clause" (which is not permissible under Basel)
  - likely to be rejected in some jurisdictions

default procedures

close-out netting

- Automatic Early Termination is deemed to have occurred immediately preceding the occurrence of the event
- otherwise, non-defaulting party serves notice of no more than 20 days designating an Early Termination Date
- on the Early Termination Date:
  - Repurchase Dates occur immediately --- acceleration
  - margin to be repaid/returned immediately --- same effect as acceleration
  - non-defaulting party establishes Default Market Values, cash sums outstanding at new Repurchase Date --- conversion to monetary obligations
  - conversion to Base Currency
  - aggregation of accelerated amounts to single net obligation
  - as soon as reasonably practicable after calculation, non-defaulting party sends statement
  - balance due & payable next business day

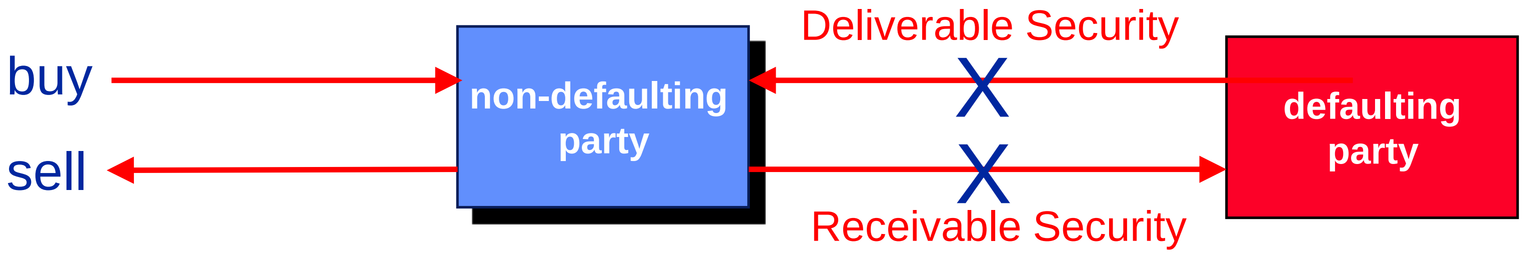
default procedures



default procedures

Default Market Value

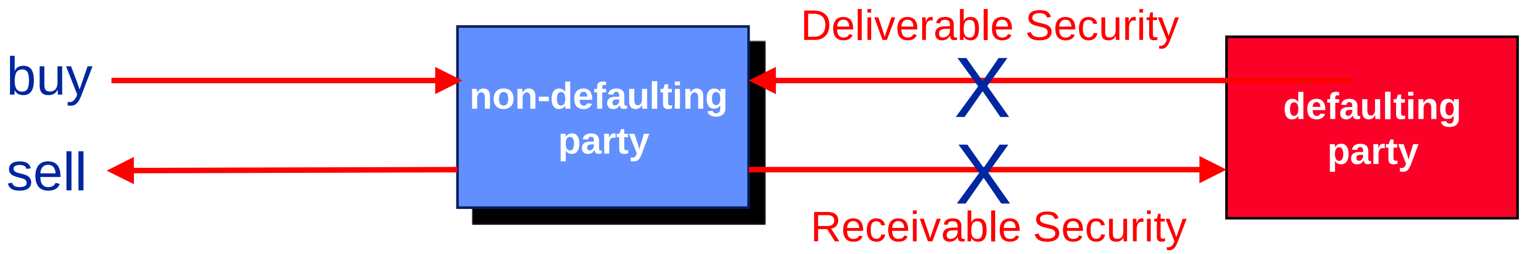
- collateral values can be calculated using:
  - option 1 --- actual dealing prices
    - sales/purchases between D and DVT
    - aggregate cost of Deliverable Securities bought
    - net proceeds of Receivable Securities sold
    - net of reasonable costs, fees, expenses
    - applied to whole or same amount of Equivalent Securities



default procedures

Default Market Value [10(e)]

- collateral values can be calculated using:
  - option 2 --- market quotes [10(e)(i)(B)]
    - offers for Deliverable Securities
    - bids for Receivable Securities
    - plus transactions costs including those reasonably anticipated
    - from 2 or more market-makers/regular dealers
    - in *commercially reasonable size*



default procedures

Default Market Value [10(e)]

- collateral values can be calculated using:
  - option 1/2 --- combination of actual dealing prices and market quotes
  - provide separate notices [10(e)(i)(A)]

default procedures

Default Market Value [10(e)]

- collateral values can be calculated using::
  - option 3 --- Net Value [10(e)(i)(C)]
    - if, *acting in good faith*, non-defaulting party has failed to:
      - buy/sell Equivalent Securities
      - obtain quotations
      - or it is not *commercially reasonable* to obtain market quotes
      - or it is not *commercially reasonable* to use market quotes
    - Net Value [10(d)(iv)]
      - fair market value based on appropriate pricing sources & methods
      - reasonable opinion of non-defaulting party
      - less Transaction Costs including those reasonably anticipated

default procedures

source of spot rate [2(ss)]

- unless agreed otherwise
- for para.10 (default, termination, mini close-out)
  - pricing source or quoting bank selected by non-Defaulting Party in London interbank market
  - at such dates and times determined by non-Defaulting Party
- all other purposes (eg margin)
  - latest available rate from agreed pricing source or quoting bank in London interbank market
  - if no agreement, selection by Buyer
  - on day of calculation or, if not a business day, at close on previous

default procedures

Default Market Value

- reasonable legal and other professional expenses arising from Event of Default
- plus interest at
  - Applicable Rate
  - for expenses attributable to a specific transaction, its Pricing Rate, if greater than LIBOR
- complete remedy
- no consequential loss or damages

default procedures

Applicable Rate

- interest payable by defaulting party on expenses --- choice of non-defaulter acting in a commercially reasonable manner
- interest payable on late payments --- by agreement in a commercially reasonable manner

default procedures

Default Market Value

- can also recover loss or expense of replacement transactions or (if reasonable) of unwinding/replacing hedging transactions
  - loss or expense to be determined in good faith by non-defaulting party
  - add all fees, costs, other expenses; deduct any profit on replacements
  - any net profit to defaulting party
  - decision to unwind/replace hedging transactions, instead of replacing the terminated transactions, must be reasonable

default procedures

general set-off

- non-Defaulting Party can set off post-default set-off amount against any other amount payable by Defaulting Party
  - actual or estimated
  - current, future or contingent amount
  - under any agreement, instrument or undertaking
  - any currency, place of payment, booking office
  - no pledge created
- without prejudice to rights of set-off
- achieves same result as walk-away clauses
- may be rejected in some jurisdictions

failure to deliver collateral

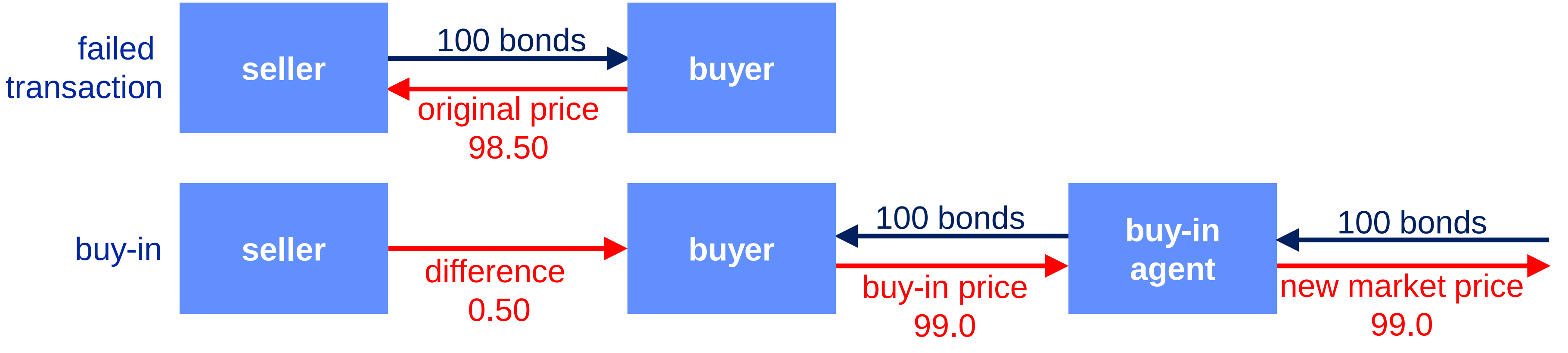
failure to deliver collateral

- non-delivery of collateral
- delayed delivery of collateral
- delayed intra-day delivery of collateral
- partial delivery of collateral
- cash or repo transactions
- at purchase or repurchase

failure to deliver collateral

remedies in cash market

- Section 450 of ICMA Rules & Recommendations (amended April 2017) --- buy-in/sell-out
- 4-10 days notice
- failed party buys/sells security or appoints agent to do so
- extra costs & execution costs passed to failing party
- if buy-out not possible, parties can agree cash or other settlement
- partial buy-ins not to leave untradeable balances



failure to deliver collateral

remedies for fails in repo

- event of default under GMRA 1992
- not an event of default under GMRA 1995
- optional event of default under GMRA 2000
- optional event of default under GMRA 2011

failure to deliver collateral

non-default remedies for fails

- **purchase date**
  - buyer holds back/reclaim purchase price or call cash margin
  - buyer has right of early termination
    - to be served in writing, at any time
    - seller pays RP - PP = repo return accrued to termination date [10(g)(iii)]
  - wait to repurchase date
    - seller pays RP – PP = full repo return [10(g)(iii)]
    - penalty on failing party, compensation to failed party
  - no grace period (cf ISDA)
  - seller has to pay special margin in cash on any exposure to a failed transaction [10(g)(ii)]

failure to deliver collateral

- **zero repo rates** --- RR-PP = 0 --- penalty disappears
- **negative rates** --- RP-PP < 0 --- penalty becomes perverse incentive to seller to fail

failure to deliver collateral

ICMA recommendation on negative rates

- buyer can terminate repo at any time
- negative repo rate set to zero at failure until late delivery
- agree trade by trade
- or renegotiate to include in master agreement
- or sign GMRA 2011

failure to deliver collateral

non-default remedies for fails

- **repurchase date**
  - seller holds back/reclaims repurchase price or calls cash margin
  - no grace period (cf ISDA)
  - buyer has to pay special margin in cash [10(h)(ii)]
  - mini close-out on failed transaction on any exposure to a failed transaction [10(g)(ii)]
    - seller has right of termination (to be served in writing, at any time)
    - buyer pays Default Market Value – final RP [10(h)(iii)]
    - close-out notice
    - too expensive to use in European government bond repo market

failure to deliver collateral

compensatory payments after fail under GMRA 2011

- para.5(a)(ii)
- obligation to make compensatory payment continues after failure to deliver on the Repurchase Date, if an Income Payment Date occurs before late delivery or termination

failure to deliver collateral

failure to return margin securities when requested

- due to market or clearing system
- after making all reasonable efforts
  - pay Cash Margin at least equal to Market Value
  - no interest, unless agreed
- on or after two Business Days
  - notice to Transferor
  - pay Cash Equivalent Amount = Default Market Value on effective date of notice (include in Net Margin)
  - Default Market Value > Margin
  - cannot then require return of margin securities
  - margin consequence

failure to deliver collateral

measures to reduce the economic impact of fails

- shaping --- breaking up large settlement instructions into smaller tickets to minimise economic impact of a fail
- partialling --- agreement of buyer to accept incomplete deliveries but without relieving seller of legal obligation to deliver full amount