

Credit Risk Simulation Report

Amanda Achiangia

2025-05-04

Executive Summary

This report simulates potential credit losses using Monte Carlo methods. The simulation uses standard credit risk inputs: Probability of Default (PD), Loss Given Default (LGD), and Exposure at Default (EAD). We assess the distribution of credit losses across trials, and summarize key metrics such as average loss and worst-case loss.

Methodology

- Generate 1,000 simulated obligors
- Each obligor defaults with probability PD
- Loss per obligor = $PD \times LGD \times EAD$
- Aggregate losses visualized and summarized

Credit Risk Simulation

```
set.seed(123)
pd <- 0.05
lgd <- 0.6
ead <- 100000
n <- 1000

losses <- rbinom(n, 1, pd) * lgd * ead
hist(losses, breaks = 20, col = "purple", main = "Credit Loss Distribution", xlab = "Loss Amount")

avg_loss <- mean(losses)
max_loss <- max(losses)
loss_summary <- data.frame(
  Metric = c("Average Loss", "Maximum Loss"),
  Value = c(round(avg_loss, 2), round(max_loss, 2))
)
kable(loss_summary, caption = "Credit Risk Metrics")
```

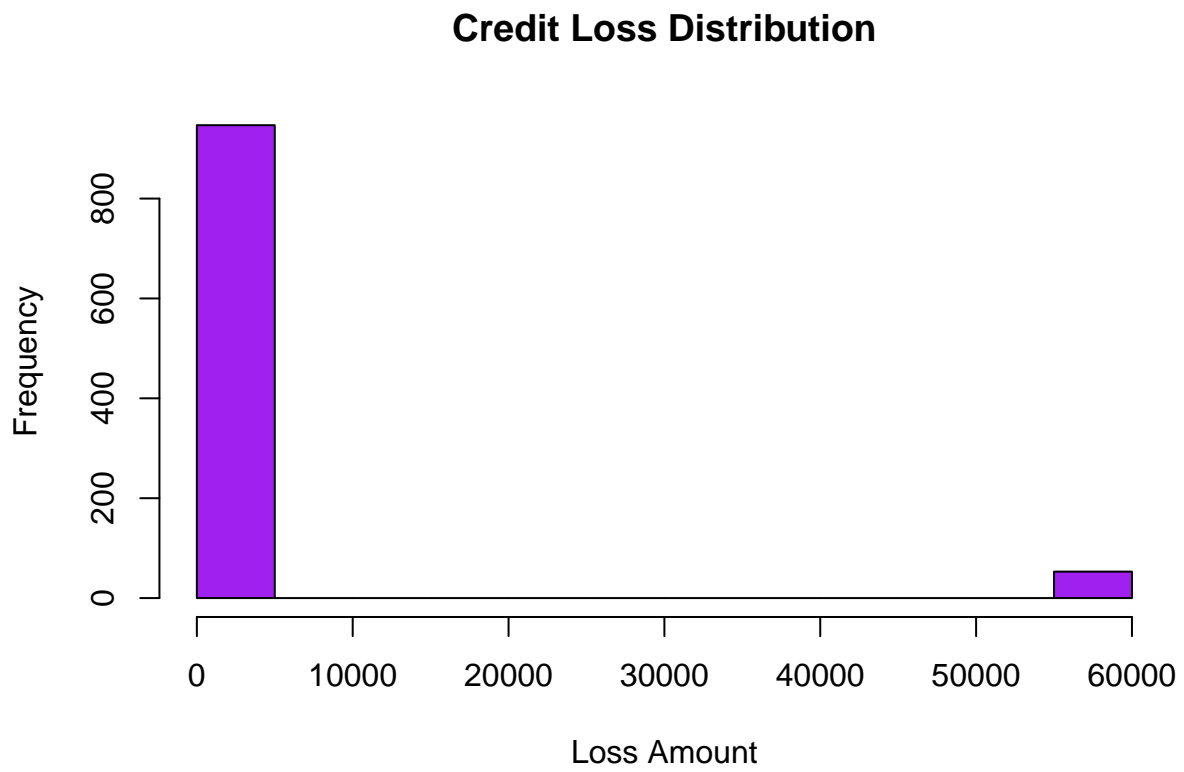


Figure 1: Simulated Credit Losses

Table 1: Credit Risk Metrics

Metric	Value
Average Loss	3180
Maximum Loss	60000

```
if (avg_loss > 2500) {
  cat("\nThe average loss exceeds $2,500, indicating moderate expected credit risk exposure.")
} else {
  cat("\nThe average loss is relatively low, suggesting a low overall credit risk under current")
}
```

```
##
```

```
## The average loss exceeds $2,500, indicating moderate expected credit risk exposure.
```

Conclusion

This simulation provides an overview of portfolio exposure to credit risk based on assumed PD, LGD, and EAD inputs. While the average loss is moderate, concentration risk or economic downturns could amplify losses. Future enhancements could include correlated defaults, sector-specific LGDs, or macroeconomic stress scenarios.