Application Memorandum for

REGULATORY AUTHORISATION

Collateral Management Framework

MARCH, 2023

EURONEXT CLEARING

TABLE OF CONTENTS

Executive Summary

The objective of this document is to support the regulatory review and approval process with respect to EURONEXT CLEARING (from now on addressed as "ENXC") Collateral Management framework, by providing an overview of all ENXC's proposed amendments and expected changes.

Changes and amendments to the existing collateral framework are related to two distinct phases. A first phase, around October 2023 where the changes described in this document will be applied to ENX legacy cash markets; a second phase, around June 2024 when new additional changes (that will be part of a distinct art.49 assessment) will be implemented.

With regards to the changes of the first phase (that are in scope of the present art.49 submission), the set of eligible collateral is extended considering new limits to ensure that posted collateral is highly liquid, new eligible securities and new wrong-way-risk multipliers to be applied to the haircuts. Out scope of the current document are the haircut methodology and diversification limits, which remain unchanged.

The document in organized in the following sections:

- Service Description, which describes the intended changes to be implemented to the existing collateral risk framework and the proposed timeline for their implementation;
- Internal governance approval, where a description of ENXC internal approval process with respect to the collateral framework is provided (e.g. haircuts periodical approval, wrong-way-risk multipliers revision, etc.). No changes are expected compared to current framework;
- CCP self-assessment on the significance of the proposed changes under article 49 of EMIR;
- Comprehensive Risk Assessment, which details the main implications of the new collateral systems on aspects such Systems and Processes, Operational Risk and Compliance;

2. Service Description

2.1 General Overview

ENXC accepts non-cash collateral from Clearing Members to cover their margin requirements. Non-cash collateral is subject to specific limits, as it will described in the following sections.

The effectiveness of non-cash collateral accepted by ENXC depends on the selection of appropriate assets qualified as eligible collateral, with the objective to reduce credit risk exposure and market risk.

Since certain collateral types may present inherent risks related to price volatility and liquidity of the asset, appropriate eligibility criteria have to be set before accepting a security as collateral.

Under the current collateral framework, which is subject to change according to the amendments presented in this document, Clearing Members are entitled to deposit cash or bonds to cover Initial Margins while to cover the Contribution Quota to the Default Fund, only cash is admitted.

As already anticipated, amendments to the existing collateral framework will happen in two distinct phases.

Phase 1: around October 2023 where the changes described in this document will be applied to ENX cash legacy markets only[1].

Related amendments:

- High liquid bonds denominated in € for IM only, EOD and ITD (with the exclusion of variations margins on futures and option premiums for which only € cash is accepted) with specific diversification limits and ad-hoc limits. ENXC considers the ECB list of eligible assets which is then restricted by applying several criteria based on a set of variables including: issuer, country, asset type, currency, liquidity, instrument optionality, reference market. The list of accepted bonds will be expanded also to non-MTS bonds subject to specific liquidity criteria. Securities collateral can be granted to the CCP following Full Title transfer only: securities are deposited in the CCP collateral account in Euronext Securities Milan (ESM) for assets eligible in ESM or in Euroclear Bank (EB) for assets non eligible to ESM;
- Wrong Way Risk based on the Clearing Member's country of risk/country[2]: wrong-way-risk multipliers to the haircuts will be applied taking into account the couple Issuer country/depositing participant country of risk;
- Collateral Evaluation – Dirty Price: the valuation of fixed-income securities posted as collateral will be based on dirty-price instead of clean-price.

Phase 2: The second phase will take place contextually to migration of Euronext Derivatives legacy markets to ENXC.

[1] In the interim period, which is expected to range from the migration of Euronext legacy markets to ENXC up to the fourth quarter of 2024, Borsa Italiana and Euronext legacy markets will be managed through two distinct clearing platforms with different account structures and referential data. In this interim period, Euonext legacy and Borsa Italiana markets will be considered as separate: the existing rules will remain valid for Borsa Italiana market, while the new collateral rules object of this document will be applied to Euronext legacy markets. Once also Borsa Italiana markets will migrate to the new clearing platform, the new collateral rules will be extended across all markets.

[2] "Country of Risk" is a field downloaded by the info-provider Bloomberg. "Country of Risk" represents the main country where the activity Clearing Member takes place

Related amendments, that will applied from June 2024 to the end of the interim period[3] to ENX legacy markets only, are reported below:

- Non € cash currencies as collateral: USD, GBP (list to be confirmed) subject to defined limits;
- High liquid bonds denominated also in non € (also for variations margins on futures and option premiums for which € and non-€ cash will be accepted), subject to defined limits;
- NCBs guarantees (issued by the National Central Banks of Belgium and The Netherlands – NBB and DNB - for Dutch clients and Belgian clients only) for IM and DF EOD and ITD, subject to defined limits.
- Bank guarantees (private bank guarantees - PGB): to be evaluated the possibility to deposit such guarantees setting appropriate limits

The present document requires validation in relation to collateral amendments related only to phase 1.

2.2 Current Collateral Risk Framework Overview

ENXC collects margins both in form of cash and securities. ENXC sets the maximum proportion of securities that is willing to accept (with respect to initial margins that can be posted both in securities or euro cash). ENXC requires that at least 50% of initial margins are covered with cash. Additionally, concentration limits apply to securities posted as collateral. The ratio between the sum of the collateral value of deposited securities of a single Country and the Initial Margins calculated should be no greater than 45%.

ENXC also establishes ad-hoc Risk Limits, in terms of maximum notional amount that can be posted for every specific eligible security, such as BTP Italia, BTP Futura, EU Sure Bonds, EU Next Gen Bonds[4]. In particular, the maximum amount refers to each single issue of that specific type of security that can be posted as collateral, for each direct Clearing Member. These limits are periodically reviewed.

Such limits will remain unchanged.

For further details please refer to section **Risk Management|Parameters** of ENXC website **Euronext Clearing | euronext.com**.

Here below we summarize all the aspects that will remain unchanged:

- Cash Collateral eligibility: euro remains the only accepted currency in this phase

[3] The interim period is expected to range from the migration of Euronext legacy markets to ENXC up to the fourth quarter of 2024. After the end of the interim period, amendments as of phase-1 and phase-2 will be applied also to Borsa Italiana Markets

[4] Such limits can be found under **Parameters | euronext.com**

- Collateral Haircuts: the logic and methodology for calculating and applying haircuts to collateral are unchanged (except for the new approach to the calculation of the WWR multiplier, which is described in section 2.3.2)
- Concentration Limits : the ratio between securities deposited as collateral from a single Clearing Member and its Initial Margins, has to be no greater than 50% (type of asset diversification); the ratio between the value of securities issued by a distinct country deposited from a single Clearing Member and its Initial Margins has to be no greater than 45% (issuer diversification)

2.3 Collateral framework extension

As already anticipated, ENXC is going to introduce the following set of changes to its existing collateral framework:

2.3.1 Eligible Assets extension

The first change relates to the universe of eligible securities to be accepted as collateral by ENXC. In this respect, ENXC is going to include in its universe of acceptable collateral European Central Bank (ECB) eligible assets, subject to defined filters and limits. Compared to the current framework, additional sub-asset types of securities are going to be accepted including a broadened range of European Government Bonds and supranational bonds issued by European entities.

The set of securities accepted by ENXC will include bonds that are issued by eligible governments and supranational entities[5]. Conditions based on the rating and GDP[6] of the issuer of the government bond instruments are applied. Conditions based on the amount outstanding of eligible securities are applied to supranational issuers[7]. Conditions are set on the maturity[8] of the bonds. Securities have to be denominated in EUR currency. Bonds embedding some type of optionality (callable, sinkable, puttable), or stripped bonds, are excluded from eligibility.

---

[5] Supranationals are European ones, such as: EFSF European Financial Stability Facility, EIB European Investment Bank, ESM European Stability Mechanism, EU European Union (SURE, NXG)

[6] Have a long-term rating qualified as "investment grade" (at least BBB- or equivalent) and assigned by at least one of the following agencies: Fitch, Moody's, Standard & Poor's and GDP greater than 150bn. Additionally, the given country has to be a be a Member of the OECD. The list of countries is periodically reviewed by the Internal Risk Committee.

[7] Following a suggestion arising from the validation activity performed by Risk Policy, it has been decided to accept supranational securities with the condition that are issued by those entities which total outstanding amount of eligible securities exceeds EUR 25 billion.

[8] Residual maturity of the security has to fall between 1 week and 50 years

In order to ensure rigorous risk management, ENXC is willing to accept only high liquid securities traded on markets where ENXC has access. Securities that are not traded on MTS markets are accepted as collateral only if they show a LQA[9]>80.

ENXC Risk Management team always retains the possibility to discretionally reject securities in case new material risks affecting a security or a given set of security arise[10].

2.3.2 Wrong Way Risk – framework extension

ENXC, by accepting securities as collateral, is exposed to generic wrong-way-risk (WWR). ENXC is not exposed to specific wrong-way-risk as it does not accept as collateral the securities that are issued by its Clearing Members (CMs).

Therefore, for what concerns generic wrong way risk, dedicated penalizing multipliers are applied to the haircuts.
The wrong-way-risk framework of ENXC has been so far exclusively focused on the Italian market, i.e. wrong-way-risk multipliers have only been applied to Italian government securities. However, as already anticipated, ENXC is going to extend the existing WWR framework. In particular, a wrong-way-risk multiplier is going to be applied whenever the country of risk/country of the CMs coincides with the country of the security posted as collateral.

Here below some descriptive statistics about securities collateral posted by Clearing Members in order to cover their margins (calculated as the average across all segments from January 2021 to August 2022):

[9] LQA score is an indicator provided by the info provider Bloomberg. Measured on a scale of 1 to 100 (100 being the most liquid) it summarizes the relative liquidity of an instrument in the covered universe. The LQA Liquidity Score is a relative score measuring the percentile ranking of the specified security's liquidation cost within universe of fixed income securities. The score is based on the average liquidation cost for each security across a range of duration adjusted volumes. The score calculation incorporates all the key liquidity metrics (cost, volume, and time). The Liquidity Score is a relative 1-100 ranking based on LQA's probability of execution metric, that estimates the likelihood of executing a trade within the specified volume, cost and time parameters. The level of 80 has been chosen considering the output of several analyses run by the CCP both on collateral and on its investment universe, which have shown that applying such a threshold ensures considering only securities characterized by high-level of liquidity, in terms of amount outstanding.

[10] Under approval of the ENXC CEO after the analyses received by Risk Management and discussed in the Internal Risk Committee. ENXC may also set additional conservative restrictions, on the securities accepted as collateral, based on the maximum number of no-quotation days.

Table 1 - Clearing Member Country vs Country of Securities posted (average from Jan-21 till Ago-22)

		Clearing Members (Country)		
		DE	*GB*	*IT*
Securities Collateral (Country)	*AT*	16,48%	0,00%	0,00%
	BE	0,00%	0,00%	1,60%
	DE	65,02%	0,00%	0,76%
	ES	0,00%	0,00%	3,97%
	FR	18,49%	100,00%	0,24%
	IE	0,00%	0,00%	4,54%
	IT	0,00%	0,00%	88,89%
	NL	0,02%	0,00%	0,00%

In the previous table it is possible to note that the Italian Clearing Members deposit up to 88.9% of securities of their country (BTP, CCT etc). The German Clearing Member deposit up to 65% of their securities collateral in German government bonds, and about 18.5% in French govies and 16.5% in Austrian govies. The UK Clearing Member (only one in this classification) deposit all their securities in French government bonds[11].

This table confirms that Clearing Members show a tendency to post securities collateral of their own Country of Risk/Country. This clearly shows the necessity to appropriately assess Wrong Way Risk that need to be factored in the haircuts applied to securities posted as collateral.

Therefore, the relationship between the Participants' Country of Risk/Country and bonds accepted as collateral is taken into account by applying a wrong-way-risk multiplier to the haircuts.

In particular, the following multipliers are applied. A wrong-way-risk multiplier is defined for each of the bands defined by the Sovereign Risk Framework (SRF) methodology. For each rating band, a specific wrong-way risk multiplier is set[12].

---

[11] The table focuses only on those participants that currently posts securities as collateral. The statistics of Great Britain Clearing Member refer to a unique Clearing Member that is a subsidiary of a Parent Company that has its headquarter in France.

[12] The formula for calculating the B4 band's WWR multiplier is $WWR\ HC\ multiplier = Round(\sqrt{\frac{HP\_new}{HP\ standard}};1)$

Where HP_new is equal to the increase of HP for the concentration in the FIRE model (it equals 5) plus $HP\ standard$. The $HP\ standard$ is conservatively set to the lowest HP for the Band B4 as set in the SRF (it equals 3). The resulting wrong-way-risk multiplier, of 1.6, is scaled down for the other Bands taking into account the average default probability of EXC eligible countries, divided according to their Bands.

Table 2 – WWR haircut multipliers

Band	Label	WWR haircut multiplier
B1	L1	1.1
	L2	
	L3	
	L4	
	L5	
B2	L1	1.2
	L2	
	L3	
	L4	
	L5	
B3	L1	1.3
	L2	
	L3	
	L4	
	L5	
B4	L1	1.6
	L2	
	L3	
	L4	
	L5	

Table 2 shows that if a Participant whose country of risk/country is classified as B4 (using the SRF methodology) posts securities as collateral which are issued by the same country the wrong-way-risk haircut multiplier will be equal to 1.6. Please note that values in table 3 are reviewed on yearly basis and subject to change by the internal risk committee.

2.3.3 Collateral Evaluation – Dirty Price

Another change proposed for collateral framework is related to the valuation of the securities accepted as collateral. In fact, ENXC proposes to change the type of price used in the calculation of fair-value of fixed-income securities posted as collateral from clean-price to dirty-price. Dirty price includes accrued interest. The dirty price is what ENXC would get by selling securities posted as collateral in case of a CM’s default.

In considering the amount of accrued interest, ENXC decided to adopt a conservative approach. In fact, assuming for instance that ENXC has to sell a given security in T following a CM's default, only the accrued interest that has matured until T is considered (and not at T+2 following the normal settlement window of fixed-income securities).

Additionally, it was adopted a forced reset of accrued interest at zero one day before coupon payment date.

These two measures have been implemented to minimize the accrued interest considered in dirty price especially around coupon payment date.

In fact, considering only accrued interest matured until T, with reset at zero one day before coupon payment date, provides an amount of accrued interest which is smaller than the accrued interest calculated taking T+2 as a reference (this is true for any day, also around coupon payment date) and therefore it represents a more conservative approach in case of default of the participant.

3. Internal Governance Approval

On the basis of the methodological analysis provided, on 24 March 2023, the Members of the Risk Committee issued a first satisfactory non-binding opinion on the amendments related to the collateral management framework. These enhancements, along with the non-binding opinion of ENXC's Risk Committee, were reported to the Board of Directors of ENXC of 31 March 2023.

The collateral management framework is detailed in the collateral management policy.

ENXC roles and responsibilities in relation to collateral management framework are detailed below:

- Whenever required, the CEO, supported by the Internal Risk Committee, approves the methodologies adopted to estimate the value of the collateral and haircuts applied to all the securities accepted as collateral.

- The Internal Risk Committee is responsible to monthly review collateral haircut parameters and collateral statistics. Risk management team, at least annually, monitors collateral Wrong-Way Risk multipliers, eligible collateral assessment, collateral haircut policy assessment and collateral concentration limits assessment.

- Internal Audit monitors the effectiveness of the procedure as well as the adequateness of methodologies adopted for haircut and concentration limits definition.

Policies and procedures on collateral had to be reviewed at least annually, or whenever a material change that affects the CCP's risk exposure occurs.

Here below are summarized the roles and responsibilities of ENXC with respect to collateral management:

ACTIVITY	RISK	OWNERSHIP	FREQUENCY	INVOLVED PARTIES
Collateral Haircut review	Market	Risk Management	At least Monthly	Internal Risk Committee
Collateral Statistics	Market	Risk Management	At least Monthly	Internal Risk Committee
Collateral Wrong - Way Risk multiplier	Wrong - Way	Risk Management	At least Annually	Internal Risk Committee
Eligible Collateral Assessment	Market	Risk Management	At least Annually	Internal Risk Committee
Collateral Haircut Policy Assessment	Market	Risk Management	At least Annually	Internal Risk Committee
Collateral Concentration Limits Assessment	Concentration	Risk Management	At least Annually	Internal Risk Committee

4. CCP assessment on the applicability of article 49 of EMIR

4.1 Article 49 EMIR

In line with the ESMA opinion on the application of Article 49 of EMIR, ENXC does consider that the discussed amendments to the collateral management framework involve a significant change to the CCP's models and parameters for the purpose of Article 49 of EMIR.

ENXC's assessment under EMIR Article 49 with respect to the Proposed Changes

Indicators	ENXC Response
Please confirm if the Risk Committee and/or Board have reviewed and approved the change.	Yes, presentation and approval by relevant committees as described under section 5.
Please list any new risk factor or indicator.	With respect to the current model there are no new risk factors/indicators

Please confirm if the change involves the development or the implementation of new default fund	No
Please confirm if the change involves the development or the implementation of new stress scenarios	No
Please confirm if the change involves the development or the implementation of new pricing model	Yes, dirty price is used instead of clean price for collateral valuation
Please confirm if the change involves the development or the implementation of new pricing histories	No
Please confirm if the change involves the development or the implementation of new procedures detecting pricing uncertainties or ensuring reliable settlement prices	No
Please confirm if the change involves the development or the implementation of new data used as input to risk models	No
Please confirm if the change involves the development or the implementation of new changes in the risk calculation or risk parameterization modules	Yes, the framework for calculating wrong-way-risk (WWR) multipliers
Please confirm if the change involves the development or the implementation of new operational or organizational developments	No
Please confirm if the change involves the development or the implementation of new delivery/settlement procedures	No
Please confirm if the CCP is introducing a new settlement currency	No
Please confirm if the change is introducing a new set of eligible collateral with a different	No, as the extended perimeter of accepted securities is not characterized by a different

risk profile in terms of credit and/or liquidity risk factors	risk profile in terms of credit and/or liquidity risk factors from what currently in place
Please confirm if the change implies the development or implementation of new stress scenarios, including either historical or hypothetical scenarios or both, or the modification of the calibration or of the definition of the existing scenarios, for determining the default fund exposures	No
Please confirm if the change implies the development or implementation of new stress scenarios, including either historical or hypothetical scenarios or both, or the modification of the calibration or of the definition of the existing scenarios, for determining the collateral haircut	No
Please confirm if the change implies the development or implementation of new stress scenarios, including either historical or hypothetical scenarios or both, or the modification of the calibration or of the definition of the existing scenarios, for determining the liquidity risk	No
Please confirm if the change implies the development or implementation of new stress scenarios, including either historical or hypothetical scenarios or both, or the modification of the calibration or of the definition of the existing scenarios, for determining the credit and counterparty risk	No
Please confirm if the change implies the development or implementation of new stress scenarios, including either historical or hypothetical scenarios or both, or the modification of the calibration or of the definition of the existing scenarios, for determining the operational risk	No

Please confirm if the change involves a decrease/increase of the CCP capital greater than +/-10%	No
Please confirm if the change involves a decrease/increase of the total pre-funded financial resources (including margin requirements, default fund and skin-in-the-game), greater than +/-5%	No
Please confirm if the change involves a decrease/ increase of the margin requirements and/or stress test exposures on an individual underlying, a class of financial instruments[13], greater +/-10%	No
Please confirm if the change involves a decrease/ increase of the default fund contributions of any clearing member, greater than +/-5%	No

5. Comprehensive Risk Assessment

5.1 Systems and Processes

The Collateral Management System is a critical component of the Clearing System that ensures that counterparties have sufficient collateral to cover their obligations related to margin requirements and default fund. As part of the central clearing system the system is designed to operate continuously, even in the event of unexpected events such as natural disasters, power outages, or other disruptions. In particular the system implements full redundancy at hardware and networking level, leveraging the existing and consolidated "Business Continuity" infrastructures and processes of the CCP. This cover the following points:

- Geographically segregated Primary and Secondary sites;
- Data backup and preservation ;

[13] https://www.esma.europa.eu/sites/default/files/library/ccps_authorised_under_emir.pdf

- Tools to enable manual exception management and manual data load via files;
- Collateral balances account balances end-of day reconciliation.

5.2 Operational Risks

System failures: Any system outage or hardware failure can disrupt the collateral management process. **Mitigation**: Implemented Emir requirements in terms “time to restore operational capability” and “data preservation time horizon”.

Data quality: The accuracy and completeness of data used in the collateral management system are critical to its effectiveness. **Mitigation**: implemented data quality checks, possibility to perform manual exception handling, end of day reconciliation of account balances and real time monitoring and alerting.

Human error: The use of collateral management systems involves manual processes. **Mitigation**: manual interactions have been reduced to the sole management of business exceptions. Validations are always executed on data inputs.

5.3 Compliance

Subject to the governance and regulatory approval processes duly completed, no specific compliance issues have been identified. Furthermore, the rulebook has been updated with respect to the aforementioned changes in the collateral framework.

EURONEXT CLEARING