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BNK501

Banking Financial Analytics

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VIRTUAL UNIVERSITY OF PAKISTAN

BNK501

Banking Financial Analytics

STUDY HANDOUT

Banking Financial Analytics applies financial analysis to banks: reading bank financial statements, ratio and credit analysis, risk measurement, Basel capital rules and performance analytics. This handout builds these topics with formulas, key terms, examples and exam pointers. ☰

Compiled as a structured study resource for VU students.

Covers the key topics, definitions, concepts and exam pointers of the course.

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Unit 1: Banks and Their Financial Statements

Learning Objectives

- Explain the business model of a commercial bank
- Read a bank's balance sheet: assets, liabilities, equity
- Read a bank's income statement: NII, non-interest income, provisions
- Distinguish banks' statements from non-financial companies'

A commercial bank takes deposits and makes loans, earning the spread between lending and deposit rates, plus fees. Unlike manufacturers, a bank's 'raw material' is money: its balance sheet is dominated by financial assets (loans) and financial liabilities (deposits).

The bank balance sheet: Assets - cash and balances with central bank, investments (government securities), advances/loans (the largest item), fixed assets, other assets. Liabilities - deposits (current, savings, term - the largest item), borrowings, bills payable. Equity - share capital, reserves, retained earnings. Banks are highly leveraged: equity is typically only 8-12% of assets.

Assets = Liabilities + Equity holds, but analysts watch the structure: the advances-to-deposits ratio (ADR) shows how much of deposits is lent out; the investment mix shows liquidity; and non-performing loans (NPLs) - loans overdue (usually 90+ days) - signal asset-quality trouble.

The income statement: interest income (from loans/investments) minus interest expense (on deposits/borrowings) = net interest income (NII); plus non-interest income (fees, commissions, forex, trading gains); minus provisions (against bad loans) and operating expenses; minus tax = net profit. The net interest margin (NIM) = NII / average earning assets.

Key Terms

Spread	Difference between average lending rate and average deposit (funding) rate.
NII	Net interest income = interest income - interest expense.
NIM	Net interest margin = NII / average earning assets.
NPL	Non-performing loan; typically overdue 90+ days.
ADR	Advances-to-deposits ratio; measures balance-sheet deployment.
Provisions	Charges set aside against expected loan losses.

Example - NIM: Interest income Rs 120B, interest expense Rs 70B -> NII = 50B.
Average earning assets Rs 1,000B -> NIM = 5%.

Example - leverage: Assets Rs 2,000B, equity Rs 160B -> equity ratio 8%; a 4% fall in asset values would halve equity - why capital adequacy matters.

Summary

- ✓ Banks earn the spread between lending and deposit rates plus fees.
- ✓ Balance sheet: loans = main asset, deposits = main liability, thin equity layer.
- ✓ Income: NII + non-interest income - provisions - expenses = profit.
- ✓ Watch ADR, NPLs and NIM as the core health indicators.

Exam Pointers

- ★ Sketch a bank's balance sheet and income statement with the key line items.
- ★ Define NII and NIM; compute NIM from given figures.
- ★ Why are NPLs and provisions central to bank analysis?

Unit 2: Ratio Analysis for Banks

Learning Objectives

- Compute profitability ratios: ROA, ROE, NIM, cost-to-income
- Compute asset-quality ratios: NPL ratio, provision coverage
- Compute liquidity and funding ratios: ADR, LCR concept
- Use DuPont decomposition for banks

Profitability: $ROA = \text{net profit} / \text{average assets}$ (banks: ~1-1.5% is good); $ROE = \text{net profit} / \text{average equity}$ (~15-20% typical); NIM as above; cost-to-income ratio = operating expenses / (NII + non-interest income) - lower is better (~40-50% efficient); EPS and dividend payout for shareholders.

DuPont for banks: $ROE = ROA \times \text{leverage (assets/equity)} = (\text{profit margin}) \times (\text{asset utilization}) \times (\text{leverage})$. It shows whether high ROE comes from genuine profitability or just thin capital - regulators care deeply about the difference.

Asset quality: $NPL \text{ ratio} = NPLs / \text{gross advances}$ (lower better; >10% is stressed); provision coverage = provisions / NPLs (higher = better cushioned); net NPL ratio after provisions. Rising NPLs with falling coverage is the classic red flag.

Liquidity/funding: ADR (very high = illiquid); CASA ratio = current + savings accounts / total deposits (high CASA = cheap funding, very desirable); LCR (Basel III: high-quality liquid assets / 30-day stressed outflows, must be $\geq 100\%$).

Key Terms

ROA / ROE	Return on assets / equity; core profitability measures.
Cost-to-income	Operating expenses / total income; efficiency gauge.
NPL ratio	NPLs / gross advances; asset-quality headline.
Provision coverage	Provisions / NPLs; cushion against bad loans.

CASA ratio	Share of cheap current/savings deposits in total deposits.
LCR	Liquidity coverage ratio $\geq 100\%$ under Basel III.

Example - DuPont: Net profit 20, assets 2000, equity 160: ROA = 1%, leverage = 12.5x, ROE = 12.5%. Same ROA with equity 100 -> ROE 20% but riskier.

Example - coverage: NPLs 100, provisions 70 -> coverage 70%. If NPLs jump to 150 with provisions still 70, coverage falls to 47% - deteriorating.

Summary

- ✓ Profitability: ROA, ROE, NIM, cost-to-income; DuPont separates margin from leverage.
- ✓ Asset quality: NPL ratio, provision coverage - the credit health dashboard.
- ✓ Funding: CASA (cheap deposits), ADR, LCR for liquidity.

Exam Pointers

- ★ Compute ROA, ROE, NIM and cost-to-income from bank financials.
- ★ Use DuPont to explain two banks with the same ROE but different risk.
- ★ Interpret: NPL ratio rising from 6% to 11% while coverage falls from 85% to 60%.

Unit 3: Credit Analysis and Lending Decisions

Learning Objectives

- Explain the credit appraisal process: the 5 Cs
- Describe financial analysis of borrowers: cash flows, ratios, projections
- Explain credit risk rating and loan pricing
- Describe monitoring, recovery and NPL management

Banks lose money when borrowers don't repay, so credit appraisal precedes every loan. The classic 5 Cs: Character (integrity, repayment history, CIB/credit bureau record); **Capacity (cash flows to service debt - the most important)**; **Capital (borrower's own stake/equity)**; Collateral (security - property, stocks, guarantees); Conditions (industry outlook, economic environment, loan purpose).

Financial analysis of the borrower: trend of sales and profitability, debt-service coverage ratio (DSCR) = operating cash flow / debt service (lenders want $\geq 1.2-1.5x$), leverage ratios, working-capital cycle, and projected cash flows under stress scenarios. Cash flow, not collateral, repays loans - collateral is the second way out.

Risk rating grades each borrower (e.g. 1-10); the rating drives loan pricing (risk premium over the base rate/KIBOR), approval authority (bigger/riskier needs higher sign-off), and provisioning. Risk-based pricing: price = cost of funds + operating cost + expected loss + capital charge + margin.

After disbursement: monitoring (covenants, stock reports, account turnover, early-warning signals like cheque returns), remedial management (rescheduling,

restructuring for viable-but-stressed borrowers), and recovery (legal action, collateral sale) for the rest. Persistent NPLs are sold to collection agencies or written off against provisions.

Key Terms

5 Cs	Character, capacity, capital, collateral, conditions of credit.
DSCR	Debt-service coverage = operating cash flow / debt service; want $\geq 1.2x$.
Risk rating	Internal grade of borrower creditworthiness driving price and approval.
Risk-based pricing	Loan rate = funding cost + opex + expected loss + capital + margin.
Early-warning signals	Cheque returns, covenant breaches, falling turnover hinting at trouble.

Example - DSCR: Borrower's operating cash flow Rs 15M, annual debt service Rs 10M
 $\rightarrow$ DSCR 1.5x - comfortable. At 1.05x, one bad quarter means default.

Example - 5 Cs: A trader seeks Rs 50M: strong cash flows (capacity OK), but two past defaults (character fails) $\rightarrow$ decline or demand full collateral plus higher pricing.

Summary

- ✓ Appraise with the 5 Cs; capacity (cash flow) matters most.
- ✓ DSCR ≥ 1.2 -1.5x; price loans for risk; provision by rating.
- ✓ Monitor covenants and early warnings; restructure the viable, recover from the rest.

Exam Pointers

- ★ Explain the 5 Cs of credit with one check-point each.
- ★ Compute DSCR and give a lending recommendation.
- ★ How does risk rating connect to loan pricing and provisioning?

Unit 4: Risk Management in Banking

Learning Objectives

- Classify banking risks: credit, market, operational, liquidity
- Explain market risk measures: gap analysis, duration, VaR
- Explain operational risk and Basel approaches
- Describe liquidity risk and its management

Banks live with four core risks. Credit risk - borrowers default (covered above; measured via expected loss = PD x LGD x EAD: probability of default x loss given default x

exposure at default). Market risk - rates, prices move against the bank's positions. Operational risk - failures of people, processes, systems, or external events (fraud, IT outages). Liquidity risk - can't meet withdrawals/payment obligations.

Market risk tools: repricing gap - group assets/liabilities by repricing maturity; a positive gap (more assets repricing) means NII rises when rates rise; duration gap refines this for economic value; VaR (value at risk) - 'we are 99% sure the 1-day trading loss won't exceed Rs X' - the standard trading-risk metric, with known limits (it says nothing about the worst 1%).

Operational risk is managed via internal controls, segregation of duties, IT resilience, business continuity plans, and Basel capital charges (basic indicator / standardized approaches). Big operational losses (rogue trading, cyberattacks) have sunk banks.

Liquidity risk: banks borrow short (deposits) and lend long (loans) - the maturity mismatch. Managed via liquid-asset buffers, diversified funding (CASA focus), contingency funding plans, and Basel III's LCR (30-day survival) and NSFR (stable funding over a year).

Key Terms

PD / LGD / EAD	Probability of default, loss given default, exposure at default; $EL = PD \times LGD \times EAD$.
Repricing gap	Rate-sensitive assets minus liabilities per time band; sign predicts NII response.
VaR	Maximum expected loss at a confidence level over a horizon.
LCR / NSFR	Basel III 30-day liquidity buffer / 1-year stable funding ratios.
Operational risk	Loss from failed people, processes, systems or external events.

Example - gap: 1-year bucket: rate-sensitive assets 800, liabilities 600 -> +200 gap. Rates rise 2% -> NII rises ~4. Falls 2% -> NII falls ~4.

Example - EL: Loan 100M, PD 2%, LGD 45%: expected loss = $0.02 \times 0.45 \times 100M = 0.9M$ - the statistical cost priced into the loan.

Summary

- ✓ Four risks: credit ($PD \times LGD \times EAD$), market (gap, duration, VaR), operational, liquidity.
- ✓ Positive repricing gap gains when rates rise; VaR caps trading loss at a confidence level.
- ✓ Liquidity: LCR for 30 days, NSFR for a year; CASA funding is the cheapest defense.

Exam Pointers

- ★ Classify banking risks and name one measurement tool for each.
- ★ Interpret a positive one-year repricing gap when rates rise.
- ★ Compute expected loss from PD, LGD, EAD; explain each component.

Unit 5: Basel Accords and Capital Adequacy

Learning Objectives

- Explain why banks need minimum capital: the regulator's logic
- Trace Basel I -> II -> III: what each added
- Compute CAR with risk-weighted assets
- Explain CET1, Tier 1, Tier 2 and the buffers

Because banks are highly leveraged and their failure is contagious, regulators demand minimum capital adequacy: capital / risk-weighted assets $\geq$ a floor (Basel III: 8% total, plus buffers). Capital absorbs unexpected losses; adequate capital keeps depositors safe and the system stable.

Basel I (1988): simple 8% ratio with crude risk weights (0/20/50/100%). Basel II (2004): three pillars - (1) refined minimum capital (standardized or internal-ratings-based credit risk + market + operational risk charges), (2) supervisory review, (3) market discipline/disclosure. Basel III (post-2008): higher and better-quality capital, capital conservation and countercyclical buffers, a leverage ratio backstop, and liquidity rules (LCR, NSFR).

Computation: risk-weight each asset (cash 0%, mortgages ~35-50%, corporate loans 100%, etc.), sum to get risk-weighted assets (RWA); CAR = eligible capital / RWA. Off-balance-sheet items (guarantees, L/Cs) enter via credit-conversion factors.

Capital quality: CET1 (common equity - shares + retained earnings; must be $\geq$ 4.5% of RWA) absorbs losses first; Additional Tier 1 (perpetual instruments); Tier 2 (subordinated debt). Buffers sit on top: conservation buffer 2.5%, countercyclical up to 2.5%, plus D-SIB surcharges for big banks. Breaching buffers restricts dividends and bonuses - a powerful incentive.

Key Terms

CAR	Capital adequacy ratio = capital / risk-weighted assets; $\geq$ 8%.
RWA	Risk-weighted assets; riskier assets consume more capital.
CET1	Common equity tier 1; highest-quality capital, $\geq$ 4.5%.
Three pillars	Basel II: minimum capital, supervisory review, market discipline.
Conservation buffer	Extra 2.5% CET1; breaching it restricts payouts.

Example - CAR: Capital 120, RWA: cash $0 \times 100 = 0$, mortgages $0.5 \times 400 = 200$, corporate $1.0 \times 800 = 800$ -> RWA 1000 -> CAR 12%. Well above 8%.

Example - buffer bite: CET1 falls to 6% (above 4.5% minimum but inside the 2.5% buffer zone) -> regulator caps dividends until rebuilt.

Summary

- ✓ Capital absorbs unexpected loss; Basel sets minimum quality and quantity.

- ✓ I: simple 8%; II: three pillars + refined risk; III: better capital + buffers + liquidity + leverage.
- ✓ CAR = capital/RWA; CET1 $\geq$ 4.5% + 2.5% conservation buffer.

Exam Pointers

- ★ Why do regulators impose capital adequacy on banks?
- ★ Compare what Basel I, II and III each added.
- ★ Compute CAR from a simplified balance sheet with risk weights.

Unit 6: Bank Performance Analytics and CAMEL

Learning Objectives

- Apply the CAMEL rating framework
- Benchmark banks: peer comparison and trend analysis
- Explain funds transfer pricing (FTP) basics
- Use dashboards: KPIs analysts actually track

Regulators and analysts grade banks with CAMEL: Capital adequacy (CAR, leverage), Asset quality (NPL ratio, coverage, provisioning), Management (governance, strategy, risk culture - qualitative), Earnings (ROA, ROE, NIM, cost-to-income, earnings stability), Liquidity (LCR, ADR, funding mix). Each scored 1 (best) to 5; composite rating drives supervisory intensity. (Extended: CAMELS adds Sensitivity to market risk.)

Benchmarking: compare ratios against peer banks (same size/market) and against the bank's own 5-year trend. A 1.2% ROA means little alone; top-quartile among peers with a rising trend means a lot. Common peer cuts: large vs mid-size banks, Islamic vs conventional.

Funds transfer pricing (FTP) is how banks measure branch/product profitability internally: the treasury 'buys' deposits from branches at a transfer rate and 'sells' funds to lending units - revealing which branches and products truly create value after adjusting for the bank's funding cost and maturity mismatch.

The analyst's dashboard: growth (advances, deposits, CASA), profitability (NIM, ROA, ROE, cost-to-income), quality (NPLs, coverage, credit cost), capital (CAR, CET1), liquidity (LCR, ADR), market (P/E, dividend yield, price-to-book). Analytics turns these into early warnings: e.g. advances growing 30% while NPL recognition lags often precedes a provisioning shock.

Key Terms

CAMEL(S)	Regulatory rating: Capital, Asset quality, Management, Earnings, Liquidity (+Sensitivity).
Benchmarking	Peer and trend comparison giving ratios meaning.

FTP	Funds transfer pricing; internal pricing of funds to measure unit profitability.
Credit cost	Annual provisions / average advances; the P&L; price of bad loans.

Example - CAMEL read: Bank X: CAR 14% (1), NPL 12% coverage 55% (4), ROE volatile 8-18% (3), LCR 95% (4) -> composite weak despite good capital - asset quality and liquidity need action.

Example - early warning: Advances +35% YoY, NPL ratio flat at 3% (suspiciously), coverage falling -> likely evergreening; provisions will spike later.

Summary

- ✓ CAMEL(S) grades capital, asset quality, management, earnings, liquidity, sensitivity 1-5.
- ✓ Benchmark vs peers and vs own trend; FTP reveals true unit profitability.
- ✓ Track the dashboard; fast loan growth + flat NPLs = coming provisioning shock.

Exam Pointers

- ★ Explain each CAMEL component with two ratios.
- ★ How does benchmarking change the interpretation of a 1.1% ROA?
- ★ What is FTP and why do banks use it?

Unit 7: Islamic Banking Analytics and Digital Banking

Learning Objectives

- Contrast Islamic and conventional bank financials
- Explain key Islamic modes: Murabaha, Ijara, Salam, Istisna, Musharaka
- Describe digital banking analytics: KPIs and risks
- Discuss fintech competition and open banking trends

Islamic banking avoids interest (riba): deposits are profit-sharing investment accounts (Mudaraba) or safekeeping (Wadiah); financing uses Sharia-compliant modes. Analysts adjust: 'NIM' becomes net profit margin from financing, and deposit 'cost' is the profit paid to depositors. Asset-quality and capital analytics otherwise carry over.

Key modes: Murabaha (cost-plus sale - the workhorse for trade finance); Ijara (leasing); Salam (advance payment for future delivery - agriculture); Istisna (manufacturing/construction order); Musharaka/Mudaraba (partnership/profit-sharing - true risk-sharing). Each has distinct risk profiles (e.g. Salam carries commodity-price risk) that analytics must capture.

Digital banking shifts analytics to: customer acquisition cost, digital adoption (active app users), cost-per-transaction (digital ~near-zero vs branch), net promoter score, fraud rates, and IT operational risk. Branch-light banks show structurally lower cost-to-income - the strategic prize.

Fintech/open banking: wallets, P2P payments and digital lenders unbundle bank services; open banking (API-based data sharing) intensifies competition. Banks respond with digital arms, partnerships, and analytics on customer lifetime value. The analyst's question stays the same: who earns sustainable risk-adjusted returns?

Key Terms

Riba	Interest; prohibited in Islamic finance.
Murabaha / Ijara	Cost-plus sale / lease; main Islamic financing modes.
Musharaka	Profit-and-loss sharing partnership.
Digital adoption	Share of customers actively using digital channels.
Open banking	API-based sharing of banking data enabling third-party services.

Example - Murabaha: Bank buys machinery for 10M, sells to client at 11M payable over 2 years - the 1M markup (not interest) is the bank's income, disclosed upfront.

Example - digital KPI: Cost per branch transaction Rs 150 vs Rs 5 via app; migrating 1M transactions/month saves ~Rs 145M monthly - visible in cost-to-income within a year.

Summary

- ✓ Islamic banks replace interest with profit-sharing and trade-based modes; analytics adapt accordingly.
- ✓ Know Murabaha, Ijara, Salam, Istisna, Musharaka and their risk profiles.
- ✓ Digital KPIs: adoption, cost-per-transaction, fraud; fintech competition is the strategic backdrop.

Exam Pointers

- ★ How do Islamic bank financials differ from conventional ones?
- ★ Explain Murabaha and Ijara with examples.
- ★ Name four digital-banking KPIs and explain why each matters.