Mitigating risks in the Eurosysterm’s monetary policy operations

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Outline

1 Introductory remarks
2 Overview of risks & operations
3 Risk measurement & reporting
4 Outright purchases risk control framework
5 Reverse transactions risk control framework
   i Eurosystem Credit Assessment Framework (ECAF)
   ii Valuation
   iii Haircuts
Outline

1. Introductory remarks
2. Overview of risks & operations
3. Risk measurement & reporting
4. Outright purchases risk control framework
5. Reverse transactions risk control framework
   i. Eurosysterm Credit Assessment Framework (ECAF)
   ii. Valuation
   iii. Haircuts
1. Introductory remarks

What are the types of financial risks?

- Equity price risk
- Interest rate risk
- Spread risk
- Credit risk
- Gold price risk
- Foreign exchange risk
- Liquidity risk

Financial risk
Why is the management of financial risks important?

Central bank revenues can be seen as public funds (dividend distribution policy)

The mismanagement of risks could affect the credibility and reputation of the central bank (a key asset)

Mitigate potential distortions and risk transfers in the market that may arise from central bank operations otherwise

Financial independence requires a sound financial position and not relying on capital injections by the Treasury
1. Introductory remarks (cont.)

Who is responsible for the management of financial risks (at the ECB level)?

- Directorate of Risk Management (D-RM)
- Analysis Division (RAN)
- Strategy Division (RST)
- Secretariat & Administrative Support
What are the major domains and tasks in financial risk management?

1. Financial risk framework
   Setting the relevant risk management frameworks (e.g. FRM, ECAF)

2. Financial risk identification
   Identifying potential risks based on exposures, trends, regulatory and environmental changes

3. Financial risk measurement and modelling
   Design/select appropriate measure or assessment methodology to quantify exposures to risk

4. Financial risk monitoring
   Select monitoring methods and set frequency (e.g. early warning indicators, limits)

5. Financial risk management
   Assessment of the materiality of risk and impact, ensure mitigation actions and escalate risks

6. Financial risk reporting
   Generate, validate and communicate standardised risk reports for internal & external purposes
Overview of a typical risk management cycle

1. Introductory remarks (cont.)

- Risk capacity/tolerance
- Risk aversion
- Risk man. Maturity
- Risk culture

- Definition of roles
- Reporting lines
- Policies
- RMC
1. Introductory remarks (cont.)

Guiding ‘principles’ underpinning financial risk management

1. Risk efficiency and protection: enabling the achievement of policy objectives with the lowest possibly risk, striving to align the risk-taking and the Eurosystem’s risk appetite

2. Risk equivalence and consistency: promoting a level playing field across assets and financial markets, and ensuring a sufficient level of consistency across central bank operations

3. Robustness: provide adequate protection over the economic cycle

4. Objectivity and timeliness: monitoring and reporting risk in an objective, consistent, reliable and timely way, based on generally recognised risk identification and estimation methods

5. Clarity: ensuring the necessary degree of clarity, transparency and simplicity to facilitate accountability among all stakeholders
Risk efficiency, risk equivalence and policy-making

**Financial perspective**
- maximise return per unit of risk (or minimise risk per expected unit of return)
- diversified asset allocation and due diligence to minimise idiosyncratic risks, and
- adequate (market) pricing to compensate (systematic) risks and ensure a fair (equivalent) reward
- for a given reward (e.g. interest rate) risk controls should ensure residual risks are similar

**Policy perspective**
- maximise policy impact per unit of risk (or minimum risk per policy impact)
- asset allocation largely determined by policy considerations
- diversified allocation and adequate pricing mitigate risks while potentially contributing to positive policy impact
- a fair treatment of assets and counterparties within the policy boundaries minimise unintended market impacts (distortions)
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1 Introductory remarks

2 Overview of risks & operations

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5 Reverse transactions risk control framework

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ii Valuation

iii Haircuts
2. Overview of risks & operations

Typology of monetary policy operations

- Open market operations
  - Reverse transactions
  - Outright transactions
  - Issuance of ECB debt certificates
  - FX swaps
- Standing facilities
  - Deposit facility
  - Margin lending facility
  - Collection of fixed-term deposits

Eurosistem monetary policy operations (MPOs)
Purchase programmes/outright purchases

• **Outright transactions** are operations where the Eurosystem buys or sells eligible assets outright in the market.

• The Eurosystem is **directly exposed** to credit, market and liquidity risks.

• For each **purchase programme**, a risk control and governance framework is in place determining the asset type specific eligibility and surveillance.

• During the **reinvestment phase**, the same risk management concerns keep valid.
Credit operations/reverse transactions

- Eurosystem should provide loans to **financially sound** counterparties against **adequate collateral**

- **Counterparty credit risk**
  - Loan not redeemed at maturity due to default

- **Collateral risk** in case of counterparty default stemming from:
  - Liquidation risk
    - adverse movement in price caused by liquidation of a large position
  - Market risk
    - adverse movement in price between last valuation and realisation
  - Credit risk
    - adverse movement in price due to deterioration of credit quality
    - default of collateral
2. Overview of risks & operations (cont.)

Sequence of events in case of a counterparty default

- Counterparty default
- Collateral pool liquidation
- Collateral default?
  - Yes
    - Collateral recovery rate
  - No
    - Price change
      - Interest rates/spreads/FX changes
    - Credit migration
      - EAD: nominal collateral value

EAD: nominal collateral value
Risks in reverse transactions illustration

Source: ECB
2. Overview of risks & operations (cont.)

Typology of financial risks

Financial risks in MPOs

- **Credit risk**
  - losses arising from ‘credit events’
  - Default risk
  - ‘Rating migration’ risk

- **Market risk**
  - risk due to changes in market prices (unrelated to credit events)
  - Interest rate risk
  - Spread risk

- **Liquidity risk**
  - losses from liquidation of positions if market cannot absorb them
  - Price impact from liquidation (if positions are closed quickly)
  - Not liquidating the position might result in market and credit related losses
Developments in the Eurosystem’s balance sheet & implications for risk management...

- The financial crisis has led to CBs expanding MPOs and introducing a number of non-standards measures.
- As a consequence, financial risk has grown on CB’s balance sheet and an increased demand for analysis of the risk implications of policy decisions and their consistency with the risk tolerance of the decision makers.
- Significant efforts have been made to define the role and scope of the risk management function and ensure that organisation and governance of the function are consistent with ‘best practices’.
2. Overview of risks & operations (cont.)

... as a consequence of bold policy decisions

Non-standard instruments spanning the period 2012 - 2018

- Outright Monetary Transactions (OMT)
- Targeted Long-Term Refinancing Operations (TLTRO)
- Covered Bond purchase programme 3 (CBPP3)
- Corporate sector purchase programme (CSPP)
- ABS purchase programme (ABSPP)
- Public sector purchase programme (PSPP)
- Negative Interest Rates
- TLTRO II
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
2. Overview of risks & operations (cont.)

The Eurosystem’s balance sheet over recent years

![Graph showing the Eurosystem's balance sheet over recent years, with various categories such as Monetary Policy Programmes, Non Monetary Policy Assets, Longer-term Refinancing Operations, Refinancing Operations, Gold, Net Equity, Non Monetary Policy Liabilities, Current Accounts, and Banknotes. The x-axis represents years from 2000 to 2018 Q2, and the y-axis represents EUR Trillion.]
2. Overview of risks & operations (cont.)

Evolution of marketable assets eligible as collateral

Source: ECB
Use of collateral by AT and outstanding credit

Source: ECB
Reinvestment phase purchases evolution
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5 Reverse transactions risk control framework
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   ii Valuation
   iii Haircuts
### A joint model for market and credit risk

**Integrated model comprising 3 ‘blocs’**

<table>
<thead>
<tr>
<th>[1]</th>
<th>[2]</th>
<th>[3]</th>
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<tbody>
<tr>
<td>a multi-factor model for joint credit quality migrations and defaults (CreditMetrics)</td>
<td>a model for the dependency of changes in market variables on the credit factors in [1]</td>
<td>a model for the dependencies between the changes in market variables unexplained by the credit in [2]</td>
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<tr>
<td><strong>Explained variables:</strong></td>
<td><strong>Explained variables:</strong></td>
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<tr>
<td>log distance-to-default of each (ultimate) issuer</td>
<td>changes in yield curves and rating-specific spread curves; log-changes in the price of gold, exchange rates, securities’ prices, equity indices</td>
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**Forward rating states for all assets**

The cash-flows of each asset are discounted in each scenario with the rating specific forward curve corresponding to the simulated rating of the asset in that scenario.

**Forward risk-free curves and rating-specific spread curves**

**Return distributions are derived as the difference between the simulated price distribution, and the deterministic beginning-of-horizon price**

**Expected shortfall at the 99% CL**

**Scenario generator**

**Pricing**
Risk measures and scenario analysis

Value at Risk 99% 1-year horizon (VaR99%)
- What is the **maximum loss not exceeded at a 99% CL** over one year (only 1 out of 100 scenarios could be worse)
- **Percentile** of the loss distribution

Expected Shortfall 99% 1-year horizon (ES99%)
- What would be the **expected loss in the worst 1%** of the cases
- ‘Average’ loss beyond percentile/VaR

Scenario analysis/stress test
- **Conditional losses** (or risks): Losses (or risks) expected in the case a certain (adverse) scenario materialises
Internal & public risk disclosure

- **Timely and accurate communication** with the relevant internal stakeholders in order to better supporting decision-making regarding monetary policy implementation.

- **Effective communication** with the citizens of Europe reinforces credibility, trust, transparency and accountability, hence supports monetary policy.

- **Channels** used:
  - Annual Report
    - ECB annual accounts and accompanying management report
    - Annual reports and accounts of the NCBs
  - Contributions to ECB Monthly/Economic Bulletin
  - *Ad hoc* publications
  - ECB website
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3. Risk measurement & reporting
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i. Eurosysteem Credit Assessment Framework (ECAF)
ii. Valuation
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Risk mitigation in outright purchases

• **Asset-type specific eligibility**, analysis and surveillance
  – Specific framework for each purchase programme considers the specific features of the asset type
  – Purchase of assets of **sufficient credit quality**, i.e. eligibility as collateral according to the Eurosystem credit assessment framework (ECAF) for monetary policy operations plus asset-class specific requirements
  – Credit risk assessment/due diligence **prior to purchase** for covered bonds and ABS

• **Pricing framework**
  – Purchase at market price / fair value
  – Pre/Post-trade checks on transaction prices
4. Outright purchases risk control framework (cont.)

Risk mitigation in outright purchases

• **Exposure management** to ensure some degree of diversification
  – Definition of **benchmarks**, i.e. the allocation of assets to be purchased
  – Definition of **issue and issuer limits** to reduce concentration risk and avoid interference with Collective Action Clauses (CACs) in case of debt restructuring

• **Close monitoring** and **due diligence** of all reinvestments (incl. news, financial developments) and possible deviation from benchmarks and in case of need implementation of additional risk control measures

• **Manage risks** to keep them at levels that do not threaten the Eurosystem capacity to fulfil its policy mandate to maintain price stability
4. Outright purchases risk control framework (cont.)

Elements of the RCF for purchase programmes

**Eligibility criteria for the reinvestment phase:**
- minimum credit quality thresholds (ECAF Credit Quality Step 3 or equivalent based on exceptions)
- additional safeguards + policy constraints define programme-specific eligibility requirements

**Pricing framework**
- Price checks and safeguards for adequate market-price formation mechanism
- Portfolio valuation

**Asset allocation policies**
- Diversification (market capitalisation or capital-key based) - Benchmarks

**Credit risk assessment and due diligence**
- Prior to purchases
- Ongoing monitoring
- Impairment tests

**Risk analysis to ensure compliance with risk tolerance**
- prior to decision
- ex-post risk monitoring

**Limit system**
- Issue limits
- Issuer (group) limits
- Ad-hoc limits

**4th ECB Central Banking Seminar**
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   i. Eurosystem Credit Assessment Framework (ECAF)
   ii. Valuation
   iii. Haircuts
Collateral must be of quality and quantity such that the Eurosistema claim is recovered in full with high probability in the event of a counterparty default.
# Eurosysterm Credit Assessment Framework (ECAF)

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<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Introductory remarks</td>
<td></td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Overview of risks &amp; operations</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Risk measurement &amp; reporting</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Outright purchases risk control framework</td>
<td></td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Reverse transactions risk control framework</td>
<td></td>
</tr>
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<td>i</td>
<td>Eurosysterm Credit Assessment Framework (ECAF)</td>
<td></td>
</tr>
<tr>
<td>ii</td>
<td>Valuation</td>
<td></td>
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<tr>
<td>iii</td>
<td>Haircuts</td>
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</tr>
</tbody>
</table>
ECAF scope and elements

- Defines procedures, rules and techniques ensuring that the Eurosystem requirement of **high credit standards** for all eligible assets is met.
- Four **credit assessment systems** (CASs) are considered in the ECAF general framework (and temporary framework):
  - External Credit Assessment Institutions (ECAIs) [4]
  - National Central Banks’ in-house credit assessment systems (ICASs) [8+1]
  - Internal Ratings-based (IRB) systems [39 (15)]
  - Third-party providers’ rating tools (RTs) (3)
5. Reverse transactions risk control framework (cont.)

Reducing reliance on ECAI

Overview of ICASs in the Eurosystem

Scope non-financial corporations (NFCs)

NCB-specific PD model only or ICAS for MBPNs

For the yearly ECAF performance monitoring

ECB’s D-RM assesses the system performance, methodological changes and validation performed by the NCBs for their ICASs
ECAF principles and objectives

• Consistency
  – Wide range of equally ranked credit quality assessment systems need to be available throughout the euro area

• Accuracy
  – Credit assessment systems will have to estimate accurately the credit risk of issuers/debtors of collateral

• Comparability
  – The comparison and monitoring of the different systems that comprise the framework must be possible

• Two main technical ‘tools’ were defined to guarantee the last two principles
  – Minimum credit quality requirements
  – Performance monitoring framework
Minimum credit quality requirement

- Eurosysterm maps rating grades of credit assessment systems onto a **harmonised credit assessment scale**
- Eurosysterm minimum **credit quality requirement** is CQS3
  - One-year PD of 0.40% following Basel II default definition
  - Additional requirements for ABS
  - CQS2 required for RMBDs
- **Assets in CQS1&2 benefit of lower haircuts**

<table>
<thead>
<tr>
<th>Horizon</th>
<th>ECAI credit assessment</th>
<th>Credit quality step</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>1</td>
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<tr>
<td>Long-term</td>
<td>DBRS</td>
<td>AAA/AAH/AA/AAL</td>
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<td></td>
<td>FitchRatings</td>
<td>AAA/AA+/AA/AA-</td>
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<td>Moody’s</td>
<td>Aaa/Aa1/Aa2/Aa3</td>
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<td>Standard &amp; Poor’s</td>
<td>AAA/AA+/AA/AA-</td>
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<tr>
<td></td>
<td>DBRS</td>
<td>AH/A/AL</td>
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<td>A1/A2/A3</td>
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<td>A+/A/A-</td>
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<tr>
<td></td>
<td>DBRS</td>
<td>BBBH/BBB/BBBL</td>
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<td></td>
<td>FitchRatings</td>
<td>BBB+/BBB/BBB-</td>
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<td>Moody’s</td>
<td>Baa1/Baa2/Baa3</td>
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<td>Standard &amp; Poor’s</td>
<td>BBB+/BBB/BBB-</td>
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<td>Short-term</td>
<td>DBRS</td>
<td>R-1H, R-1M</td>
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<td>FitchRatings</td>
<td>F1+, F1</td>
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<td>Moody’s</td>
<td>P-1</td>
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<td></td>
<td>Standard &amp; Poor’s</td>
<td>A-1+, A-1</td>
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Source: ECB
Performance monitoring framework

- **Monitoring** and **regular assessment** of performance of credit assessment system with ‘traffic light approach’
  - Quantitative statistical component
    - **back-testing** procedure on **static pools** to check **appropriateness of mapping**
  - Qualitative component
    - **Processes** and **methodologies** taking also into account **supervisory information**
- Set of ‘tools’ to **prevent mechanistic reliance** on any system and to address any issue
  - Remap a system’s rating grades to the harmonised rating scale
  - Define eligibility requirements to credit assessment systems
  - Discretionary measures
  - Exclude or temporarily suspend a system
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i Eurosysten Credit Assessment Framework (ECAF)
ii Valuation
iii Haircuts
5. Reverse transactions risk control framework (cont.)

Eurosystem valuation principles

- Daily **marking-to-market** of all eligible marketable assets
- **Minimise possible interferences** with the market price formation process
  - Most representative market prices on previous business day
  - Theoretical valuation for assets without market price
- **Theoretical valuation**
  - Crucial when markets become dysfunctional because of the ‘evaporation’ of market liquidity
  - Eurosystem currently improving these capabilities in integrated valuation framework combining mark-to-market and mark-to-model approaches
Valuation by asset type

• Marketable assets
  – Implementation via **Common Eurosystem Pricing Hub** (CEPH)
    • Banque de France valuing ABS
    • Deutsche Bundesbank valuing all other assets

• Non-marketable assets
  – NCB assigns value based on theoretical price or **outstanding amount**
    (default approach)

Higher haircuts for valuation based on outstanding amount to take into account present value adjustment
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1. Introductory remarks
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   3. Haircuts
Haircuts

- Haircuts are **not differentiated by counterparty** to maintain a **level playing field** among market participants.

- Haircuts on **an asset-by-asset basis** not adjusting to the diversification or concentration of the collateral pool.

- Possibility to apply additional **discretionary haircuts**.

- Pursue **ex ante risk equivalence** across all financial instruments:
  - ‘Calibration’ using an ES at a 99% CL across all assets classes and ‘through-the-cycle’
Desirable features

- Need to cover various **sources of risk** between default of counterparty and liquidation *inter alia*:
  - Credit risk
  - Market risk

- **Rule-based** and **simple** approach
  - Haircuts set by asset categories, credit quality and residual maturity

- **Liquidation time**
  - Assumed to be the shortest possible but without impact on price
  - Based on observed market liquidity and historical average collateral pledging behaviour
Elements of the RCF for credit operations

Counterparties need to comply with regulatory ratios
- Broad set of counterparties
- Supervised under harmonised EU/EEA standard
- Discretionary powers to suspend counterparties on grounds of prudence
- Separation of supervision of monetary policy, but still allows reaping some benefits on need-to-know basis

Collateral eligibility
- Wide range of eligible collateral
- Requirements mitigate credit, legal and operational risks, and result from cost-benefit analysis (risk equivalence, risk protection, collateral availability)
- Focus on simple and transparent debt instruments
- No close-links (collateral / counterparty) with few justified exceptions (secured and guaranteed collateral)
- Minimum credit quality based on ECAF (CQS3 as a rule)
- Discretionary exclusion (on grounds of prudence)

Collateral valuation
- Mark-to-market (or model) valuation for marketable assets
- Nominal valuation for non-marketable

Collateral valuation haircuts
- for liquidation, valuation, market and credit risks
- based on ES99% measure
- Assets grouped into haircut categories

Limits
- Concentration limits (bank bonds)
Thank you for your attention!
Appendix
A1. Further readings

Useful references and links


## Changes in the collateral framework since 2007

<table>
<thead>
<tr>
<th>Frameworks</th>
<th>Major features</th>
<th>Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>General credit risk (*)</td>
<td>Lowering of rating threshold to CQS3 without additional criteria</td>
<td>Temporary Non-loss shared</td>
</tr>
<tr>
<td>Loss-shared additional ABS</td>
<td>Lowering of rating threshold to CQS3 (second-best rating), additional criteria regarding structure and underlying pool, additional financial close link restriction</td>
<td>Temporary</td>
</tr>
<tr>
<td>Additional credit claims (ACCs) (*)</td>
<td>Individual and pools of ACCs (extended to March 2021)</td>
<td>Temporary Non-loss shared</td>
</tr>
<tr>
<td>Certain short-term debt instruments</td>
<td>Tradable, although economically equivalent to credit claims (only used in PT)</td>
<td>Temporary Non-loss shared</td>
</tr>
<tr>
<td>Non-euro denominated assets</td>
<td>Foreign currency marketable debt instruments denominated in USD, GBP &amp; JPY from issuers established in the EEA</td>
<td>Temporary</td>
</tr>
<tr>
<td>Derrogations for own-use of GGBBs (*)</td>
<td>Bank bonds with a state guarantee</td>
<td>Temporary Non-loss shared</td>
</tr>
<tr>
<td>Rating waiver (*)</td>
<td>Certain marketable instruments in countries under assistance programmes (conditional to ‘on track’ assessment)</td>
<td>Non-loss shared</td>
</tr>
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</table>

(*) Quantitatively more relevant.
Risk components and risk control measures

- **Liquidity risk**
  - Exchange rate risk: 16% valuation markdown on assets denominated in USD, GBP, CHD, CAD, AUD and 26% markdown on assets denominated in JPY.
  - Only applicable to foreign-currency denominated assets issued within the European Economic Area (temporary measure).

- **Market risk**

- **Credit risk**
  - Close-link risk: 8% valuation markdown for assets in credit quality step 1 & 2 and 12% for assets in credit quality step 3.
  - Only applicable to retained covered bank bonds.

- **Other risks**
  - Theoretical valuation risk: 5% valuation markdown.
  - Only applicable to theoretically valued assets (asset-backed securities (ABSs), covered and uncovered bank bonds).
Other risk controls

- Additional markdowns and limit
  - Valuation model risk
  - FX risk
  - Close links in retained covered bonds
  - Concentration limit
    - Unsecured debt instruments issued by credit institutions and their closely linked entities limited to 2.5% of total value after haircut of collateral pool

- Current haircuts range between 0.5% (most liquid short-term marketable asset) and 63% (most risky eligible non-marketable asset)