

IFRS 9 EXPECTED CREDIT LOSS (ECL) MODEL

Framework, Mathematical Models, Scenario Analysis, and
Implementation Guide

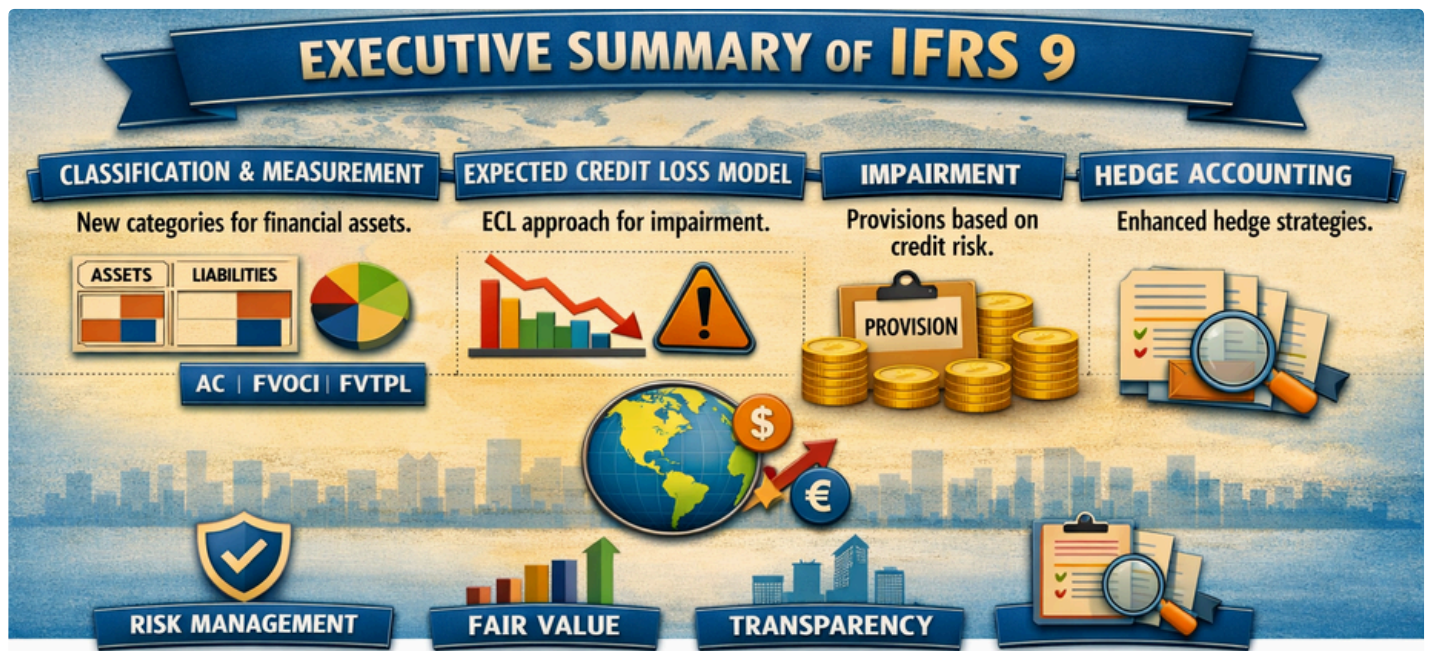


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Executive Summary



The Expected Credit Loss (ECL) model under IFRS 9 Financial Instruments represents a major transformation in credit risk accounting. The model requires entities to recognize forward-looking expected losses rather than incurred losses, thereby improving transparency and early identification of credit deterioration.

The ECL model integrates risk management, statistical modeling, macroeconomic forecasting, and accounting frameworks. Financial institutions and corporates must estimate credit losses using probabilistic models incorporating Probability of Default (PD), Loss Given Default (LGD), and Exposure at Default (EAD).

This white paper provides a detailed analysis of:

- IFRS 9 impairment framework
- ECL mathematical models
- staging methodology
- macroeconomic scenario modeling
- governance and validation
- implementation architecture
- practical examples and case studies

1. Background of IFRS 9:

Following the 2008 global financial crisis, regulators criticized the incurred loss model under IAS 39 for recognizing credit losses too late.



To address this, the International Accounting Standards Board introduced IFRS 9, requiring:

- forward-looking credit loss estimation
- earlier recognition of impairments
- integration of risk management practices with accounting

2. Scope of the ECL Model

The ECL model applies to financial assets measured at:

1. Amortized Cost Examples:

- bank loans
- corporate lending
- consumer financing

2. Fair Value Through OCI (FVOCI) Examples:

- debt securities
- bonds

3. Other Exposures

- loan commitments
- financial guarantees
- lease receivables
- trade receivables

3. Core Concept of Expected Credit Loss

Expected credit loss represents the probability-weighted present value of all cash shortfalls over the expected life of a financial instrument.

Mathematical Representation

$$ECL = \sum (PD \times LGD \times EAD \times DF)$$

Where:

PD = Probability of Default

LGD = Loss Given Default

EAD = Exposure at Default

DF = Discount Factor

4. IFRS 9 Three-Stage Model

The impairment framework is based on credit risk deterioration since initial recognition

Stages





Stage 1 — Performing Assets

Characteristics:

- no significant increase in credit risk
- borrower performing normally

Provision requirement:

12-month Expected Credit Loss

Meaning:

Expected losses resulting from defaults occurring within 12 months.

Stage 2 — Underperforming Assets

Characteristics:

- significant increase in credit risk
- payments may be delayed

Provision requirement:

Lifetime Expected Credit Loss

Meaning:

Expected losses over the entire remaining life of the asset.

Stage 3 — Credit-Impaired Assets

Characteristics:

- default has occurred
- borrower unlikely to repay

Provision requirement:

Lifetime ECL with interest calculated on net carrying amount

5. Lifetime ECL Formula

For lifetime loss estimation:

$$ECL = \sum (PD_t \times LGD \times EAD_t \times DF_t)$$

Where:

t = time period

DF = discount factor using effective interest rate

IFRS 9 Three-Stage Model

Stage 1: Performing Assets



No Significant increase
in credit risk

12-Month Expected
Credit Loss

*Expected losses in the
next 12 months.*

Stage 2: Underperforming Assets



Significant increase
In credit risk

Lifetime Expected Credit Loss

*Expected losses over
the asset's lifetime.*

Stage 3: Credit-impaired Assets



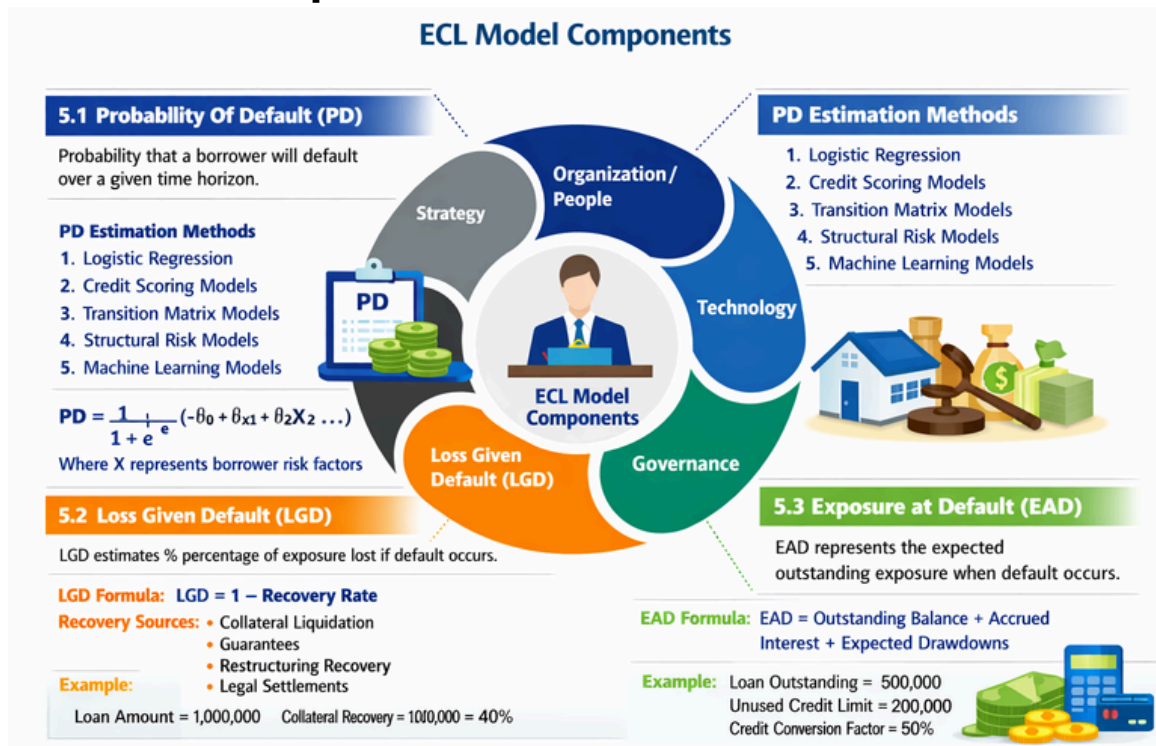
Default has occurred

Lifetime ECL-on
Net-Carrying Amount

Losses based on reduced asset value



6. ECL Model Components



6.1 Probability of Default (PD)

Probability that a borrower will default over a given time horizon.

PD Estimation Methods

1. Logistic regression models
2. Credit scoring models
3. Transition matrix models
4. Structural credit risk models
5. Machine learning models

Logistic Regression Example

$$PD = 1 / (1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots)})$$

Where X represents borrower risk factors

6.2 Loss Given Default (LGD)

LGD estimates the percentage of exposure lost if default occurs.

LGD Formula

$$LGD = 1 - \text{Recovery Rate}$$

Recovery Sources

- collateral liquidation
- guarantees
- restructuring recovery
- legal settlements



Example:

Loan amount = 1,000,000

Collateral recovery = 600,000

$LGD = (1,000,000 - 600,000) / 1,000,000 = 40\%$

6.3 Exposure at Default (EAD)

EAD represents the expected outstanding exposure when default occurs.

EAD Formula

$EAD = \text{Outstanding Balance} + \text{Accrued Interest} + \text{Expected Drawdowns}$

Example:

Loan outstanding = 500,000

Unused credit limit = 200,000

Credit conversion factor = 50%

$EAD = 500,000 + (200,000 \times 0.5) = 600,000$

7. Forward-Looking Macroeconomic Models

IFRS 9 requires inclusion of future economic expectations.

Common Macroeconomic Variables

- GDP growth
- unemployment rate
- inflation
- housing price index
- interest rates

These variables affect borrower default probabilities.

8. Scenario Analysis

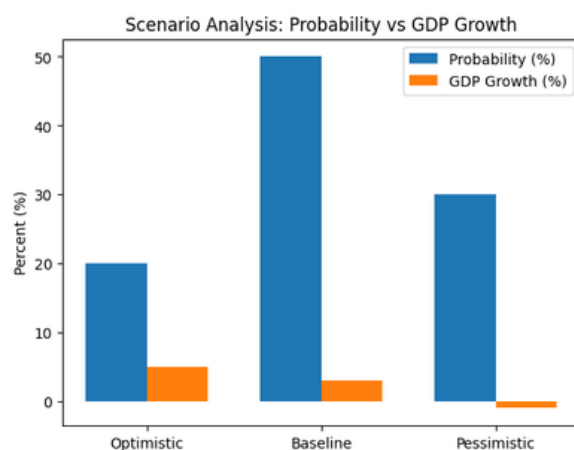
Financial institutions usually develop multiple economic scenarios.

Example Scenarios

SCENARIO	PROBABILITY	GDP GROWTH
OPTIMISTIC	20%	5%
BASELINE	50%	3%
PESSIMISTIC	30%	-1%

Expected credit loss becomes:

$\text{Weighted ECL} = \sum (\text{Scenario Probability} \times \text{Scenario ECL})$





9. Example ECL Calculation

Loan Portfolio:

Loan value = 1,000,000

PD = 3%

LGD = 40%

EAD = 1,000,000

$ECL = PD \times LGD \times EAD$

$ECL = 0.03 \times 0.40 \times 1,000,000$

ECL = 12,000

Provision required = 12,000

10. Simplified Approach (Trade Receivables)

Companies with trade receivables use provision matrices.

Example Provision Matrix

Aging Bucket Default Rate

Current 1%

30 days 3%

Aging Bucket Default Rate

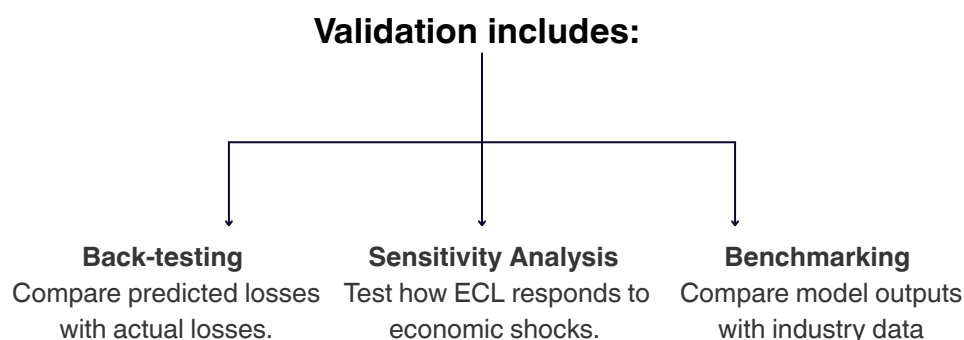
60 days 7%

90+ days 15%

ECL = Outstanding Balance × Default Rate

11. Model Validation Framework

Financial institutions must validate ECL models regularly.



12. Data Requirements

ECL models require extensive datasets.

Internal Data

- loan performance history



- default data
- recovery history
- customer credit scores

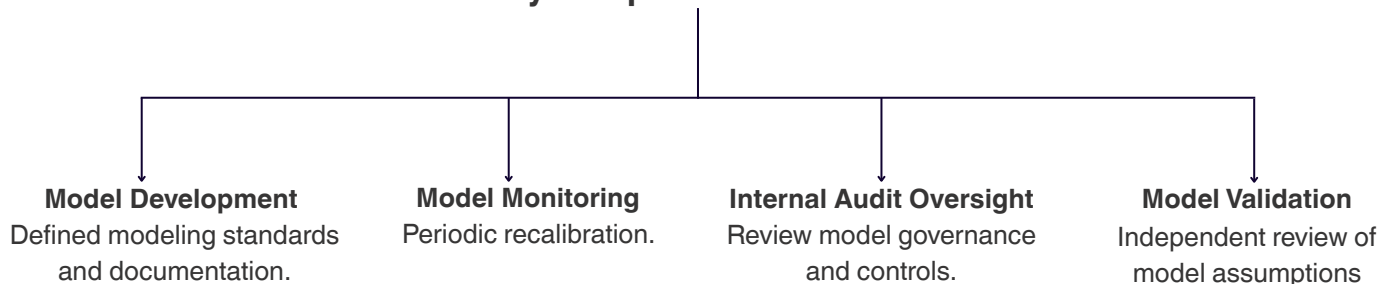
External Data

- macroeconomic forecasts
- credit bureau statistics
- industry default rates

13. Governance Framework

Strong governance is essential.

Key components include:



14. Technology Infrastructure

IFRS 9 implementation requires advanced IT architecture.

Core Components

Data warehouse
risk modeling engine
accounting integration system
reporting dashboards

Many institutions use:

- SAS
- Python
- R
- MATLAB
- specialized IFRS 9 platforms

15. IFRS 9 Implementation Challenges

- **Data Limitations**
Historical default data may be insufficient.
- **Model Complexity**
Advanced statistical techniques required.

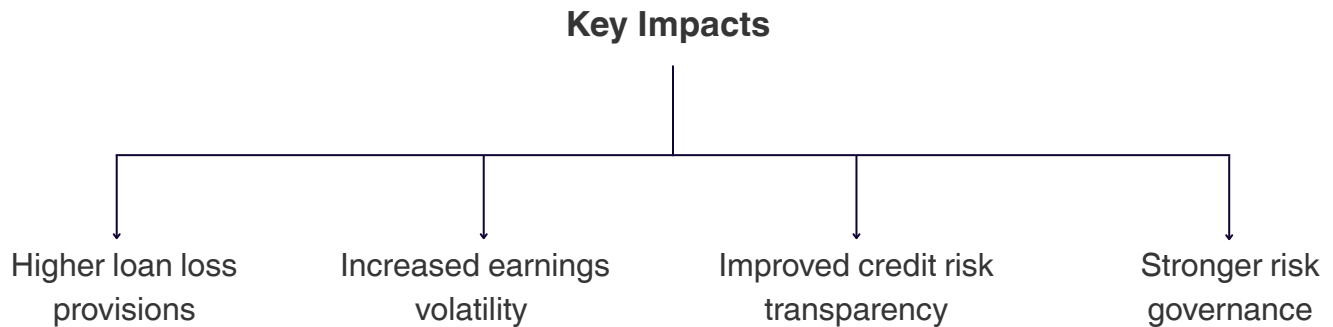


- **System Integration**

Risk systems must integrate with accounting systems.

16. Impact on Financial Institutions

IFRS 9 significantly affects financial statements.



17. Internal Audit Role in IFRS 9

Internal audit should evaluate:

- Model governance
- Data quality controls
- Staging criteria
- Scenario modeling

Internal auditors assess whether ECL models comply with IFRS standards.

18. Case Study: Bank Loan Portfolio

Portfolio:

Retail loans = 500 million

PD = 2.5%

LGD = 45%

ECL Calculation:

$ECL = 0.025 \times 0.45 \times 500,000,000$

ECL = 5,625,000

Provision required = **5.6 million**

19. Regulatory Expectations

Bank regulators expect:

- Robust model governance
- Transparent documentation
- Independent validation

Many regulatory frameworks align IFRS 9 with Basel credit risk guidelines.



20. Conclusion

The IFRS 9 ECL model represents a major advancement in credit risk accounting. By incorporating forward-looking information, probabilistic modeling, and macroeconomic scenarios, the model improves transparency and risk management.

Successful implementation requires:

- robust data infrastructure
- sophisticated statistical modeling
- strong governance and validation frameworks
- collaboration between finance, risk, and IT functions

Organizations that effectively implement IFRS 9 can enhance credit risk monitoring, financial reporting reliability, and regulatory compliance.

References:

International Accounting Standards Board (IASB). IFRS 9 Financial Instruments.
Basel Committee on Banking Supervision.



About us

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