INTERNAL AUDIT REPORT

ICAAP CREDIT RISK MODEL — 2023 REVIEW (FIRST IMPLEMENTATION)

Bank: European Fictive Bank (EFB)
Department: Internal Audit — Risk Models Division
Date: December 2023

1. Executive Summary

Internal Audit has performed an inaugural review of the ICAAP Credit Risk Capital Model implemented in 2023. The model constitutes a fundamental component of the Bank's internal capital assessment and is expected to meet the standards required by the EBA Guidelines on ICAAP (EBA/GL/2016/10).

Overall, the audit concludes that:

The model, as implemented and documented in 2023, does not meet the minimum standards of conceptual soundness, implementation quality, data governance, or documentation completeness expected for ICAAP purposes.

Significant issues were identified across **all dimensions**:

- Incomplete and insufficient documentation
- Lack of clear data lineage
- Missing definitions for key inputs
- No description of the simulation framework
- Weaknesses in Excel implementation
- Absence of version control
- Missing validation evidence
- Material data quality problems
- Ambiguity about roles and responsibilities
- No traceability between data, assumptions, methodology, and results

Despite receiving additional files, manual explanations, and partial access to internal systems, Internal Audit concludes that the model is **not fully reliable**, and several assumptions remain **unjustified** or **unsupported by evidence**.

2. Scope of Review

The 2023 audit covered:

- Model conceptual soundness
- Data sources and data quality
- Implementation (Excel, Python, process flow)
- Documentation
- Governance
- ICAAP integration
- Reproducibility of results

Additional materials reviewed beyond the provided documentation:

Internal Audit had to request:

- Raw PD and LGD extracts (4 CSV files)
- 17 EAD Excel files (partial subset due to delays in delivery)
- Segment exposure file used for results
- Python script `simulate.py` (sent informally via email)
- Two screenshots of the modelling folder structure
- A draft backtesting file (largely empty)
- A meeting with the modelling team to explain assumptions orally

This is typical of a **first-year implementation audit**, but the gaps were larger than expected.

3. Key Findings (Critical Issues)

(12 Major Findings, 7 Moderate, 4 Minor)

I only detail the **critical** here — the rest will appear in annex.

Finding 1 — Severe Documentation Insufficiency (Critical)

The 2023 documentation consists of 6 sections totalling only ~3 pages of text.
Key missing components:

- No description of data sources
- No methodology explanation
- No segmentation logic
- No calibration detail
- No model assumptions
- No validation evidence
- No governance or sign-offs
- No annexes except a 4-line variable list

Internal Audit concludes that **the documentation does not meet any minimum ICAAP standard**.

Recommendation 1:
Produce a complete Model Development Documentation (expected length 12–20 pages), including data lineage, assumptions, methodology, calibration, tests, results, governance, and annexes.

Finding 2 — No Data Lineage / Traceability (Critical)

No information is provided on:

- source systems,
- file structure,
- transformation steps,
- data ownership,
- QC controls,
- or intermediate datasets.

Audit had to reconstruct lineage manually by interviewing staff.

Recommendation 2:
Implement an end-to-end data lineage description, including source → transformations → final model inputs.

Finding 3 — Unexplained PD and LGD Inputs (Critical)

The documentation provides **no reconciliation** of PD/LGD values.

Audit identified:

- PD overrides in the internal rating system not captured in the modelling file
- LGD values inconsistent across files (1–5 percentage point differences)
- Missing PDs with no documented imputation process
- LGDs provided by Recoveries without downturn justification

Recommendation 3:
Formalise a PD/LGD extraction and reconciliation process, including QC checks and completeness rules.

Finding 4 — Methodology Not Documented (Critical)

The documentation states:

“A simulation-based approach is used.”

But audit found:

- No information on the type of distribution
- No number of simulations
- No explanation of correlation
- No formula for loss calculation
- No parameters μ, σ, or calibration approach

The script `simulate.py` provided by email shows:

- ad-hoc lognormal assumptions
- 5,000 simulations (not 20,000 as communicated verbally)
- correlation hardcoded to 0.18
- no seed control
- no input checks

Recommendation 4:
Document full methodology including equations, parameters, distributions, calibration and simulation setup.

Finding 5 — Weak and Error-Prone Implementation (Critical)

Implementation flaws:

Excel:

- 17 EAD files merged manually
- Broken formulas in 3 sheets
- Hidden columns with inconsistent values
- External links to local desktops of former employees
- Macros undocumented
- No cell protection

Python:

- Hardcoded file paths
- Script not documented
- No logging
- Overwrites results
- Not version-controlled

Recommendation 5:
Industrialise implementation, remove manual steps, create a controlled pipeline.

Finding 6 — Unreliable Data Quality (Critical)

Audit identified:

- 2.4% missing PDs
- 17% missing recovery values
- 1.1% negative EADs
- SME flag inconsistencies
- Duplicates of counterparty/product lines
- Incorrect cross-joins between LGD and PD tables

None of these issues are mentioned anywhere in the documentation.

Recommendation 6:
Define a systematic data quality framework with thresholds, checks, and remediation steps.

Finding 7 — No Validation or Testing Evidence (Critical)

The 2023 documentation contains **zero backtesting**, **zero sensitivity analysis**, and **zero stability tests**.

Audit requested evidence and received:

- A partially filled Excel file called “Backtest.xlsx” (empty for Retail).
- An E-mail stating that “sensitivity is broadly stable”.

This is not acceptable for ICAAP.

Recommendation 7:
Perform full validation: backtesting, sensitivity, stability, scenario consistency.

Finding 8 — Questionable Model Output Reliability (Critical)

The economic capital result provided (**€1.68bn**) does not match:

- the recalculation made by the audit team (we obtained **€1.74bn**)
- the simulation code output (**€1.63bn**)
- the intermediate Excel output (**€1.71bn**)

Discrepancies of **€90m–€110m** exist with no explanation.

Recommendation 8:
Ensure reproducibility, create a single source of truth, and fix inconsistencies.

Finding 9 — Governance Not Operational (Critical)

No sign-offs, no review checklist, no formal validation opinion.
Roles unclear.
No change log.

Recommendation 9:
Implement proper model governance: ownership, review, approval, annual cycle.

Finding 10 — ICAAP Integration Weak (Critical)

The ICAAP submission uses the model’s output but does not provide supporting commentary.
There is no reconciliation with regulatory capital.
No link with the risk appetite framework.

Recommendation 10:
Ensure ICAAP consistency between models, stress tests, and narrative.

4. Moderate and Minor Findings

I will summarise because the critical ones are the heart of the audit.
Moderate issues include:

- Missing description of segmentation
- No mapping of exposures by geography
- Missing commentary on PD spike in 2021
- Lack of stress scenario articulation
- Insufficient documentation of EAD calculation
- Excel files not archived
- Inconsistent LGD downturn treatment

Minor issues:

- Formatting inconsistencies
- Typos in variable names
- Non-standard file naming conventions

5. Overall Conclusion

The ICAAP Credit Risk Model, as implemented in 2023, is **not fit for purpose in its current form**. While the initiative represents a positive first step toward an internal capital framework, substantial work is necessary before Internal Audit can consider the model compliant with internal or regulatory expectations.

6. Summary of Recommendations (High-Level)

1. Rewrite full documentation
2. Implement structured data lineage
3. Reconcile PD/LGD inputs
4. Document full methodology
5. Strengthen implementation

6. Establish data quality framework
7. Perform validation & testing
8. Ensure reproducibility
9. Improve governance and approvals
10. Align ICAAP narrative & model outputs