Bank & Financial Institution Modeling:
– Certification Quiz Questions
Module 2 – Bank Operating Model

1. You are building a 3-statement projection model with Base, Upside, and Downside Scenarios for a commercial bank in a developed country. The Base and Upside cases assume modest, steady GDP growth, while the Downside case assumes a 2-year recession followed by a recovery. The screenshot below shows the key assumptions:

		Historical					Projected				
Loan Portfolio Projections:	**Units:**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Nominal GDP Growth Rates:											
Base	%						2.5%	2.5%	2.0%	2.0%	2.0%
Upside	%						3.0%	3.5%	3.5%	3.0%	3.0%
Downside	%						0.5%	(3.0%)	(3.0%)	1.0%	2.0%
Selected Nominal GDP Growth Rate:	%	1.5%	2.0%	1.2%	2.2%	2.9%	2.5%	2.5%	2.0%	2.0%	2.0%
Lending Market Share:											
Selected Market Share Percentage:	%	0.01%	0.01%	0.06%	0.15%	0.27%	0.40%	0.50%	0.60%	0.70%	0.80%
Base	%						0.40%	0.50%	0.60%	0.70%	0.80%
Upside	%						0.45%	0.60%	0.75%	0.85%	1.00%
Downside	%						0.35%	0.40%	0.50%	0.60%	0.70%

		Historical					Projected				
Charge-Offs & Loan Loss Reserves:	**Units:**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net Charge-Offs % Average Gross Loans:	%			0.05%	0.09%	0.05%	0.11%	0.11%	0.12%	0.12%	0.13%
Base	%						0.11%	0.11%	0.12%	0.12%	0.13%
Upside	%						0.10%	0.10%	0.11%	0.11%	0.12%
Downside	%						0.10%	0.09%	0.08%	0.10%	0.11%
Provisions for Credit Losses % Average Loan Balances:											
Selected Provision for CLs % Average Loans:	%			0.23%	0.08%	0.13%	0.15%	0.16%	0.17%	0.18%	0.19%
Base	%						0.15%	0.16%	0.17%	0.18%	0.19%
Upside	%						0.15%	0.15%	0.16%	0.16%	0.16%
Downside	%						0.13%	0.12%	0.10%	0.11%	0.12%

What is the MAIN problem with these assumptions?

a. The assumed GDP growth rates are not different enough in the different cases.

b. The bank's Lending Market Share grows far too rapidly in all the cases, and the historical data doesn't support these projected growth rates.

c. The Net Charge-Offs and Provisions for Credit Losses as percentages of Average Loans should *increase* in the recession years of the Downside case.

d. In the Base and Upside cases, the Net Charge-Offs and Provisions for Credit Losses should increase to significantly higher levels.

e. All of the above.

2. **You are analyzing a bank's Net Charge-Offs, Non-Performing Loans, and Reserves in a 3-statement projection model. The screenshot below shows a summary of the model:**

Charge-Offs & Loan Loss Reserves:	Units:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
				Historical					Projected		
Gross Loan Balance:	£ M	23.4	111.0	748.0	1,352.3	2,295.9	2,828.3	3,392.6	4,183.3	4,779.5	5,392.0
Gross Loans, Net of Charge-Offs:	£ M	23.4	111.0	748.0	1,352.3	2,295.9	2,825.5	3,386.3	4,172.5	4,763.3	5,369.3
Average Loan Balance:	£ M		67.2	429.5	1,050.2	1,824.1	2,560.7	3,105.9	3,779.4	4,467.9	5,066.3
Impaired Loans (Non-Performing Loans):	£ M	2.6	0.5	3.1	8.6	13.2	27.3	41.9	59.8	82.0	107.1
% Allowance for Loan Losses:	%		159.3%	109.8%	159.3%	118.9%	136.8%	136.8%	136.8%	136.8%	136.8%
Key Metrics & Ratios:											
Net Charge-Off Ratio:	%	N/A	-	0.05%	0.09%	0.05%	0.11%	0.11%	0.12%	0.12%	0.13%
Net Charge-Offs / Reserves:	%	20.00%	-	7.14%	16.67%	9.01%	14.15%	11.18%	10.39%	8.97%	8.45%
Reserve Ratio:	%	6.41%	0.27%	0.37%	0.40%	0.48%	0.70%	0.90%	1.05%	1.26%	1.46%
NCO / Prior Year Provision:	%	N/A	-	100.0%	33.3%	28.6%	42.1%	29.4%	32.2%	30.4%	30.7%
NPLs / Gross Loans:	%	10.9%	0.4%	0.4%	0.6%	0.6%	1.0%	1.2%	1.4%	1.7%	2.0%

Which of the following conclusions might be reasonable, based on these metrics and ratios?

a. The bank is over-provisioning for expected Charge-Offs in the projection period.

b. The bank's Non-Performing Loans as a % of Gross Loans rise to a concerning level by the end of the projection period.

c. The projection methodology for the Non-Performing Loans is questionable because they don't necessarily trend with the Allowance for Loan Losses.

d. The bank's Allowance for Loan Losses may be increasing to too high a level over the projection period.

3. **You're still working on the same 3-statement projection model for a bank described in the previous questions. How would you expect the Yields, Spreads, and Interest Rates to differ in the different cases?**

   a. The benchmark rate, such as LIBOR or the Federal Funds Rate, will be lowest in the Downside case and higher in the other cases since central banks tend to cut rates during recessions and increase rates when the economy expands.

   b. The Yields on Interest-Earning Assets will be higher in the Base and Upside cases.

   c. The Yields on Interest-Earning Assets will be about the same in all the cases, but the Interest Rates paid on Interest-Bearing Liabilities will be lowest in the Downside case.

   d. The Spreads against the benchmark rate will rise over time for both Interest-Earning Assets and Interest-Bearing Liabilities.

4. **You are completing the Cash Flow Statement projections for a commercial bank. To determine the "Change in Loans" item under Cash Flow from Operations, you do NOT link to the Gross Loans figures on the Balance Sheet, but to the Gross Loans Prior to Net Charge-Offs on a separate schedule.**

   Your co-worker sees that and claims that it's incorrect. Who's right?

   a. The co-worker is right – you should link to Net Loans on the Balance Sheet instead.

   b. You're right – since Net Charge-Offs affect both the Allowance for Loan Losses and Gross Loans on the Balance Sheet, they cancel out, and only the Loan Additions and Provisions for CLs affect the Net Loans figure.

   c. You're right – Net Charge-Offs show up as a separate line item on the Cash Flow Statement, so if you linked to Gross Loans After Charge-Offs, you'd be double-counting.

   d. The co-worker is right – Since the Provision for CLs affects the Allowance for Loan Losses, and Loan Additions and Net Charge-Offs affect Gross Loans, you must link to the Balance Sheet figures to reflect everything.

5. You are building a 3-statement projection model for a bank with a 13% Targeted CET 1 Ratio. To project the bank's Dividends, you first multiply this 13% by the bank's Risk-Weighted Assets to determine its Minimum CET 1.

   Then, you compare that figure to the bank's CET 1 prior to Dividends, Stock Issuances, and Stock Repurchases in the year ("Available CET 1"). If that figure exceeds the Minimum CET 1, the bank issues Dividends.

   Each year in the model, the bank issues Dividends equal to Available CET 1 minus Minimum CET 1. Despite that, its CET 1 Ratio increases to 17% over time, far above the 13% target. What might explain this result?

   a. To calculate the Minimum CET 1, you are linking to the Beginning Risk-Weighted Assets rather than the Average RWA to avoid circular references.

   b. The bank issues a significant amount of Stock via follow-on equity offerings in the projected years.

   c. The bank sharply reduces its Stock Repurchases below historical levels in the projected years.

   d. All of the above.

6. You are attempting to estimate a bank's Liquidity Coverage Ratio (LCR). The bank discloses the LCR percentage, but not the calculations that go into it. However, the bank is a small, pure-play firm with a simple Balance Sheet that includes mostly Cash and Loans on the Assets side, and mostly Deposits and a small amount of Debt on the Liabilities & Equity side.

   You estimate the LCR based on Liquid Assets and Net Cash Outflows linked to a 10% Deposit Run-Off Rate and 50% of Lease and Installment Credit repayments:

Liquidity Coverage Ratio Calculations:	Units:	Year 1	Year 2	Historical Year 3	Year 4	Year 5
Run-Off Rate - Retail Deposits:	10.0%					
% Qualifying Retail and SME Repayments:	50.0%					
Finance Lease Receivables (<= 1 Year):	£ M			£ 44.1	£ 52.4	£ 54.7
% Gross Loans:	%			5.9%	3.9%	2.4%
Installment Credit Receivables (<= 1 Year):	£ M			109.0	125.4	149.3
% Gross Loans:	%			14.6%	9.3%	6.5%
Liquid Assets:						
(+) Cash:	£ M			0.2	206.6	313.1
(+) Marketable Sec. - Central Banks/Sovereigns:	£ M			-	-	-
(+) Debt Securities - Central Banks/Sovereigns:	£ M			144.9	-	-
(+) Other Securities and Bonds:	£ M			-	-	-
Total Liquid Assets:	£ M			145.1	206.6	313.1
Net Cash Outflows:						
(+) Percentage of Retail and SME Deposits:	£ M			92.4	146.3	242.1
(+) Unsecured Wholesale Deposits:	£ M			-	-	-
(+) Secured Funding:	£ M			-	-	-
(+) Derivatives Payable:	£ M			-	-	-
(+) Committed Credit & Contractual Obligations:	£ M			-	-	-
(-) Reverse Repo and Securities Borrowing:	£ M			-	-	-
(-) Lines of Credit and Operational Deposits:	£ M			-	-	-
(-) % of Retail / SME Scheduled Repayments:	£ M			(76.6)	(88.9)	(102.0)
Total Net Cash Outflows:	£ M			15.8	57.4	140.1
Liquidity Coverage Ratio (LCR):	%	N/A	N/A	917.2%	359.9%	223.5%
Company-Reported LCR:	%	N/A	N/A	N/A	N/A	326.0%

What is the MOST LIKELY reason why your estimate for the LCR differs significantly from the company-reported LCR?

a. The company has additional Liquid Assets, such as certain Loans or Derivatives, that increase the numerator of the LCR.

b. The company is projecting its Net Cash Outflows in the "stressed 30-day period" based on its full Cash Flow Statement, not just the items shown here.

c. The company might be assuming a lower Run-Off Rate for its Deposits, or it might be excluding a portion of its Total Deposits from the figure.

d. The percentage of Qualifying Lease and Installment Credit repayments may be significantly lower than the 50% assumed here.

7. **This same company also discloses very little information about its Net Stable Funding Ratio (NSFR) – just the percentage, but not the calculations that go into it. To make estimates, you've set the Available Stable Funding (ASF) equal to the bank's Total Regulatory Capital plus its Total Deposits, discounted by a small percentage for shorter-term accounts.**

   Then, to estimate its Required Stable Funding (RSF), you've included all Off-Balance Sheet Assets, a percentage of Net Loans with maturities of under one year, a percentage of Net Loans with maturities of over one year, and all other On-Balance Sheet Assets. You've also weighted each item by an Adjustment Factor, such as 65% or 85%.

   You have also subtracted the Encumbered Net Loans from the Total Net Loans before including their contribution to Required Stable Funding.

   What is INCORRECT about these calculations for the Net Stable Funding Ratio?

   a. In the Available Stable Funding number, you should use the bank's CET 1, not its Total Capital.

   b. You should use only a smaller portion of the bank's Total Deposits in the ASF number since some of the Deposits are shorter-term and not truly "stable."

   c. You should not subtract Encumbered Net Loans in the RSF calculations; the bank still needs funding to back them up.

   d. It is incorrect to include PP&E, Other Intangible Assets, and Deferred Tax Assets in the RSF calculation since they do not relate to the bank's core lending business.

   e. Nothing is "wrong," necessarily, but your estimate might be off because the Adjustment Factors are difficult to figure out unless the company discloses its calculations.

8. When calculating the summary statistics in a bank operating model, you notice that the Return on Equity (ROE) and Return on Tangible Common Equity (ROTCE) both increase over time, while the Return on Assets (ROA) and Return on Tangible Assets (ROTA) decrease slightly over time. Which of the following statements correctly explains this result and the implications for the bank's regulatory capital ratios?

    a. You didn't tie Dividends to the Targeted CET 1 Ratio; therefore, ROA and ROTA both decline when they should increase.

    b. It means that Non-Interest-Earning Assets increase by more than Interest-Earning Assets, but it does not make a predictable impact on the regulatory capital ratios.

    c. It means that Non-Interest-Earning Assets decrease by more than Interest-Earning Assets, and it also implies that the bank's regulatory capital ratios decline.

    d. None of the above – it is not possible for ROE and ROTCE to increase as ROA and ROTA decrease.

9. You've finished a 3-statement projection model for a commercial bank, but you get an odd result at the end: The bank's final year CET 1 Ratio is highest in the Downside case and lowest in the Upside case.

    Which assumptions MOST LIKELY explain this result, and does this result indicate that your model is wrong?

    a. This happened because of lower Loan Growth in the Downside case but the same CET 1 Target; it's not necessarily wrong because the bank's ROE and ROTCE are also likely to be lower in the Downside case, which implies lower multiples.

    b. This happened because of lower Loan Growth in the Downside case but the same CET 1 Target; it's wrong because the bank's valuation is based on TBV, and its TBV should always be lowest in the Downside case.

    c. This happened because of different CET 1 Targets but similar Loan Growth assumptions in the different cases; it's not "wrong," but it is misleading since the projected TBV should be lowest in the Downside case.

d. This happened because of different CET 1 Targets but similar Loan Growth assumptions in the different cases; it's incorrect because the assumptions should be the opposite of these.

10. You are reviewing a bank model summary that one of your Analysts has prepared. Based on the metrics and ratios below, what might be your TOP question for this Analyst?

Summary of Financial Model:	Units:	Historical					Projected				
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Balance Sheet Summary:											
Net Loans:	£ M	21.9	110.7	745.2	1,346.9	2,284.8	2,805.5	3,355.7	4,128.7	4,703.4	5,291.0
Total Assets:	£ M	39.1	214.8	1,044.1	1,668.0	2,754.0	3,333.5	3,949.0	4,815.2	5,467.6	6,141.7
Deposits:	£ M	29.7	180.4	923.7	1,463.0	2,421.0	2,723.8	3,165.8	3,787.8	4,275.8	4,810.0
Total Liabilities & Equity:	£ M	39.1	214.8	1,044.1	1,668.0	2,754.0	3,333.5	3,949.0	4,815.2	5,467.6	6,141.7
Book Value:	£ M	4.2	30.3	99.2	135.5	218.7	364.9	461.4	556.6	658.0	763.1
Tangible Book Value:	£ M	4.2	24.9	84.2	113.3	169.2	311.9	404.2	494.3	589.8	688.3
Risk-Weighted Assets (RWA):	£ M	11.3	53.6	479.0	822.0	1,461.0	1,863.0	2,399.4	3,161.1	3,725.0	4,330.6
Operational Metrics & Ratios:											
Return on Common Equity:	%	N/A	(46.4%)	(10.5%)	10.9%	19.5%	18.6%	16.0%	16.3%	16.3%	16.0%
Return on Tangible Common Equity:	%	N/A	(55.0%)	(12.4%)	13.0%	24.4%	22.6%	18.5%	18.5%	18.3%	17.7%
Return on Equity:	%	N/A	(46.4%)	(10.5%)	10.9%	19.5%	18.6%	16.0%	16.3%	16.3%	16.0%
Return on Assets:	%	N/A	(6.3%)	(1.1%)	0.9%	1.6%	1.8%	1.8%	1.9%	1.9%	2.0%
Return on Tangible Assets:	%	N/A	(6.4%)	(1.1%)	1.0%	1.6%	1.8%	1.8%	1.9%	2.0%	2.0%
Net Charge-Off Ratio:	%	N/A	-	0.05%	0.09%	0.05%	0.11%	0.11%	0.12%	0.12%	0.13%
Net Charge-Offs / Reserves:	%	20.00%	-	7.14%	16.67%	9.01%	14.15%	11.18%	10.39%	8.97%	8.45%
Reserve Ratio:	%	6.41%	0.27%	0.37%	0.40%	0.48%	0.70%	0.90%	1.05%	1.26%	1.46%
Net Loans / Deposits:	%	73.7%	61.4%	80.7%	92.1%	94.4%	103.0%	106.0%	109.0%	110.0%	110.0%
Net Interest Margin:	%	N/A	1.5%	3.6%	4.7%	5.5%	5.4%	5.3%	5.3%	5.2%	5.2%
Spread Between IEA and IBL Rates:	%	N/A	1.1%	3.4%	4.9%	5.7%	5.5%	5.3%	5.3%	5.2%	5.1%
Net Interest Income / Revenue:	%	64.3%	81.8%	85.4%	91.3%	91.5%	92.1%	91.9%	92.0%	91.9%	91.8%
Overhead Ratio:	%	97.6%	503.9%	104.8%	64.7%	51.4%	46.2%	44.7%	42.6%	41.3%	39.9%
Dividend Payout Ratio:	%	-	-	-	-	-	-	10.0%	30.0%	35.0%	40.0%
Regulatory Capital:											
Common Equity Tier 1 (CET1) Ratio:	%	37.1%	46.4%	17.6%	13.8%	11.6%	16.7%	16.8%	15.6%	15.8%	15.9%
Tier 1 Capital Ratio:	%	37.1%	46.4%	17.6%	13.8%	11.6%	16.7%	16.8%	15.6%	15.8%	15.9%
Total Capital Ratio:	%	37.1%	46.4%	17.7%	17.3%	13.9%	18.9%	18.9%	17.6%	17.8%	17.9%
Leverage Ratio:	%	N/A	N/A	N/A	6.8%	6.2%	9.4%	10.2%	10.2%	10.7%	11.2%
Tangible Common Equity (TCE) Ratio:	%	10.7%	11.9%	8.2%	6.9%	6.3%	9.5%	10.4%	10.4%	10.9%	11.3%
Liquidity Coverage Ratio (LCR):	%	N/A	N/A	917.2%	359.9%	223.5%	235.4%	240.9%	230.5%	232.3%	218.0%
Net Stable Funding Ratio (NSFR):	%	169.1%	168.8%	142.5%	150.6%	160.4%	160.9%	164.6%	164.7%	169.2%	174.9%

a. Why does the Net Loans / Deposits ratio increase to a significantly higher level by the end of the projection period?

b. How can this bank maintain such high ROCE, ROTCE, and ROE metrics even as its Loan Portfolio more than doubles?

c. Why are you assuming that this bank's CET 1 and other capital ratios stay far above the minimums, even though the bank could issue more Dividends to boost its Returns-based metrics?

d. Why do the ROE, ROTCE, and ROCE decrease while the ROA and ROTA both increase?

e. Why does the IEA/IBL Spread decrease even though it has increased substantially in the historical period?