Measuring and Evaluating Bank Performance
The purpose of this session is to discover what analytical tools can be applied to a bank’s financial statements so that management and the public can identify the most critical problems inside each bank and develop ways to deal with those problems.
Introduction

• Banks today are under great pressure to perform due to ever rising expectations of their
  – Stockholders, Employees, Depositors etc.

• Banks entry in open market for funds raising means their financial statements are being scrutinised by investors and general public regularly

• As a result there is a need of performance evaluation not only for banks itself but whole community of stockholders, employees, depositors, borrowing customers, and government regulators.
Introduction

- Two important dimensions for any bank-
  *profitability* and *risk*

- Some banks want to grow faster and achieve
  some long range growth objectives. Others
  seem to prefer a quiet life, minimising risk and
  conveying the image of a sound bank but with
  modest rewards for their shareholders

- If stock fails to rise in value correspond to
  stockholders expectations, current investors
  may seek to unload their shares and the bank
  will have difficulty in raising new capital to
  support its future growth.
Value of the Bank’s Stock

\[ P_0 = \text{Expected stream of future stockholder dividends} \div \text{Discount factor (based on the minimum required market rate of return on equity capital given each bank perceived level of risk)} \]

\[ P_0 = \sum_{t=0}^{\infty} \frac{E(D_t)}{(1 + r)^t} \]

\[ E(D_t) = \text{expected dividend stream} \]

\[ r = \text{cost of capital} \sim \text{risk free return + equity risk premium} \]
Value of a Bank’s Stock Rises When:

• Expected Dividends Increase

• Risk to the Bank Falls

• Combination of Expected Dividend Increase and Risk Decline
Profitability Ratios in Banking

• Bank Profitability: The net after tax income or net earning of a bank (usually divided by a measure of bank size).

• Some of key ratios are given below:

  \[
  \text{Return on Equity Capital (ROE)} = \frac{\text{Net Income After Taxes}}{\text{Total Equity Capital}}
  \]

  \[
  \text{Return on Assets (ROA)} = \frac{\text{Net Income After Taxes}}{\text{Total Assets}}
  \]

  \[
  \text{Net Interest Margin} = \frac{\text{Net Interest Income}}{\text{Total Assets}}
  \]
Profitability Ratios in Banking

**Net Noninterest Margin** = \( \frac{\text{Net Noninterest Income}}{\text{Total Assets}} \)

**Net Bank Operating Margin** = \( \frac{\text{Total Operating Revenues} - \text{Total Operating Expenses}}{\text{Total Assets}} \)

**Earnings Per Share (EPS)** = \( \frac{\text{Net Income After Taxes}}{\text{Common Equity Shares Outstanding}} \)
Profitability Ratios in Banking

• Banks normally borrow from savers and lend to the investors. A key measure of the success of this intermediation function is certainly the spread between the yield on average earning assets to the cost rate on interest-bearing sources of funds. That is, to measure the true cost of intermediation, we must look at:
  – Yield Spread = (Percent yield on average earning assets -- Percent cost on interest-earning sources of funds)
Profitability Ratios in Banking

• Are ROA and ROE equal good proxies for the return of ownership of a financial institution? Does it matter which earnings ratio we use?

• The answer is yes, because ROA and ROE reveal different information about a bank or other financial institution.

• ROA is a measure of efficiency. It conveys information on how well the institution’s resources are being used in order to generate income.
Profitability Ratios in Banking

• ROE is a more direct measure of returns to the shareholders. Since the reward to the owners are a key goal for the whole organization, ROE is generally superior to ROA as a measure of profitability.

• One point should be obvious here: ROE is strongly influenced by the capital structure of a financial institution, in particular, how much use it makes of equity financing.
Profitability Ratios in Banking

• Management may be able to boost ROE simply by greater use of financial leverage— that is, increasing the ratio of debt to equity capital. This can be seen clearly if we note that

$$\text{ROE} = \text{ROA} \times \left( \frac{\text{total assets}}{\text{total equity capital}} \right)$$

or equivalently,

$$\text{ROE} = \text{ROA} \times \left( \frac{\text{total equity} + \text{total debt}}{\text{total equity}} \right)$$
Profitability Ratios in Banking

- The elements which make up ROE can be derived by multiplying together three other financial ratios:
  - Ratio of net income to total operating income (revenue). This is known as the profit margin.
  - Ratio of operating income to total assets--known as asset utilization ratio.
  - Ratio of total assets to equity capital--known as equity multiplier.
  
  \[ \text{ROE} = \frac{\text{NI}}{\text{TE}} = \left( \frac{\text{NI}}{\text{OI}} \right) \times \left( \frac{\text{OI}}{\text{TA}} \right) \times \left( \frac{\text{TA}}{\text{TE}} \right) \]
Profitability Ratios in Banking

• ROE = (Profit margin x Asset utilization x Equity multiplier)
  – The importance of the above formula is that it can aid management in pinpointing where the problem lies if a financial institution’s ROE is lower or falling.
  – For example, if the profit margin is falling, this implies that less net income is being recovered from each dollar of operating revenue.
Profitability Ratios in Banking

• The causes of this problem would be due to:
  – lack of adequate expense control
  – below-par tax management practices
  – inappropriate pricing of services
  – ineffective marketing strategies

• However, if ROE, is low or declining due to a decreasing asset utilization ratio, we need to review the institution’s asset management policies—particularly the yield and mix of its loans and security investment and the size of its cash or liquidity.
Profitability Ratios in Banking

- Finally, the equity multiplier sheds light on the financing mix of the institution -- what proportion of assets are supported by owner’s equity (particularly stock and retained earnings) as opposed to debt capital.
Breakdown Analysis of ROE

ROE = Tax management efficiency \times Expense control efficiency \times Asset management efficiency \times Funds management efficiency

\[
ROE = \frac{\text{Net income after tax}}{\text{Net income before taxes and securities gain (losses)}} \times \frac{\text{Net income before taxes and securities gain (losses)}}{\text{Total operating revenues}} \times \frac{\text{Total operating revenues}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Total equity capital accounts}}
\]
Breakdown Analysis of Bank’s ROA

ROA = Interest margin + Non-interest margin – Special income margin

• (Where special income and expense items = Provision for loan losses + taxes + securities gain or losses + extraordinary income or losses)

\[
ROA = \frac{\text{Net interest income}}{\text{Total assets}} + \frac{\text{Net non-interest income}}{\text{Total assets}} - \frac{\text{Special income and expense items}}{\text{Total assets}}
\]
Barclays Bank Profitability Ratios

- Return on equity is quite high and stable over time with exception of 1997-98 and 2001.

- Net interest margin declined during 1997 and 2000 showing less revenues from loans and high costs of deposits. Otherwise it remained stable.

- Commission fee income relative to expenses remained also stable over the study period. This highlights the fact that Barclays had been successfully marketing its fee-paying business.

- Earning per share improved significantly benefiting shareholders in Barclays.
Barclays Bank Profitability Ratios

• Overall profitability ratios for Barclays show high returns to shareholders as well as management control on costs items.

• Most of the profitability and efficiency ratios for the Barclays remained stable over the study period, showing the consistency of management policies.
However…

• Profitability taken in isolation is only half the story.

• We also need to know about risk exposure….
Bank Risks

• Credit Risk
• Liquidity Risk
• Market Risk
• Interest Rate Risk
• Earnings Risk
• Solvency Risk
Credit Risk

• The Probability that Some of the Bank’s Assets Will Decline in Value and Perhaps Become Worthless
Credit Risk Measures

- Non-performing Loans/Total Loans
- Net Charge-Offs (Written Off Loans)/Total Loans
- Provision for Loan Losses/Total Loans
- Provision for Loan Losses/Equity Capital
- Total Loans/Total Deposits
Liquidity Risk

• Probability the Bank Will Not Have Sufficient Cash and Borrowing Capacity to Meet Deposit Withdrawals and Other Cash Needs
Liquidity Risk Measures

- Purchased Funds (Eurodollars, federal funds, large value certificate of deposits (CDs) and commercial papers)/Total Assets
- Net Loans/Total Assets
- Cash assets and Due from Banks/Total Assets
- Cash assets and Government Securities/Total Assets
Market Risk

• Probability of the Market Value of the Bank’s Investment Portfolio Declining in Value Due to a Rise in Interest Rates
Market Risk Measures

- Book-Value of Assets/ Estimated Market Value of Assets

- Book-Value of Equity/ Market Value of Equity

- Market Value of Bonds/Book-Value of Bonds

- Market Value of Preferred Stock and Common Stock
Interest Rate Risk

• The Danger that Shifting Interest Rates May Adversely Affect a Bank’s Net Income, the Value of its Assets or Equity
Interest Rate Risk Measures

• Interest Sensitive Assets/Interest Sensitive Liabilities
• Uninsured Deposits/Total Deposits
Earnings Risk

• The Risk to the Bank’s Bottom Line – Its Net Income After All Expenses
Earnings Risk Measures

- Standard Deviation of Net Income
- Standard Deviation of ROE
- Standard Deviation of ROA
Solvency or Default Risk

• Probability of the Value of the Bank’s Assets Declining Below the Level of its Total Liabilities. The Probability of the Bank’s Long Run Survival
Solvency Risk Measures

• Stock Price/Earnings Per Share

• Equity Capital/Total Assets

• Purchased Funds/Total Liabilities

• Equity Capital/Risk Assets
Credit Risk

• Total loans to total deposits: As this ratio grow, banks examiners may become more concerned because they may endanger the interest of depositors.

• Non-performing loans to total loans and leases: The rise in this ratio signals that bank’s credit risk is increasing. If this ratio persistently rise, then bank’s failure may be just around the corner.

• Annual provision for loan losses/Total loans and leases: The increase in this ratio signals that the management is having enough funds to control the bad loans. More is better.
Liquidity Risk

- Net loans to total assets: Higher the value of the ratio, lower cash available and higher chance to liquidity crunch.
- Cash and due to total assets: The higher the value higher the liquidity. More is better.
- Cash asset and government securities to total assets: Higher the value, more easily the bank can convert these securities into cash. More is better.
- Purchased funds to total assets: Higher use of purchased funds increase the chances of liquidity crunch
Interest Rate Risk

• Ratio of interest sensitive assets to interest sensitive liabilities: When interest sensitive assets exceeds interest sensitive liabilities in a particular maturity range, a bank is vulnerable to falling interest rate. Same is the case for opposite.
Earning Risk

• Standard Deviation: The higher the standard deviation or variance of bank income, the more risky the banks earning picture is.
Solvency/Default Risk

- **PE**: This ratio often falls if investors come to believe that a bank is undercapitalised relative to the risks it has taken on.
- **Ratio of equity capital to assets**: A decline in equity funding relative to assets may indicate increased risk exposure for the banks shareholders and debtholders.
- **Ratio of equity capital to risk assets**: It reflects how well current bank capital covers potential losses from these assets most likely to decline in value.
Economic value added (EVA) …an approach to measuring performance that compares a bank’s (or line of business) net operating profit after-tax (NOPAT) with a capital charge.

- Economic Value Added (EVA) is the capital charge which represents the required return to stockholders assuming a specific allocated risk capital amount.
Economic Value Added (EVA)

- EVA measures the extent to which the firm has increased shareholder value in a given year.

- EVA represents the residual value that remains after the cost of all capital, including equity capital has been deducted.

- Increase Economic Value Added (EVA)
  - Increase operating efficiency
  - Commit new resources that promise a high return
  - Redirect resources to more productive uses
  - Make prudent use of tax benefits of debt financing
Some analysts criticize traditional earnings measures such as ROE, ROA, and EPS because they provide no information about how a bank’s management is adding to shareholder value.

• If the objective of the firm is to maximize stockholders’ wealth, such measures do not indicate whether stockholder wealth has increased over time, let alone whether it has been maximized.

• Stern, Stewart & Company has introduced the concepts of market value added (MVA) and its associated economic value added (EVA) in an attempt to directly link performance to shareholder wealth creation.
Market and economic value added

• MVA represents the increment to market value and is determined by the present value of current and expected economic profit:

\[ MVA = \text{Mkt Value of Capital} - \text{Hist. Amt of Invested Capital} \]

• Stern Stewart and Company measures economic profit with EVA, which is equal to a firm's operating profit minus the charge for the cost of capital:

\[ EVA = \text{Net Operating Profit After Tax (NOPAT)} - \text{Capital Charge} \]

where the capital charge equals the product of the firm’s value of capital and the associated cost of capital.
Difficulties in measuring EVA for the entire bank

• It is often difficult to obtain an accurate measure of a firm's cost of capital.

• The amount of bank capital includes not just stockholders' equity, but also includes loan loss reserves, deferred (net) tax credits, non-recurring items such as restructuring charges and unamortized securities gains.

• NOPAT should reflect operating profit associated with the current economics of the firm. Thus, traditional GAAP-based accounting data, which distort true profits, must be modified to obtain estimates of economic profit.
### A. Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>$Millions</th>
<th>Rate</th>
<th>Liabilities &amp; Equity</th>
<th>$Millions</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>$150</td>
<td>0</td>
<td>Demand deposits</td>
<td>$800</td>
<td></td>
</tr>
<tr>
<td>Securities</td>
<td>$800</td>
<td>6.5%</td>
<td>MMDAs</td>
<td>$1800</td>
<td>3%</td>
</tr>
<tr>
<td>Commercial loans</td>
<td>$2000</td>
<td>9.0%</td>
<td>CDs</td>
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<td>5.5%</td>
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<tr>
<td>Credit card loans</td>
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<td>10.0%</td>
<td>Small time deposits</td>
<td>$680</td>
<td>4.5%</td>
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<tr>
<td>-Loss reserve</td>
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<td></td>
<td>Deferred tax credits</td>
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<tr>
<td>Other assets</td>
<td>-$250</td>
<td></td>
<td>Equity</td>
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<td></td>
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<tr>
<td>Total assets</td>
<td>$5,000</td>
<td></td>
<td>Liabilities + equity</td>
<td>$5,000</td>
<td></td>
</tr>
</tbody>
</table>

Risk-weighted assets: \(0.5(800) + 1(2000) + 1(1900) + 1(250) = 4550\)

Tier 1 capital = $320  
Tier I ratio: $320/$4,550 = 7.03%

Total capital = $420  
Total capital ratio: $420/$4,550 = 9.23%

### B. Income Statement

Interest income: \(0.065(800) + 0.090(2000) + 0.10(1900)\) = $422

Interest expense: \(0.03(1800) + 0.055(1300) + 0.045(680)\) = $156.1

Net interest income  
Pre tax income $110.90

Taxes @ 40% $44.36

Net income $66.54

### C. Profit Measures

ROE = \((66.54 \div 320)\) = 20.8%  
ROA = \((66.54 \div 5,000)\) = 1.33%

Assuming that net charge-offs $22, cash taxes paid = $39, and allocated risk capital $550 with a capital charge of 12%:

NOPAT = $110.90 + $25 - $22 - $39 = $74.9

EVA = $74.9 - 0.12($550) = $8.9