Credit Portfolio Risk & Capital Optimization Report

1. Project Overview

This report presents the simulation and optimization of a credit portfolio composed of 2,500 loans. The objective is to calculate regulatory credit risk via Risk-Weighted Assets (RWA) using Basel II/III Internal Ratings-Based (IRB) formulas, and to apply optimization techniques such as Credit Default Swaps (CDS) and loan disposal to reduce capital requirements.

2. Portfolio Simulation

The portfolio includes realistic distributions of ratings, Probability of Default (PD), Exposure at Default (EAD), Loss Given Default (LGD), maturity, sectors, and regions. Ratings were mapped to PD using Basel guidelines. Secured loans were assigned a lower LGD (0.45) versus unsecured (0.75). EADs followed a log-normal distribution.

3. Credit Risk Calculation

RWA for each loan was calculated using the Basel IRB formula:

RWA = 12.5 x LGD x [Phi((Phi_inv(PD) + sqrt(R) x Phi_inv(0.999)) / sqrt(1-R)) - PD] x Maturity Adjustment x EAD

where R is the asset correlation depending on PD, and Phi is the standard normal cumulative distribution function.

4. Capital Optimization Strategy

Two techniques were used:

- CDS Coverage: Applied to the top 10% of loans by RWA, reducing LGD to 0.45
- Loan Disposal: Top 5% loans by RWA were removed from the balance sheet

These strategies were chosen to target the most capital-intensive exposures.

5. Optimization Results

Original Portfolio RWA: EUR 1,853,255,895.62

Final Portfolio RWA after CDS & Disposal: EUR 1,407,728,939.08

Total Capital Saved: EUR 445,526,956.54

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RWA Reduction: 24.04%

Loans Covered by CDS: 250

Loans Disposed: 125

These results demonstrate a significant improvement in capital efficiency while maintaining portfolio integrity.