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HANDOUT

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.