Credit Risk Management
Credit Risk

RBI definition of credit risk

• Possibility of losses associated with decline in the credit quality of borrowers or counterparties.

• Default due to inability or unwillingness of a customer or counterparty to meet commitments in relation to lending, trading, settlement and other financial transactions.

• Loss from reduction in portfolio value (actual or perceived).
Credit Risk

RBI definition of credit risk

• Possibility that a borrowers may not meet their obligation in terms of the loan agreed terms and conditions.

• Probability of loss from a credit transaction.
Forms of Credit Risk

• Non-repayment of the interest on loan or loan principal.

• Inability to meet contingent liabilities such as letters of credit, guarantees issued by the bank on behalf of the client.

• Default by the counterparties in meeting the obligations in terms of treasury operations.

• Not meeting settlement in terms of security trading when it is due.

• Default from the flow of foreign exchange in terms of cross-border obligations.

• Default due to restrictions imposed on remittances out of the country.
Components of Credit Risk

- Default risk – Risk that a borrower or counterparty is unable to meet its commitment.
- Portfolio risk – Risk which arises from the composition or concentration of bank’s exposure to various sectors.

Two factors affect credit risk

  Internal factors – Bank specific.
  External factors – State of economy, size of fiscal deficit etc.
Managing Internal Factors

• Adopting proactive loan policy.

• Good quality credit analysis.

• Loan monitoring.

• Sound credit culture.
Managing External Factors

- Diversified loan portfolio.
- Scientific credit appraisal for assessing financial and commercial viability of loan proposal.
- Norms for single and group borrowers.
- Norms for sectoral deployment of funds.
- Strong monitoring and internal control systems.
- Delegation and accountability.
Credit Risk Management as per RBI

• Measurement of risk through credit scoring.

• Quantifying risk through estimating loan losses.

• Risk pricing – Prime lending rate which also accounts for risk.

• Risk control through effective Loan Review Mechanism and Portfolio Management.
Principles of Credit Risk Management

- Board of directors of a bank has to take responsibility for approving and periodically reviewing credit risk strategy.
- Senior management has to take the responsibility to implement the credit risk strategy.
- Bank has to identify and manage credit risk of all banking products and activities.
Prudential Norms for Credit Risk

• Capital adequacy norms.
• Exposure norms
  ✓ Credit exposure and investment exposure norms to borrowers (individuals and group)
  ✓ Capital market exposures
  ✓ Individual bank’s internal exposure limits
• Bank’s internal risk assessment committee norms.
• Credit rating system and risk pricing policy.
• Asset liability management requirements.
• Bank’s loan policy norms.
Framework for Credit Risk Management

✓ Credit risk management framework
  • Policy framework
    ✓ strategy and policy
    ✓ organization structure
    ✓ operations / systems support
  • Credit risk rating framework
  • Credit risk limits
  • Credit risk modeling
  • Credit risk pricing
  • Risk mitigation
  • Loan review mechanism
  • Credit audit
Policy Framework

✓ Strategy and Policy

• Documented policy specifying target markets.
• Statement of risk acceptance criteria.
• Credit approval authority.
• Credit follow up procedures.
• Guidelines for portfolio management.
• Systems of loan restructuring to manage problem loans.
• Follow up procedures and provisioning of non-performing loans and advances.
Policy Framework

✓ Strategy and Policy

• Consistent approach towards early problem recognition.

• Classification of exposures in problem loans.

• Maintain a diversified portfolio of loans in line with the desired capital.

• Procedures and systems for monitoring financial performance of customers.

• Controlling outstanding loan performance so that the non-performance is within limits.
Policy Framework

• Organizational Structure

  ✓ Independent group responsible for credit risk management.
  ✓ Formulation of credit policies.
  ✓ Procedures and controls of all credit risk functions
    • corporate banking
    • treasury function
    • credit cards
    • personal banking
    • portfolio finance
    • securities’ finance
    • payment and settlement systems

• Credit management team responsibility for overall credit risk
Policy Framework

- Organizational Structure

  - Board is in charge of the overall risk management policy of the bank
    - credit
    - liquidity
    - interest rate
    - foreign exchange
    - price risk
Policy Framework

✓ Credit risk management committee
  - Integration of credit risk management committee with market risk management committee, operations risk management committee and asset liability management committee
Policy Framework

✓ Operations / Systems support
  - Phases of credit process
    - Relationship management phase
      - Business development
      - Product development
      - System development
Policy Framework

✓ Operations / Systems support
  - Phases of credit process
    - Transaction management phase
      - Risk assessment
      - Pricing
      - Structuring of the credit operations
      - Internal approvals
      - Documentation
      - Loan administration
      - Credit monitoring and measurement
Policy Framework

✓ Operations / Systems support

- Phases of credit process
  - Portfolio management phase
    - Monitoring of portfolio
    - Management of problem loans
Credit Risk Rating Framework

• Credit rating models.
• Credit rating analysts.
• Loans to individuals or small businesses.
• Credit quality assessed through credit scoring.
  ✓ Annual income.
  ✓ Existing debt.
  ✓ Asset ownership details.
  ✓ Family status.
Credit Risk Limits

- Credit limit exposure for each client (borrowers and counterparties).
- Total credit limit exposure for a firm.
- Total credit limit exposure for an industry.
- Total credit limit exposure for a region / division.
- Total credit limit exposure for the bank.
Credit Risk Limits

• Reserve Bank of India Guidelines
  ✓ not more than 15% of capital to individual borrower
  ✓ not more than 40% of capital to a group borrower
  ✓ Aggregate ceiling in unsecured advances not to exceed 15% of total demand and time liability (DTL) of the bank

• Threshold limits
  ✓ Credit rating of the borrower
  ✓ Past financial records
  ✓ Willingness and ability to repay
  ✓ Borrower’s future cash flow projections
Credit Risk Modelling

- Altman’s Z score model
- Credit metrics model
- Value at risk model
- Merton model
Altman’s Z Score Model

Altman Z-Score variables developed to measure the financial strength of a firm

$$Z\text{ Score} = a_1 \times V_1 + a_2 \times V_2 + a_3 \times V_3 + a_4 \times V_4 + a_5 \times V_5$$

- Where,
  - $V_1 = \frac{\text{Working capital}}{\text{Total assets}}$
  - $V_2 = \frac{\text{Retained earnings}}{\text{Total assets}}$
  - $V_3 = \frac{\text{Earnings before interest and taxes}}{\text{Total assets}}$
  - $V_4 = \frac{\text{Market value of equity}}{\text{Book value of total liabilities}}$
  - $V_5 = \frac{\text{Sales}}{\text{Total assets}}$
  - $a_1$ to $a_5$ are the model constants identified through statistical analysis (discriminate analysis)
Altman’s Z Score Model

Usage of Z score of the firm

• Z1 or more – Excellent firm
• Z2 to Z1 – Safe
• Z3 to Z2 – Doubtful performance
• Below Z3 – Expected to become bankrupt

Where: Z1 > Z2 > Z3
Credit Metrics Model

Assessment of portfolio risk due to changes in debt value caused by changes in credit quality

Applications

• Reduces portfolio risk
• Sets exposure limits
• Identify correlations across portfolio
  • Reduce potential risk concentration
  • Results in diversified portfolio
  • Reduction of total risk
Value-at-Risk Model

• Estimate of potential loss in loan portfolio over a given holding period at a given level of confidence.

• Probability distribution of a loan portfolio value reducing by an estimated amount over a given time horizon.

• Time horizon estimate is over a daily, weekly or monthly basis.
Merton Model

• Bank would default only if its asset value falls below certain level (default point), which is a function of its liability.

• Estimates the asset value of the bank and its asset volatility from the market value and the debt structure in the option theoretic framework.

• A measurement that represents the number of standard deviation that the bank’s asset value would be away from the default point.

• (Merton’s (1973))
Merton Model

Historical default experience to compute Expected Default Frequency (EDF)

Distance from Default (DFD) is the estimation of asset value and asset volatility and volatility of equity return

$$DFD = \frac{(\text{Expected asset value} - \text{Default point})}{(\text{Asset value} \times \text{Asset volatility})}$$

Expected default frequency (EDF) is arrived at from historical data in terms of number of banks that have DFD values similar to the bank’s DFD in relation to the total number of banks considered for evaluation.

Model Efficiency

Difference between the estimated default values and actual default rate
Merton Model (Example)

- Expected asset value (1 year hence) 200 billion
- Default point (DP) 140 billion
- Volatility of asset value 12%
- Asset value 250 billion

$$DFD = \frac{E(V_t) - DP}{\sigma_v \times V} = \frac{200 - 140}{0.12 \times 250} = 2.00$$

- If from historical observation the number of banks among 80 banks that have a default point of 2.00 are 12, then EDF = 12/80 = 15%
Merton Model (Example)

• Relationship between DFD and EDF
Risk Adjusted Rate of Capital for Banks

- Mark-to-market concept
- Allocates capital to a transaction at an amount equal to the maximum expected loss (at a 99 percent confidence level)
  - Basic risk categories
    - interest rate risk
    - credit risk
    - operational risk
    - foreign exchange risk
Risk Adjusted Return on Capital

• Quantify the risk in each category

• Risk factor = 2.33 x weekly volatility x square root of 52 x (1 – tax rate)

  ✓ 2.33 gives the volatility at 99% confidence level
  ✓ 52 weekly price movement is annualized
  ✓ (1 – tax rate) converts this to an after-tax basis

• Capital required for each category

• Multiplying the risk factor by the size of the position
Credit Risk Mitigation

• Credit risk mitigation reduces exposure of credit risk
  ✓ Safety net of tangible assets
  ✓ Safety from realizable (marketable) securities
  ✓ Reduces exposure of risk from counterparty dealings in guarantees and insurance

• Risk mitigation measures
  ✓ Collateral securities
  ✓ Guarantees
  ✓ Credit derivatives
  ✓ Balance sheet netting
Risk Mitigation

• Needed procedures

  ✓ Documentation made for all credit related transactions
  ✓ Collateralized transactions monitored regularly
  ✓ Legally binding terms for the credit transaction
  ✓ Review of borrower performance profile
  ✓ Alternate options in terms of loan restructure to changed scenarios
Credit Audit

• Compliance with pre sanction and post-sanction processes set by the external and internal audit committee

• Special compliance requirement by the credit risk management committee of the Board of Directors of the bank
Credit Audit

• Bank credit audit
  ✓ Quality of credit portfolio
  ✓ Review of loan process
  ✓ Compliance status of large loans
  ✓ Report on regulatory compliance
  ✓ Independent audit of credit risk measurement
  ✓ Identification of loan distress signals
  ✓ Review of loan restructuring decisions in terms of distress loans
  ✓ Review of credit quality
  ✓ Review of credit administration
  ✓ Review of employee credit skills
RBI Guidelines on Credit Exposure and Management

- Bank cannot grant loans against security of its own shares
- Prohibition on remission of debts for Urban Cooperative Banks (UCBs) without prior approval of RBI
- Restrictions on loans and advances to Directors and their relatives
- Ceiling on advances to Nominal Members – With deposits up to ₹ 50 crore (₹ 50,000/- per borrower) and ₹ 1,00,000/- for above ₹ 50 crore
RBI Guidelines on Credit Exposure and Management

• Prohibition on Urban Cooperative Banks (UCBs) for bridge loans including that against capital / debenture issues

• Loans and advances against shares, debentures
  ✓ UCBs are prohibited to extend any facilities to stock brokers
  ✓ Margin of 40 per cent to be maintained on all such advances

• Restriction on advances to real estate sector
  ✓ Genuine construction and not for speculative purposes