

Chapter 8

Banks' balance sheet and income structure

Learning objectives

- To understand the importance of banks' financial statements
- To identify the main assets and liabilities of commercial and investment banks
- To understand the sources of revenue for commercial and investment banks
- To understand the importance of economic capital
- To describe the concept of shareholder value creation and the cost of equity capital
- To become familiar with the most commonly used bank financial ratios

8.1 Introduction

Traditionally, the business of banks is to intermediate funds between surplus units and deficit units thereby linking depositors with borrowers. Banks also provide pooling of risk, liquidity services and undertake delegated monitoring. Financial intermediaries can be classified according to their different **balance sheet** structures. For deposit-taking institutions, the main source of funding (customer deposits) are reported on the liabilities side of the balance sheet, while the allocation of these funds (cash, loans, investments, and fixed assets) is detailed on the assets side. Banks' profits are derived from the **income statement (profit and loss account)**, a document that reports data on costs and revenues and measures bank performance over two balance sheet periods. This chapter focuses on understanding commercial and investment banks' financial statements and describes the main characteristics of their balance sheet and income statements. The last part of the chapter investigates the most common bank financial ratios such as **return-on-assets**, **return-on-equity** and the **cost–income** ratio.

8.2 Retail banks' balance sheet structure

The **balance sheet** is a financial statement of the wealth of a business or other organisation on a given date. This is usually at the end of the financial year. For commercial banks the balance sheet lists all the stock values of sources and uses of banks' funds. Banks' funds come from:

a) the general public (retail deposits);
b) companies (small, medium, and large corporate deposits);
c) other banks (interbank deposits);
d) equity issues (share issues, conferring ownership rights on holders);
e) debt issues (bond issues and loans); and
f) saving past profits (retained earnings).

The above is generally classified as banks' **liabilities** (debt) and **capital** (equity). These funds are then transformed into financial and, to a lesser extent, real **assets**:

a) cash;
b) liquid assets (securities);
c) short-term money market instruments such as Treasury bills, which banks can sell (liquidate) quickly if they have a cash shortage;
d) loans;
e) other investments; and
f) fixed assets (branch network, computers, premises).

Table 8.1 summarises the assets and liabilities in a simplified commercial bank balance sheet.

Banks liabilities (e.g., retail deposits) tend to have shorter maturities than assets (e.g., mortgage loans). This mismatch derives from the different requirements of depositors and borrowers: typically the majority of depositors want to lend their assets for short periods of time and for the highest possible return. In contrast, the majority of borrowers require loans that are cheap and for long periods. The asset

Table 8.1 **Simplified commercial bank balance sheet**

Assets	Liabilities
Cash Liquid assets Loans	Deposits: retail Deposits: wholesale
Other investments Fixed assets	Equity Other capital terms
Total assets	**Total liabilities and equity**

transformation function of banks is derived from these characteristics. To recap, banks have the primary function of being asset transformers because they intermediate between depositors and borrowers by changing the characteristics of their liabilities as they move from one side of the balance sheet to the other. Capital (see also Section 8.2.1.3 below) is sometimes referred to as equity capital or net worth and is equal to the difference between assets and liabilities.

8.2.1 Assets and liabilities of commercial banks: main components

The balance sheet provides information about the bank's financial position at the end of the accounting period. It comprises three principal components: a) the assets the bank controls; b) the liabilities the bank is obliged to meet; and c) the equity interests of the bank's owners.

Tables 8.2 and 8.3 exhibit the combined balance sheet for UK banks as reported by the Bank of England. The tables aggregate assets and liabilities of all financial institutions recognised by the Bank of England as UK banks for statistical purposes.

8.2.1.1 The assets side

On the asset side, banks store a relatively small amount (about 0.5 per cent of total assets in 2004) of cash in the form of *notes and coins* to meet daily commitments. To ensure their liquidity, banks are also required to hold assets with the Bank of England in the form of *cash ratio deposits*. In the United Kingdom, according to the current regulation, both banks and building societies with average eligible liabilities of £500 million or more are required to hold non-operational, non-interest-bearing deposits with the Bank of 0.15 per cent. Banks can also keep *other balances with the Bank of England* (i.e., other than cash ratio deposits); these deposits give the central bank a source of income.

In case of cash shortage, banks can ask for a loan in the interbank market. The interbank market constitutes an important portion of the money markets and it is the place where banks meet each day to exchange liquidity. Therefore, the item *market loans* in the asset side of a bank balance sheet includes wholesale loans that are typically very short-term (i.e., overnight or 'call' loans), very liquid (they allow banks to lend money and call them back at short notice) and characterised by large volumes (typically >£1 million).

Bankers' acceptances are negotiable time drafts, or bills of exchange, that have been accepted by a bank that, by accepting, assumes the obligation to pay the holder of the draft the face amount of the instrument on the maturity date specified. They are used primarily to finance the export, import, shipment or storage of goods. *Acceptances granted* comprise a claim on the party whose bill the banks have

accepted, except for bills both accepted and discounted by the same bank that are included as lending (unless subsequently rediscounted).

Another important source of liquidity is provided by *bills*. As shown in Table 8.2, the main bills held by banks are *Treasury bills* (or *T-bills*) that are essentially a form of short-term government borrowing; *bank bills* (usually eligible for rediscounting at the Bank of England) and other short-term bills including *local government bills* and *public corporation bills*.

Further liquidity is provided by the item *claims under sale and repurchase agreements*. This item comprises cash claims arising from the purchase of securities for a finite period with a commitment to re-sell.

By far the most important item on the asset side, *advances*, includes all balances with, and lending to, customers not included elsewhere. Despite the dramatic changes that have characterised the banking sector over the last two decades (see Chapter 2) loans are still the primary earning assets of banks, and account for a relatively large proportion of total assets. As reported in Table 8.2, in 2004 loans were the largest items on the balance sheet: sterling advances held on the asset side of banks in the United Kingdom totalled £1,204.1 billion, which was over 57 per cent of total sterling assets. Typically, UK banks lend to individuals, financial and non-financial firms. The major categories of loans are: *commercial loans* (such as short-term loans to businesses); *consumer loans* (for example: overdrafts and credit card loans); *mortgage lending* and *real estate loans* (such as long-term loans to finance commercial real estate such as office buildings).

The next item on the asset side of the balance sheet is *investments*. These include all longer-term securities beneficially owned by the reporting institution and include securities that the reporting institution has sold for a finite period, but with a commitment to repurchase (i.e., repos), but exclude securities that have been bought for a finite period, but with a commitment to resell (i.e., reverse repos). Securities are defined as marketable or potentially marketable income-yielding instruments including bonds, floating rate notes (FRNs), preference shares and other debt instruments, but excluding certificates of deposit and commercial paper that are shown as market loans.

The remaining non-deposit assets include:

- *Items in suspense and collection* that include, for example, debit balances awaiting transfer to customers' accounts and balances awaiting settlement of securities transactions. Collections comprise cheques drawn, and in course of collection, on other UK banks and building societies.
- *Accrued amounts receivable* are gross amounts receivable, but have not yet been received, and include interest and other revenues.
- *Other assets* include holdings of gold bullion and gold coin, other commodities, together with land, premises, plant and equipment and other physical assets owned, or recorded as such, including assets leased out under operating leases. Assets leased out under finance leases are included as loans.
- *Eligible banks' total sterling acceptances* comprise all bills accepted by a reporting institution whose bills are eligible for rediscount at the Bank of England including those that the reporting institution has itself discounted.

Finally, in 2004 UK banks had about £2,603 billion in foreign currency assets (e.g., foreign currency loans) of which approximately 44 per cent were Euro-denominated. As shown in Table 8.2, foreign currency assets and liabilities account for a significant proportion of total bank assets.

Table 8.2 **Bank of England aggregate assets of UK banks (end-year 2004, £000million amounts)**

Assets	*£000 mil end-year 2004*	*% over total sterling assets*
Notes and coins	10.6	0.5
With UK central bank	**1.9**	**0.1**
– Cash ratio deposit	1.8	0.1
– Other	0.1	0.0
Market loans	**511.8**	**24.3**
– UK banks	342.7	16.3
– UK banks' CDs, etc.	59.5	2.8
– UK banks commercial paper	0.1	0.0
– UK building societies, CDs, etc., and deposits	7.2	0.3
– Non-residents	102.3	4.9
Acceptances granted	**1.4**	**0.1**
– UK building societies	0.0	0.0
– UK public sector	0.0	0.0
– Other UK residents	1.3	0.1
– Non-residents	0.1	0.0
Bills	**16.8**	**0.8**
– Treasury bills	14.5	0.7
– UK bank bills	0.6	0.0
– UK building societies	0.0	0.0
– Other UK	1.0	0.0
– Non-residents	0.7	0.0
Claims under sale and repurchase agreements	**262.9**	**12.5**
– Of which British government securities	116.7	5.5
– UK banks	64.4	3.1
– UK building societies	0.3	0.0
– UK public sector	10.8	0.5
– Other UK residents	50.4	2.4
– Non-residents	20.5	1.0
Advances	**1,204.1**	**57.1**
– UK public sector	6.1	0.3
– Other UK residents	1,159.5	55.0
– Non-residents	38.4	1.8
Investments	**159.6**	**7.6**
– British government securities	-4.2	-0.2
– Other UK public sector	0.3	0.0
– UK banks	34.7	1.6
– UK building societies	1.9	0.1
– Other UK residents	100.9	4.8
– Non-residents	26.0	1.2
Items in suspense and collection	22.1	1.0
Accrued amounts receivable	20.0	0.9
Other assets	12.9	0.6
TOTAL STERLING ASSETS	**2,107.3**	**100.0**
Total foreign currency assets	2,603.6	
– Of which total Euro assets	1,155.8	
TOTAL ASSETS	**4,710.9**	

Note: Figures may not add due to rounding.

Source: Bank of England, Monetary and Financial Statistics Interactive database and authors' calculations.

8.2.1.2 The liability side

On the liabilities side, as illustrated in Table 8.3, the first item reported is *notes outstanding* and *cash-loaded cards*. This includes all notes and cash held by banks, including the sterling notes issued by Scottish and Northern Ireland banks and cash-loaded cards issued by banks (these are electronic cards, smart cards, etc.).

The largest proportion of bank liabilities is in the form of deposits that are typically made by individuals and firms, including deposits by other UK banks. The majority of deposits are represented by sight and time deposits, as shown in Figure 8.1.

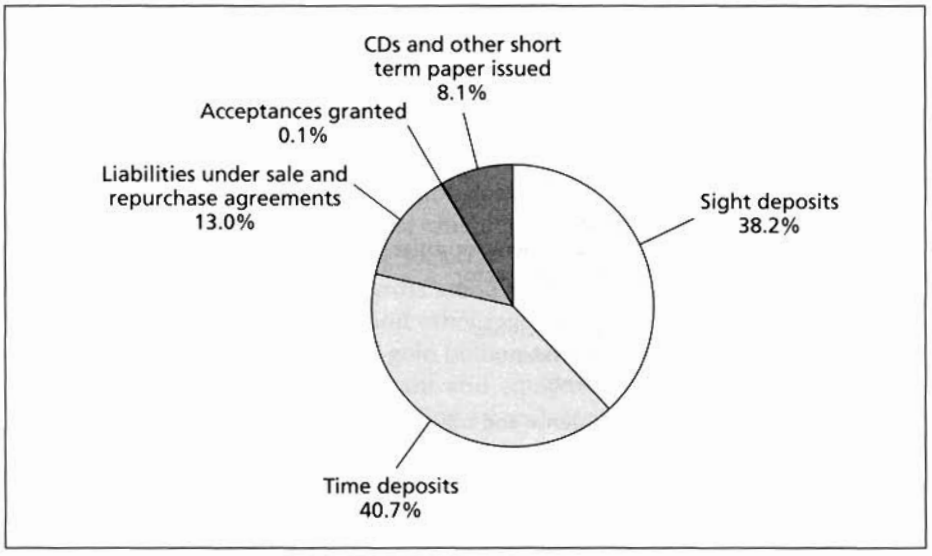
Sight deposits comprise those deposits where the entire balance is accessible without penalty, either on demand or by close of business on the day following the one on which the deposit was made. *Time deposits* comprise all other deposits and they include for example 30- and 60-day savings bank deposits and ISA deposits.[1]

As shown in Figure 8.1, deposits also include acceptances granted, liabilities under sale and repurchase agreements and certificates of deposit.

Acceptances granted represent the banks' liabilities to the owners of bills. *Liabilities under sale and repurchase agreements* comprise cash receipts arising from the sale of securities or other assets that the bank has sold temporarily with a commitment to repurchase. The bulk of a bank's liabilities under sale and repurchase agreements are British government securities, accounting for 46 per cent of the total.

CD and other short-term paper issued: certificates of deposits (CD) are certificates given to depositors in return for a (wholesale) deposit. The holder of the CD receives interest at a fixed or floating rate. CD are short-term securities and are resaleable in the market. This item also contains promissory notes issued by the reporting institutions, unsubordinated capital market instruments (except debentures and secured loan stocks) of any maturity and subordinated loan stocks with

Figure 8.1 **Breakdown of UK banks' sterling deposits, end-year 2004**



Source: Bank of England, Monetary and Financial Statistics Interactive database and authors' calculations.

[1] ISAs (Individual Savings Accounts) were introduced in the United Kingdom in 1999. These are tax-free savings and investment accounts that can be used to save cash, or invest in stocks and shares.

maturity of five years or less. Other subordinated loan stocks and debentures are included in capital and other funds (see below for the details on the capital item).

The remaining non-deposit liabilities, as reported in Table 8.3, include:

- *Items in suspense and transmission*, such as balances awaiting settlement of securities transactions, standing orders and credit transfers debited to customers' accounts, and other items for which the corresponding payment has not yet been made by the reporting institution.
- *Net derivatives*, which comprise the overall net derivatives position of contracts that are included within the trading and banking books of the reporting institutions (see Section 9.5 for more details).

Table 8.3 **Bank of England aggregate liabilities of UK banks (end-year 2004, £000 million amounts)**

Liabilities	*£000 mil end-year 2004*	*% over total sterling liabilities*
Notes outstanding and cash-loaded cards	4.3	0.2
Sight Deposits	**757.5**	**35.9**
– UK banks	109.9	5.2
– UK building societies	1.7	0.1
– UK public sector	6.6	0.3
– Other UK residents	566.8	26.8
– Non-residents	72.5	3.4
Time deposits	**807.5**	**38.2**
– UK banks	230.7	10.9
– UK building societies	4.0	0.2
– UK public sector	10.9	0.5
– Other UK residents	321.9	15.2
– Of which Tessa	0.0	0.0
– Of which SAYE	2.3	0.1
– Of which cash ISAs	60.3	2.9
– Non-residents	177.4	8.4
Liabilities under sale and repurchase agreements	**258.5**	**12.2**
– of which British govt securities	109.7	5.2
– UK banks	86.9	4.1
– UK building societies	0.1	0.0
– UK public sector	0.1	0.0
– Other UK residents	35.0	1.7
– Non-residents	26.7	1.3
Acceptances granted	**1.4**	**0.1**
CDs and other short term paper issued	**160.2**	**7.6**
TOTAL STERLING DEPOSITS	**1,812.8**	**85.9%**
Sterling items in suspense and transmission	17.9	0.8
Net derivatives	–15.5	–0.7
Accrued amounts payable	26.3	1.2
Sterling capital and other internal funds	265.4	12.6
TOTAL STERLING LIABILITIES	**2,111.3**	**100.0**
Total foreign currency liabilities	2,599.6	
Of which total Euro liabilities	1,098.1	
TOTAL LIABILITIES	4,710.9	

Note: Note: Figures may not add due to rounding.

Source: Bank of England, Monetary and Financial Statistics Interactive database and authors' calculations.

- *Accrued amounts payable*, which are gross amounts payable that have not yet been paid or credited to accounts.
- *Capital and other internal funds*, which consist primarily of shareholders' funds, reserves and long-term debt.

Finally, Table 8.3 shows that in 2004 UK banks had about £2,600 billion in foreign currency liabilities (e.g., foreign currency sight and time deposits) of which approximately 43 per cent were Euro-denominated.

Tables 8.4 and 8.5 illustrate the end-year 2004 consolidated financial data for a major UK bank, Barclays.

Figures 8.2 and 8.3 illustrate the breakdown of the major components of Barclays' assets and liabilities. Focusing on the asset side, about 64 per cent of Barclays' assets derive from loans of which 23 per cent are banking and trading loans to other banks while the vast majority consist of loans to retail customers (77 per cent). The banking group holds a substantial portfolio of debt security investments that corresponds to about 24 per cent of total assets.

The most significant item on the liability side is deposits (66 per cent of the total), of which 34 per cent is from banks and the remaining portion is from retail clients. Only 14 per cent of total liabilities are represented by short- and long-term debt securities (e.g., commercial paper, CDs and bonds).

Figure 8.3 also reports details on shareholders' capital (see Section 8.2.1.3) and the memorandum items. Note that these items do not sum up to the total balance sheet but include details on off-balance sheet contingent commitments (these latter will be explained in Section 9.5).

Table 8.4 **Barclays' assets, end-year 2004 (£m)**

Assets		
Cash and balances at central banks		1,753
Items in course of collection from other banks		1,772
Treasury bills and other eligible bills		6,658
Loans and advances to banks – banking	24,986	
– trading	50,145	
		75,131
Loans and advances to customers – banking	189,847	
– trading	65,099	
		254,946
Debt securities		127,428
Equity shares		12,166
Interests in joint ventures – share of gross assets	147	
– share of gross liabilities	–119	
		28
Interests in associated undertakings		381
Intangible fixed assets		4,295
Tangible fixed assets		1,921
Others assets		22,154
Prepayments and accrued income		5,078
Retail life-funds assets attributable to policyholders		8,378
Total assets		**522,089**

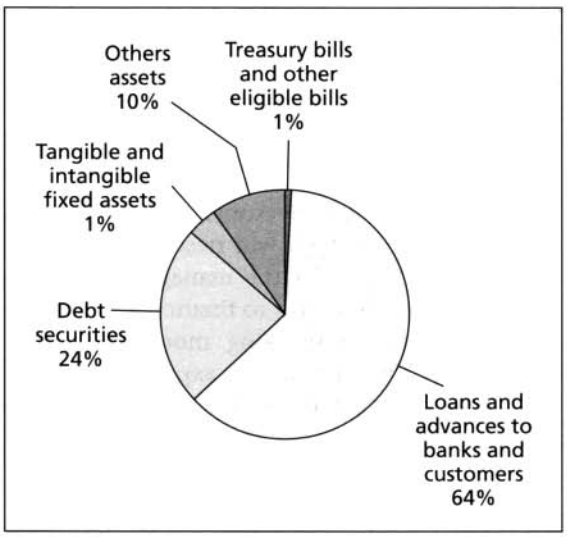
Source: http://www.investorrelations.barclays.co.uk.

Table 8.5 **Barclays' liabilities, end-year 2004 (£m)**

Liabilities		
Deposits by banks – banking	74,211	
– trading	36,813	
		111,024
Customer accounts – banking	171,963	
– trading	45,755	
		217,718
Debt securities in issue		67,806
Items in course of collection due to other banks		1,205
Other liabilities		76,565
Accruals and deferred income		6,582
Provisions for liabilities and charges – deferred tax		738
Provisions for liabilities and charges – other		467
Dividend		1,011
Subordinated liabilities:		
Undated loan capital – non-convertible		6,149
Dated loan capital – convertible to preference shares	15	
– non-convertible	6,113	
		6,128
Total liabilities		**495,393**
Minority interests (including non-equity interests)		901
Shareholders' funds – equity		17,417
Retail life – fund liabilities to policyholders		8,378
TOTAL LIABILITIES AND SHAREHOLDERS' FUNDS		**522,089**
Memorandum items		
Contingent liabilities:		
Acceptances and endorsements	303	
Guarantees and assets pledged as collateral security	30,011	
Other contingent liabilities	8,245	
		38,559
Commitments – standby facilities, credit lines and other		134,051

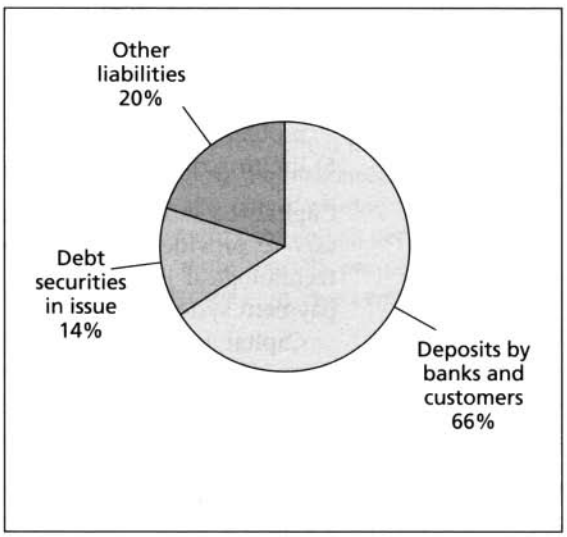
Source: http://www.investorrelations.barclays.co.uk.

Figure 8.2 **Barclays' assets, end-year 2004 (£m)**



Source: Barclays (2004) Annual Report.

Figure 8.3 **Barclays' liabilities, end-year 2004 (£m)**



Source: Barclays (2004) Annual Report.

8.2.1.3 Banks' equity capital

Defined as the value of assets minus the value of liabilities the **capital** (or 'net worth' or 'equity capital') represents the ownership interest in a firm.

Capital = Assets – Liabilities

Bank capital and liabilities represent the specific sources of funds (see Figure 8.3). However, compared to manufacturing firms typically banks are highly leveraged and thus hold a lower proportion of equity to assets (see Box 8.1). If a relatively small amount of loans are not repaid, this can seriously affect the level of equity and leave the bank technically insolvent. This is because if loans are not repaid then losses have to be borne by the capital cushion that banks hold to protect against such losses. The greater the level of capital relative to the losses incurred then the greater protection the bank will have. If losses exceed the level of capital then a bank will become technically insolvent because even if it could liquidate all its assets there would not be sufficient funds to cover deposits. In such circumstances, the need to ensure depositors' confidence (a major issue for the banking sector) may result in one of the following:

1) other banks can engage in a rescue package to pump new capital into the troubled bank; or
2) the authorities can decide to rescue the troubled bank using taxpayers money. The potential repercussions on the whole banking sector are such that regulatory authorities monitor bank behaviour and try to ensure that banks have adequate capital[2] and that they are run in a safe and sound manner (see also Section 7.8).

In general, the primary function of capital is to reduce the risk of failure by providing protection against operating and any other losses. It does this in five ways by:

1) providing a cushion for firms to absorb unanticipated losses with enough margin to inspire confidence and enable the bank to remain solvent;
2) protecting uninsured depositors (depositors not protected by a deposit insurance scheme that covers small depositors) in the event of insolvency and liquidation;
3) protecting bank insurance funds and taxpayers;
4) providing ready access to financial markets and thus guarding against liquidity problems caused by deposit outflows; and
5) limiting risk taking.

Capital is also needed to acquire plant and other real investments that are necessary to provide financial services. For example, a bank will need capital for its technological investments, branching network and for the management of the payment systems. A bank can also use its capital resources to finance acquisitions.

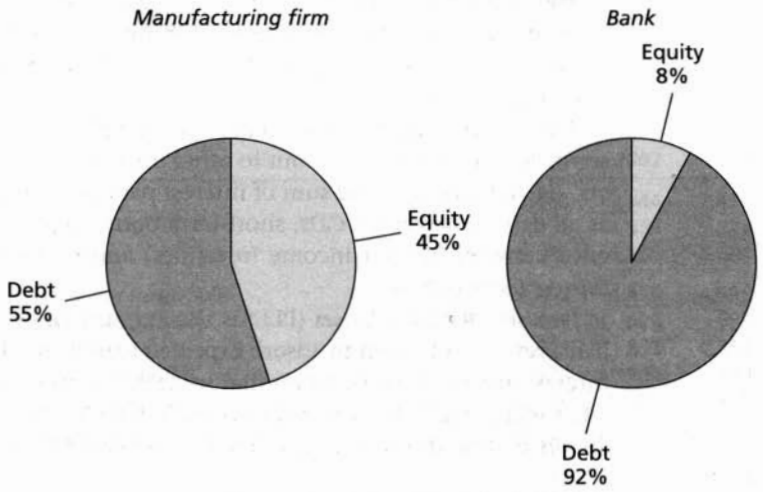
Capital and risk are strictly connected. Generally speaking, more risk requires more capital so capital adequacy should be a function of risk exposure, all other things being equal. Today banks are exposed to many different financial risks; this is because their activities are increasingly taking place in markets that can be

[2] Adequate capital corresponds to the 'C' in the CAMEL structure that includes also 'A' that is good Assets; 'M', competent Management; 'E', good Earnings; and 'L', sufficient Liquidity.

Box 8.1 Typical capital structure of a manufacturing firm versus a retail bank

Manufacturing firm	%	*Bank*	%
Assets		**Assets**	
Short-term assets	55	Short-term assets	70
Fixed assets	45	Long-term and fixed assets	30
Total assets	100	Total assets	100
Liabilities		**Liabilities**	
Short-term liabilities	25	Short-term liabilities	75
Long-term debt	30	Long-term debt	17
Shareholders' equity	45	Shareholders' equity	8
Total liabilities	100	Total liabilities	100

The debt/equity ratio (or financial leverage) of the manufacturing firm is 55/45= 1.22 and the debt/equity ratio of the bank is 92/8=11.5.



The structure of the balance sheet is extremely important for all firms. It is obvious that the way it is leveraged affects the value of the firm; it is an objective for financial managers to achieve a level of debt/equity that maximises the value of the company. As shown in the example above, the manufacturing firm's financing is composed of 55 per cent short- and long-term debt and 45 per cent equity, therefore its assets would have to decline by more than 45 per cent before it becomes insolvent. For the bank an 8 per cent decline in its assets would make the bank insolvent.

Source: Adapted from Koch, T.W. and MacDonald, S.S. (2000), *Bank Management*, 4th edn. Orlando, FL: The Dryden Press, p. 521.

affected by changes in interest and exchange rates as well as variations in credit conditions that can affect both on- and off-balance sheet positions. In such a context banks' need for capital is much higher compared to the past.

8.2.1.4 Banks' income structure

The profitability of a bank can be derived from its income statement. Also known as its **profit and loss account**, this measures bank performance between two year-end balance sheets. The relationship between the balance sheet and income statement relates to the fact that the balance sheet reports stock values (e.g., the amount of outstanding loans), whereas the income statement represents cash flow values for a particular year (e.g., the interest received on outstanding loans). Therefore, the income statement reflects the revenue sources in banking as well as the costs.

The **costs**, derived from the liabilities side of the balance sheet, relate to the payments that banks have to undertake such as: payment of interest on deposits, dividends to shareholders, interest on debt, provision for loan losses and taxes. The **revenues**, generated by the assets, include: interest earned on loans and investments; fees and commissions (interest and non-interest revenue). Then as any other firm, banks also incur staffing and other operating costs.

Bank profits = Income – Costs

In the relationship above, income is equal to interest and non-interest income; costs are the sum of interest costs, staffing costs and other operating costs. Table 8.6 shows a simplified income statement and how **profits** are calculated for a retail bank (see also Box 12.1).

The *interest income* is the income generated on all banks' assets, such as loans, securities and deposits lent out to other institutions, households and other borrowers. *Interest expense* is the sum of interest paid on all interest-bearing liabilities such as all deposit accounts, CDs, short-term borrowing and long-term debt. The difference between interest income (revenues) and interest expenses (costs) is the *Net Interest Income* (NII).

Provision for Loan Losses (PLL) is the amount charged against earnings to establish a reserve sufficient to absorb expected loan losses. It can be subtracted from net interest income in recognition that some of the reported interest income overstates what will actually be received after loan defaults. Thus *net interest income after provisions for loan losses (PLL)* is calculated as the difference between NII and PLL.

Table 8.6 **A simplified bank income statement**

a	Interest income
b	Interest expense
c (=a–b)	Net interest income (or 'spread')
d	Provision for loan losses (PLL)
e (=c–d)	Net interest income after PLL
f	Non-interest income
g	Non-interest expense
h (=f–g)	Net non-interest income
i (=e+h)	Pre-tax net operating profit
l	Securities gains (losses)
m (=i±l)	Profit before taxes
n	Taxes
o	Extraordinary items
p (=m–n–o)	Net profit
q	Cash dividends
r (=p–q)	Retained profit

Non-interest income is the income generated by fee income, commissions and trading income and has become important due to increased emphasis on this source of revenue in recent years. It includes, for example, fees and deposit service charges, such as fees paid on safe-deposit boxes; commissions (e.g., from insurance sales) and gains/losses from trading in securities; and other non-interest income sources such as gains/losses on foreign transactions and from undertaking other OBS activities (such as securities underwriting). *Non-interest expenses* include salaries and fringe benefits paid to employees, property and equipment expenses and other non-interest expenses (such as deposit insurance premiums and depreciation). *Net non-interest income* will be the difference between non-interest income and non-interest expenses.

As we move down Table 8.6 we find the item *pre-tax net operating profit,* that is the sum of interest income minus PLL plus net non-interest income. *Profit before taxes* will be equal to *Pre-tax net operating profit* ± the *securities gains (losses)* that may occur when the bank sells securities from its portfolio at prices above the initial cost to the bank. By deducting taxes and other extraordinary items (that can include for example the revenue from the sale of real assets), it is possible to obtain the *net profit* that is the profit after tax.

Finally, *retained profits* will be equal to net profit minus dividends.

A profit and loss account for Barclays is shown in Table 8.7.

Table 8.7 **Barclays' profit and loss account 2000-04 (£m)**

	2000	*2001*	*2002*	*2003*	*2004*
Interest income	11,788	13,458	12,044	12,427	13,665
Interest expense	6,680	7,492	5,839	5,823	6,823
Net interest income	**5,108**	**5,966**	**6,205**	**6,604**	**6,842**
Fee and commission receivable	3,676	4,202	4,454	4,896	5,672
Fee and commission payable	320	465	529	633	706
Trading income	677	1,011	833	1,054	1,493
Other operating income	353	428	364	490	644
Total non-interest income	**4,386**	**5,176**	**5,122**	**5,807**	**7,103**
Total operating income	**9,494**	**11,142**	**11,327**	**12,411**	**13,945**
Employment Costs	3,219	3,714	3,755	4,295	4,998
Other administrative expenses (e.g, property and equipment expenses)	1,967	2,303	2,312	2,404	2,758
Depreciation and amortisation	306	539	557	554	594
Total operating expenses	**5,492**	**6,556**	**6,624**	**7,253**	**8,350**
Operating profit before provisions	**4,002**	**4,588**	**4,703**	**5,158**	**5,595**
Provisions for loan losses, contingent liabilities and commitments	816	1,150	1,485	1,348	1,092
Operating profit	**3,186**	**3,438**	**3,218**	**3,812**	**4,502**
Exceptional items	206	–13	13	33	101
Profit on ordinary activity before tax	**3,392**	**3,425**	**3,205**	**3,845**	**4,603**
Tax on profit on ordinary activities	901	943	955	1,076	1,289
Profit on ordinary activity after tax	**2,491**	**2,482**	**2,250**	**2,769**	**3,314**
Payment to minority interests	46	36	20	25	46
Profit for the financial year attributable to the members of Barclays Bank PLC	**2,445**	**2,446**	**2,230**	**2,744**	**3,268**
Dividends	927	1,110	1,206	1,340	1,538
Profit retained for the financial year	1,518	1,336	1,024	1,404	1,730

Source: http://www.investorrelations.barclays.co.uk.

At year-end 2004 Barclays plc had total operating income of about £14 billion, an increase of 47 per cent from 2000. The increase had been brought about by a rise in interest income (+34 per cent) and by a significant increase (by more than 60 per cent) in non-interest income over the period. Barclays' net profits reached £3.3 billion in 2004, corresponding to a 33 per cent growth since 2000.

While the income statement gives a good indication of the profitability of a commercial bank, **bank performance** over time is usually measured in relation to ratio analysis that uses the information contained in both the balance sheet and the income statements. Section 8.4 focuses on the importance of ratio analysis and how to interpret the most common financial ratios.

Before moving on to ratio analysis, Section 8.3 illustrates the main characteristics of investment banks' financial statements and how they compare with commercial banks.

8.3 Investment banks' financial statements

We saw in Section 3.6 that large-scale wholesale financing activities are typically carried out by investment banks. Moreover, investment banks offer a range of services such as securities underwriting (including the issue of commercial paper, Eurobonds and other securities) and provide corporate advisory services on mergers and acquisition (M&As) and other types of corporate restructuring. In a nutshell, investment banks mainly deal with corporations and other large institutions and they typically do not deal with retail customers, apart from the provision of upmarket private banking services.

The different activities that investment banks perform are reflected in the structure of their financial statements. It follows that the balance sheet structure and income statement of investment banks differ substantially from those of commercial banks.

8.3.1 Investment banks' balance sheet

Table 8.8 exhibits a simplified investment bank balance sheet.

8.3.1.1 Assets side

On the asset side investment banks keep *cash and other non-earning assets*. These assets include, for example, short-term highly liquid securities along with assets set aside for regulatory purposes.

Another important item is *trading assets*. These are the banks' trading activities that consist primarily of securities brokerage, trading and underwriting, and derivatives dealing and brokerage. Generally, trading assets include cash instruments (e.g., securities) and derivatives instruments used for trading purposes to manage risk exposures. Other cash instruments can include, for instance, loans held for trading purposes (i.e., loans that can be traded in the secondary market).

Investment banks enter into secured lending in order to meet customer needs, and obtain securities for settlement. Under these transactions, they can receive collateral from resale agreements and securities borrowed transactions, customer

Table 8.8 **A simplified investment bank balance sheet**

Assets	Liabilities
Cash and other non-earning assets Trading assets Securities financing transactions (receivable) Investment securities Loans, notes and mortgages Other investments Fixed assets Other assets	Commercial paper and other short-term borrowing Trading liabilities Securities financing transactions (payable) Long-term borrowing Deposits Other payables
	Equity Other capital terms
Total assets	**Total liabilities and equity**

margin loans and other loans. *Securities financing transactions* are collaterised securities that the bank can sell or re-pledge.

Securities owned for non-trading purposes are classified as *investment securities*. They are marketable investment securities and other financial instruments the bank owns, and can include highly liquid debt securities such as those held for liquidity management purposes, equity securities and other investments such as long-term ones held for strategic purposes. Investment banks' lending and related activities such as loan originations, syndications and securitisations (see Section 9.6) are reported under *loans, notes and mortgages*.

Other investments include other receivables such as amounts due from customers on cash and margin transactions.

Fixed assets consist of equipment and facilities. Typical examples are technology hardware and software and owned facilities (e.g., premises).

Other assets consist of intangible assets and goodwill as well as assets generated from any unrealised gains on derivatives used to hedge the bank's borrowing and investing activities. It can also include prepaid expenses and real estate purchased for investment purposes.

8.3.1.2 Liabilities and equity

As shown in Table 8.8, funding of investment banks derives from various sources. The main items are:

- *Collaterised securities* – derive from the bank entering secured borrowing transactions and securities sold under agreement to repurchase; this includes payables under repurchase agreements and payables under securities loaned transactions. (This item corresponds to securities financing transactions on the asset side.)
- *Trading liabilities* – include activities that the investment bank undertakes based on future expectations such as trading securities and derivatives dealing and brokerage.
- *Commercial paper* – consists of short-term negotiable debt instruments that the bank issues to raise unsecured funding and that are traded in the money market.

The investment bank can issue *other short-term debt instruments* – that may be linked to the performance of equity or other indices – and *medium- and long-term debt instruments*.

Another liability is *deposits* (savings and time deposits) that are typically high-volume corporate deposits, followed by *other liabilities* to customers, brokers and dealers, etc.; and finally, *stockholders' equity*.

8.3.2 Investment banks' income statements

Investment banks, like commercial banks, are required to publish their profit and loss accounts (or 'statement of earnings') that report all costs, revenues and net profits for the financial year. Investment banks' revenues derive from the following four sources:

- trading and principal investments;
- investment banking;
- asset management, portfolio service fees and commissions; and
- interest income.

The components of *trading and principal investments* relate to income generated from trading in: equities and equity derivatives; corporate debt; debt derivatives; mortgage and municipals; government and agency obligations; and foreign exchange. *Investment banking* generally includes underwriting and financial advisory services (e.g., M&As advice). *Asset management and portfolio services* can originate revenues in the form of commissions (e.g., agency transactions for clients on main stock and futures exchanges). More specifically, asset management is a source of fees for investment banks generated by providing investment management (e.g., managing company pension funds and other investments) and advisory services to both individuals and institutions.

Securities services can also generate fees from various activities such as brokerage, financing services and securities lending, and matched book businesses. Finally, *interest income* derives primarily from wholesale lending activity of the bank.

On the cost side, the most important item is interest expenses that can be relatively high (compared to commercial banks), while the bulk of operating expenses relates to staff costs. Other costs include, among others:

- communication and technology
- occupancy and related depreciation
- brokerage, clearing and exchange fees
- professional fees
- marketing
- other expenses.

Box 8.2 illustrates the financial statement composition of Merrill Lynch, one of the top investment banks in the world.

Box 8.2 Merrill Lynch financial statements (2004)

Founded in 1914 by Charles E. Merrill and Edmund C. Lynch, Merrill Lynch is today a global investment bank with 50,600 employees working in 36 countries and had net revenues of US$22 billion as at December 2004. Merrill Lynch provides a variety of services, from capital markets services, investment banking and advisory services, wealth management, asset management, insurance, banking and related products and services.

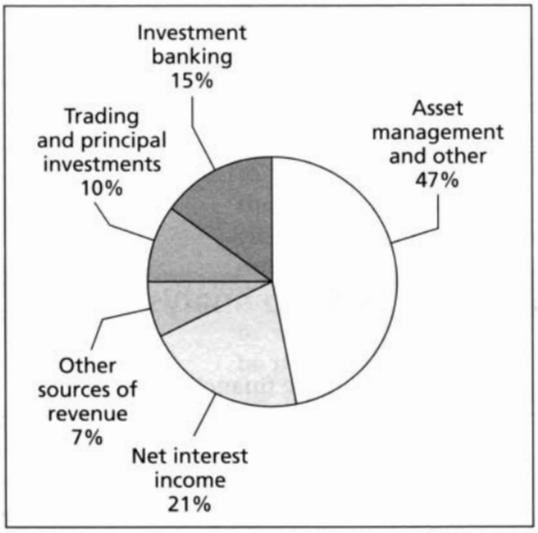
The pie diagrams report the assets and liabilities composition for Merrill Lynch in 2004.

On the asset side, the most relevant items are investment and collaterised securities (i.e., securities bought under agreement to resell). These constitute the bulk of total assets (41 per cent). Another relevant item is trading assets (28 per cent) that comprise securities and financial derivatives held by the bank for trading purposes.

Fixed assets – here incorporating both tangible (e.g., premises) and intangible (e.g., goodwill) assets – appear modest, at around 2 per cent; one reason could be that investment banks do not generally

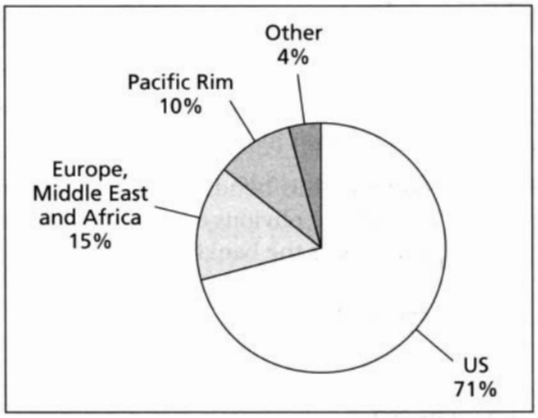
▶

Figure 8.4 Merrill Lynch: sources of revenue, 2004



Source: Merril Lynch (2004) Fact Book and Annual Report.

Figure 8.5 Merrill Lynch: net revenues by geographic regions, 2004

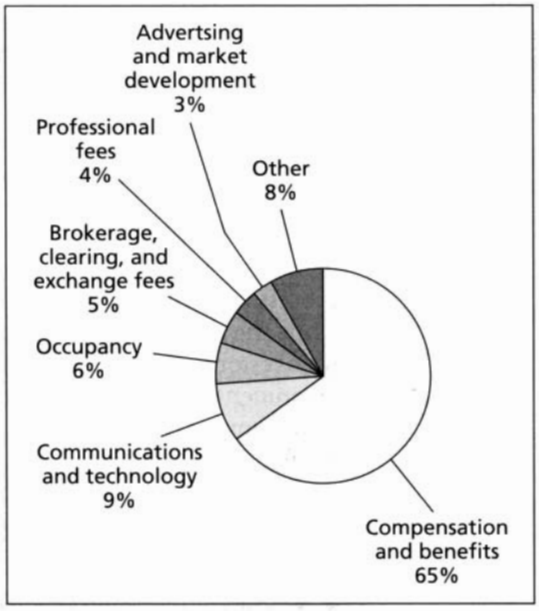


Source: Merril Lynch (2004) Fact Book and Annual Report.

need a large branch network. It is also worth noting that Merrill Lynch holds a relatively high proportion of liquid assets (around 7 per cent).

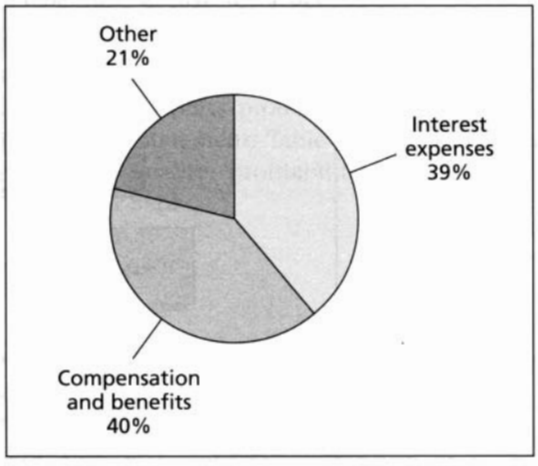
The traditional banking activity of selling loans and collecting deposits does not seem as important as other activities for the bank: wholesale loans and deposits are relatively small, amounting to 8 per cent and 12 per cent of total assets respectively. This is because unlike commercial banks, whose main activity has traditionally been to transform the maturity and size of deposits into loans, investment banks operate by reshuffling a broad range of securities transactions. Therefore the assets and liabilities structure of investment banks usually indicates shorter maturity characteristics on the assets side of the balance sheet compared with a traditional commercial bank. Merrill Lynch's funding derives mainly from securities sold under agreement to repurchase (29 per cent), long-term borrowing (18 per cent) and trading liabilities (18 per cent).

Figure 8.6 Merrill Lynch: non-interest expenses, 2004



Source: Merril Lynch (2004) Fact Book and Annual Report.

Figure 8.7 Merrill Lynch breakdown of costs, 2004



Source: Merril Lynch (2004) Fact Book and Annual Report.

▶

The revenue sources and cost characteristics of Merrill Lynch for 2004 are illustrated in the charts above. They show that most revenues derive from asset management and commissions (47 per cent), net interest income (21 per cent) and investment banking activities (15 per cent). It is notable that Merrill Lynch earns nearly three-quarters of its net revenues in the US. Operations in Europe, the Middle East and Africa account for just 15 per cent. On the operating costs side, staff expenses (in the form of employee compensation and benefits) are prevalent (65 per cent). It is worth noting that on the cost side interest expenses can be particularly high. For Merrill Lynch the proportion of non-interest to interest expenses is about 60:40 of total costs.

Source: Merrill Lynch (2004) Fact Book and Annual Report.

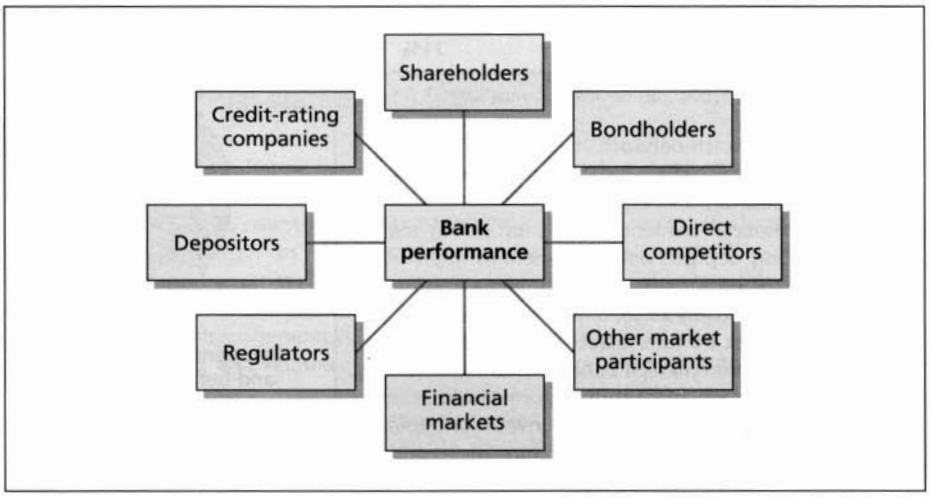
8.4 Bank performance and financial ratio analysis

The significant changes that have have occurred in the financial sector industry in all advanced economies has increased the importance of performance analysis for modern banks. As discussed in Chapter 2, the new operating environment is characterised by more intense competition and a movement towards increasingly market-oriented banking systems. In many countries, the widespread privatisation process has had the effect of weakening political interference in bank management while the objective of shareholders' wealth maximisation (maximising the returns to investors holding equity shares in the bank) is now a priority restrained merely by prudential regulatory constraints. It is not surprising that the increased riskiness of the environment in which banks operate has increased the need for prudential regulation (see Chapter 7).

Performance analysis is an important tool used by various agents operating either internally to the bank (e.g., managers) or who form part of the bank's external operating environment (e.g., regulators) as shown in Figure 8.8.

- *Shareholders, bondholders*: investors in shares and in bonds issued by the bank, and bank managers and other employees have an obvious economic and strategic interest in the current and future prospects of the banking firm.

Figure 8.8 **Who is interested in bank performance?**



- *Direct competitors*: peer group analyses compare the profitability of similar banking institutions operating in similar operating environments; in some cases the homogeneity of the groups being analysed allows for the use of sophisticated statistical techniques.
- *Other market participants*: competitors (or other firms) that represent potential take-over or merger possibilities will rely on **financial ratio analysis** to assess the viability of potential M&A activity and to evaluate potential economic synergies.
- *Financial markets*: capital and money market participants will use ratio analysis to monitor the performance of banks. Money market participants, especially those involved with lending in the interbank market will need to assess the credit-worthiness of the banks they are lending to. A deterioration in bank performance may increase credit risk and therefore interbank lenders will require higher returns on their loans. Banks with higher capital ratios will more likely be able to achieve cheaper finance in the interbank markets (as such banks will be perceived as being less risky). Capital market participants and analysts also use ratio analysis to assess the performance of banks as a change in bank performance can alter the valuation of long-term bonds and shares issued by banks. For example, potential bondholders will rely on performance trends as a guide to their investments.
- *Regulators*: domestic and international regulatory authorities will also be concerned about the performance of banking institutions. For example, financial regulators need to evaluate the solvency, liquidity and overall performance of banking firms to gauge the likelihood of potential problems. Competition authorities also investigate bank performance indicators to analyse whether banks are making excess profits and behaving in an uncompetitive manner.
- *Depositors*: The smooth performance of banks is valuable for depositors who trust their bank will remain profitable and not expose itself to too much risk.
- Finally, *credit rating companies* – such as Moody's, Standard and Poor's and FitchIBCA – analyse performance information to compile analyses and ratings of banks operating in a certain country or group of countries.

Bank performance is calculated using ratio analysis and assessed with the aim of: (1) looking at past and current trends; and (2) determining future estimates of bank performance. Financial ratio analysis investigates different areas of bank performance, such as profitability, asset quality and solvency.

The key ratios for measuring the performance of the banking firm are discussed below. The tools that can be used to calculate performance are derived from the information revealed by periodic financial reports produced by the accounting system: the balance sheet and the income statement. Table 8.9 outlines selected indicators of 50 major EU banks' asset quality, profitability and solvency as reported recently by the European Central Bank.

8.4.1 Profitability ratios

Profitability ratios typically used in banking are ROE (Return-on-equity) ROA (Return-on-assets), NIM (**Net interest margin**) and C/I (Cost–income) ratio.

ROA is the return-on-assets calculated as net income/total assets; this ratio indicates how much net income is generated per £ of assets.

Table 8.9 **Selected indicators of 50 major EU commercial banks' asset quality, profitability and solvency (%)**

	2001	*2002*	*2003*
Profitability			
Return-on-assets (ROA) (after tax and extraordinary items)	0.48	0.39	0.44
Return-on-equity (ROE) (after tax and extraordinary items)	10.34	7.99	8.70
Net interest margin (NIM) (net interest income/total assets)	1.30	1.36	1.33
Net non-interest income/total assets	1.27	1.24	1.22
Non-interest income/total operating income	50.74	48.85	47.52
Cost–income ratio	68.27	67.90	64.47
Asset quality			
Provision for loan losses/total operating income	9.60	13.18	11.13
Provision for loan losses/total loans	0.50	0.69	0.61
Provision for loan losses/total assets	0.24	0.31	0.28
Non-Performing loans/total loans	2.45	2.84	2.30
Solvency (or capital strength)			
Basle Tier 1 ratio	6.29	6.65	6.67
Basle Tier 2 ratio	9.46	9.60	9.91

Source: Adapted from ECB (2004b) *EU Banking Sector Stability*, p. 48.

$$\text{ROA} = \text{net income/total assets} \tag{8.1}$$

ROE is probably the most important indicator of a bank's profitability and growth potential. It is the rate of return to shareholders or the percentage return on each £ of equity invested in the bank.

$$\text{ROE} = \text{net income/total equity} \tag{8.2}$$

The ROE can be decomposed into two parts: the ROA (= net income/total assets), that measures average profit generated relative to the bank's assets and the so-called Equity Multiplier (EM).

$$\text{EM} = \text{total assets/total equity} \tag{8.3}$$

so that

$$\text{ROE} = \text{ROA} \times \text{EM} \tag{8.4}$$

This decomposition[3] is important because it allows financial analysts to understand the interrelationship between the various ratios and helps banks to invest in areas where the risk-adjusted returns are greater.

NIM is net interest margin and measures the net interest income relative to the bank's total, average or earning assets.

$$\text{NIM} = [(\text{interest income} - \text{interest expense})/\text{total assets}] \tag{8.5}$$

[3] This decomposition of the ROE uses a traditional method in corporate finance known as 'Du Pont Model', from the name of the US Corporation that first applied it in the 1920s. See for example, Sinkey (1998).

It reflects the difference between interest earned on assets minus interest costs per £ of assets. The NIM measures the bank's *spread* per £ of assets. High NIM suggests that the difference between deposit rates and loan (+ other interest earning assets) rates are high, and vice versa. As we have noted in earlier chapters, NIM has been falling in many banking markets reflecting increased competition in the deposits and loan markets – the difference between how much banks pay on deposits and how much they earn on loans is declining.

Finally, the Cost–income ratio (C/I) is a quick test of efficiency that reflects bank non-interest costs as a proportion of income.

$$C/I = \text{non-interest expenses} / (\text{net interest income} + \text{non-interest income}) \quad (8.6)$$

where non-interest expenses are considered as the main inputs to the production process of a bank and total operating income is the output.

As shown in Table 8.9, typically ROA ranges between 0.4 and 0.5 per cent for the 50 major EU banks over the period 2001–03 while ROE is around 10 per cent and NIM 1.30 per cent. Usually, the benchmark for ROA level is around 1 per cent while ROE is considered good when over 10 per cent. High-performing banks usually adopt a target ROE figure of 15+ per cent. Generally speaking, the higher these ratios the better from a banks' perspective, as higher NIM should feed through into greater net income thus boosting ROA and ROE. Table 8.9 illustrates the recent decline in European bank Cost–income ratios – the lower this ratio the better for the bank, because a low C/I indicates that the bank is operating in an efficient way.

Table 8.10 reports the key profitability ratios for three investment banks in 2004. It is noticeable that for all banks ROE exceeds 14 per cent while ROA ranges between 0.7 per cent and 0.9 per cent, almost twice the figure reported by commercial banks in Table 8.9. As expected, net interest margin is significantly lower than for commercial banks. We discussed the secondary role that 'traditional' banking activities have for investment banks in Box 8.2. A more suitable measure of profitability for investment banks is the **profit margin**; that is equal to earnings before income taxes to total operating income and takes into account both interest and non-interest income.

Recently investment banks have performed relatively well and this trend is expected to continue, as reported in Box 8.3.

Table 8.10 **Selected ratios for three investment banks (2004)**

2004	*Merrrill Lynch %*	*Lehman Brothers %*	*Goldman Sachs %*
Return-on-assets	0.7	0.8	0.9
Return-on-equity	14.1	15.9	18.2
Net interest margin	0.7	0.4	0.6
Cost-to-Income ratio	73.5	69.6	66.2
Profit margin	26.5	30.4	31.9

Source: Individual institutions annual reports (2004) and authors' calculations.

Box 8.3 Growth of trading: will investment banks sustain their explosive advance? FT

Investment banks have delivered explosive growth in trading revenue during the last five years, a performance that has helped them to weather a downturn arranging stock sales and mergers. The numbers show it. Three of the four largest US investment banks with November year-ends – Goldman Sachs, Lehman Brothers and Bear Stearns – generated record earnings in 2004 thanks, mainly, to their trading prowess.

Consider Goldman Sachs. It generated $20.55bn in total net revenue last year. Trading-related revenue made up 65 per cent of the total. In 2000, trading-related revenue accounted for 40 per cent of the $16.6bn total. The bank's biggest contributor in 2004 was the fixed income, currencies and commodities department, known as FICC. It had record net revenue last year of $7.32bn, a gain of 31 per cent from 2003, the previous record year, and about 2.5 times the $3bn reported in 2000.

Rivals have reported similar gains. The figures have impressed investors but also have generated fear that Wall Street's trading departments, especially those involved with fixed income, currencies and commodities are due for an inevitable cyclical downturn in 2005 or beyond.

The investment banks do not deny that trading is a cyclical business and do not pretend that their trading departments are immune from downturns. They do, however, argue that improvements in technology are allowing them to open new markets and manage risk more efficiently, increasing their chances of weathering downturns better than in the past. They also say another factor helping them is the rise in sophisticated clients, especially hedge funds, which adopt their new products quickly and find uses for them that go beyond that for which they were intended.

Lloyd Blankfein, president and chief operating officer of Goldman Sachs, says: 'I think that concern over the growing percentage of trading revenues at investment banks is misplaced.' Mr Blankfein has been instrumental in keeping Goldman Sachs' traders adept at managing risk and shifting resources to meet the needs of clients. Goldman Sachs reported $9.29bn in net revenue from all trading last year. If equities commissions and principal investments are included that total rises to $13.33bn, an increase of 28 per cent from 2003.

To understand further how explosive trading growth has been at Goldman Sachs, it helps to know that, in 2000, it generated net revenue from trading of $6.49bn. FICC revenue was $3bn. Lehman Brothers and Bear Stearns have also at least doubled the amount of fixed income trading revenue they generated in the five years from 2000 to 2004. Mr Blankfein says he thinks concern over the growing percentage of trading revenues at investment banks is misplaced for several reasons. 'First, client activity is the key driver of trading – it is our role and valuable franchise to be asked to price and assume risks that our clients want to shed', he says, 'and trading opportunities come from increasingly diverse businesses and sources, involving broad and often uncorrelated markets.'

Competitors echo Mr Blankfein's opinion. Morgan Stanley did not achieve record profits in 2004, but its trading divisions have generated explosive revenue growth as well, especially in fixed income.

Jim O'Brien, co-head of Morgan Stanley's corporate credit group which trades investment-grade and high-yield bonds, says: 'What has characterised the improved performance is bigger risk taking and bets in macro markets.'

Investment banks, he adds, have benefited from managing risk more dynamically and from trading more often with clients. Morgan Stanley and others, says Mr O'Brien, were taking steps to make it even easier to trade and manage risk. This includes finding ways to improve liquidity, developing more index products and promoting the development of electronic trading. 'Our view is that as the market gets bigger, we will benefit,' says Mr O'Brien. Morgan Stanley boosted its fixed income trading revenue last year to $5.56bn, up from $2.7bn in 2000.

Technology has played an enormous role in the growth of trading profits and will continue to do so this year, say traders. Advances in software have allowed investment banks to identify more efficiently the trading opportunities and to analyse the accompanying risk. Take Credit Suisse First Boston, which has an advanced execution services (AES) division that develops algorithms to help clients trade electronically. The product helps clients to protect their anonymity, provides split-second forecasts and trades throughout the day.

Source: *Financial Times* (2005) 'Investment Banking Survey', 27 January, by David Wells.

8.4.2 Asset quality

Lending is still one of the most important activities of banks. While it is expected that all banks will have to bear some positive levels of bad loans and loan losses (see Box 8.4), one of the key objectives of bank management is to minimise such losses. In the context of the income–expense statement, financial analysts can control the PLL to manipulate their accounting earnings. For example, more conservative bankers may understate their accounting earnings by building a large and above average loan-loss reserve; while more aggressive bankers may overstate their accounting earnings by keeping the loan-loss reserve low (Sinkey, 1998, p. 59).

As shown in Table 8.9, over the period 2001–03 the provision for loan losses/total operating income ranged between 9.60 and 13.18 per cent. Table 8.9 also indicates that the non-performing loans/total loans ratio over the same period amounted to 2.5 per cent.

8.4.3 Cost of capital and shareholder value creation in banking

While the above discussion of bank performance measures focuses on traditional indicators, one innovative indicator that is now widely used by banks (and other companies) relates to what is known as 'shareholder value creation'. The main strategic objective of a profit-oriented bank is to generate **shareholder value** for its owners (shareholders). A bank can create shareholder value by pursuing a strategy that maximises the return on capital invested relative to the (opportunity) **cost of capital** (the cost of keeping equity shareholders and bondholders happy). In other words if a bank invests in a project that generates greater returns than the cost to shareholders of financing the project then this should boost returns to holders of the banks' shares (in terms of capital appreciation of stock and higher dividends).

Box 8.4 What are non-performing loans?

Non-performing loans (NPLs) are loans on which debtors have failed to make contractual payments for a pre-determined time. It should be noted that a loan classified as non-performing does not necessarily lead to losses. If there is adequate collateral, losses might not occur. Conversely, loans may be lost even though they were never classified as non-performing. Not all countries use the same definition for NPLs, and there may even be different definitions in use within a single country depending on the sector involved (financial institutions, quoted corporations, small enterprises, government entities, and so forth). At the international level, the definition provided by paragraph 4.84 of the IMF's *Compilation Guide on Financial Soundness Indicators* reads, summarised, as follows: a loan is non-performing when payments of interest and principal are past due by 90 days or more, or at least 90 days of interest payments have been capitalised, financed or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payments will be made in full.

Source: IMF (2004), *The Treatment of Non-performing Loans in Macroeconomic Statistics*, An Issue Paper Prepared for the December 2004 Meeting of the Advisory Expert Group on National Accounts.

The concept can be applied to an individual project, like a bank considering making a strategic investment in another country, or for the whole banks' performance overall.

So shareholder value is created when:

Return on capital invested in the project > Cost of capital to the firm

or

Return on capital (ROC) > Cost of capital

In order to add shareholder value, firms must invest in projects that generate returns exceeding their cost of capital. To calculate the cost of capital we can use the Capital Asset Pricing Model (CAPM) where:

$$R_i = R_f + \beta (R_m - R_f) \tag{8.7}$$

where R_i is the required rate of return on an investment;
R_f is the risk-free rate;
R_m refers to the market return; and
β is a measure of the volatility of the company's equity relative to the overall market.[4]

The CAPM (see Appendix A2) states that investors require a return from holding a company's shares that exceeds the risk-free rate (R_f), to compensate them for holding equity over bonds (this is $R_m - R_f$, otherwise known as the equity risk premium) and for the riskiness of the company relative to the whole market (β).

For example, if a company has beta (β) of 1.5, and assuming a risk-free rate of 6 per cent (given by the US long-bond rate) and an equity premium of 5 per cent ($R_m - R_f$) then the cost of capital to the firm will be 13.5 per cent. In other words, to maintain shareholder value, this firm will have to invest in projects that generate returns greater than 13.5 per cent if they are to add to shareholder wealth. Investments that generate returns of less than 13.5 per cent will destroy shareholder value. The equity market premium (the difference between equity and bond returns) is usually calculated over a 20- or 25-year period and there is much debate as to how large this premium is, although the US equity market premiums are almost always found to be greater than those in the United Kingdom, and they are even lower in continental Europe. Betas (β) should also be calculated over long periods as short-term estimates may yield unreliable cost of capital estimates.

Box 8.5 explains the calculation of the cost of capital for NatWest and the Royal Bank of Scotland Group (RBSG) which was presented as evidence to the Competition Commission Report on the *'Supply of Banking Services by Clearing Banks to Small and Medium-Sized Enterprises'* in 2002 (see Section 12.3.3). This shows that the equity cost of capital for the two UK banks was around 11 per cent – these banks would need to generate a return-on-equity of greater than 11 per cent if they wished to create shareholder value for their owners (equity holders).

Cost of capital calculations can be done for the whole bank or divisions/business areas within a bank in order to determine the allocation of capital within the organisation. For example, if a bank's mortgage business is generating returns

[4] A beta of less than one indicates lower risk than the market; a beta of more than one indicates higher risk than the market.

Box 8.5 Calculating the cost of equity capital for NatWest and the Royal Bank of Scotland Group (RBSG)

CAPM 'standard' cost of equity capital

The standard model for the cost of equity capital is the Capital Asset Pricing Model (CAPM). Despite some drawbacks this model continues to be the most widely used tool for business decision making. In correspondence to date, RBSG have been asked by the Competition Commission to provide the cost of capital that is used by the bank. However, the appropriate benchmark is not the cost of equity capital currently used, but the cost of equity capital rates that should be used for making assessments about performance in each of 1998, 1999 and 2000. This should be the cost of equity capital prevailing at the start of each year, when we can assume that decisions were made in respect of those years.

This paper therefore starts by setting out the cost of equity capital as it would have been for NatWest and RBSG (according to the CAPM) at the beginning of each of the years 1998, 1999 and 2000.

Risk-free rate

In consultation with London Business School, we have taken 31 December 1997, 1998 and 1999 six-month LIBOR as the risk-free rates applying at the start of 1998, 1999 and 2000. Six-month LIBOR is used because it avoids some of the liquidity problems that are evident with government bill rates.

Equity risk premium

A wide range of equity premiums can be quoted from the literature, ranging from 3 per cent to 9 per cent. For this analysis a rate of 4 per cent is used to reflect lower expected returns in the future.

CAPM beta figures

For a beta we have consulted the London Business School Risk Management Service to get the start of year betas for NatWest and RBS.

The cost of equity capital for NatWest and Royal Bank of Scotland Group are shown in Table 8.11:

Table 8.11 **'Standard' cost of equity capital for NatWest and RBS**

NatWest	*1998*	*1999*	*2000*
Risk free rate (six month LIBOR)	7.7%	5.9%	6.2%
Equity risk premium (%)	4.0%	4.0%	4.0%
Beta (start of year from LBS RMS)*	1.14	1.20	1.12
CAPM 'standard cost of equity capital (%)	**12.3%**	**10.7%**	**10.7%**
RBS			
Risk free rate (six month LIBOR)	7.7%	5.9%	6.2%
Equity risk premium (%)	4.0%	4.0%	4.0%
Beta (start of year from LBS RMS)*	1.02	1.27	1.24
CAPM 'standard cost of equity capital (%)	**11.8%**	**11.0%**	**11.2%**

Note: The term 'standard' is used as the report goes on to make various adjustments to these estimates.

* LBS RMS stands for London Business School Risk Measurement Service, see http://www.london.edu/finance/riskmeasurementservice.html

Source: Competition Commission Report (2002) *Supply of Banking Services by Clearing Banks to Small and Medium-Sized Enterprises*, Appendix 13.3. Charles River Associates note on 'normal' profits and rates of return (referred to in paragraph 13.240 of the main report) pp. 148–54.

greater than the cost of capital but credit card activities are making returns less than the cost of capital the bank should consider dedicating more capital resources to the former and also should think of ways of boosting returns in (or divesting) its credit card business.

Note that this is just the equity cost of capital and we can extend the analysis to include the cost of debt to present what is known as a weighted cost of capital. Also, one should note that there is a variety of other approaches that can be used to calculate the cost of capital (including a wide range of various accounting and other adjustments) and it should be stressed that cost of capital calculations are never definitive – they vary according to the calculation method used.

8.4.4 Solvency ratios

The Basle Accord (detailed in Section 7.8) requires banks to hold a minimum overall risk-weighted capital ratio of 8 per cent of which at least 50 per cent is in the form of equity (known as Tier 1) capital. More specifically, Tier 1 capital should be at least 4 per cent. Total capital adequacy ratio measures Tier 1 capital + Tier 2 capital; this ratio should be at least 8 per cent.

The total capital adequacy ratio cannot be calculated simply by looking at the balance sheet of a bank, as the bank has to classify its assets and off-balance sheet business according to certain risk categories and varying amounts of capital have to be held according to these risks. Recalling Section 7.8, for example, cash has a 0 per cent risk weighting requiring no capital backing, whereas unsecured loans require 8 per cent capital backing. Both Tier 1 and Tier 2 ratios can only be calculated internally by the bank. Banks have the option of publishing these ratios in their annual report. Financial ratios shown in Table 8.9 illustrate that on average the 50 major banks in Europe have been able to set aside a level of Tier 1 and total capital significantly above the 4 and 8 per cent minimum requirements.

Finally, we can say that, as equity is a cushion against asset malfunction, the simple equity/assets measure (which we can calculate from bank balance sheets) indicates the amount of protection afforded to the bank by the equity they invested in it. It follows that the higher this figure the more protection there is. However, remember that this is a crude measure of a bank's financial strength because, unlike the Basle Tier 1 and Tier 2 measures, this ratio does not take into account the riskiness of banking business.

8.4.4.1 The trade-off between safety and the return to shareholders

The amount of capital affects the returns to equity holders and ROE is a good measure for shareholders to know how much profit the bank is generating on their equity investments. Indeed, ROE is related directly with ROA (a typical measure of bank profitability), as follows:

$$\text{ROA} \times \text{EM} = \text{ROE} \tag{8.8}$$

rearranging:

$$\text{EM} = \text{ROE} \times \frac{1}{\text{ROA}} \tag{8.9}$$

substituting:

$$EM = \frac{\text{Total assets}}{\text{Total equity capital}} \tag{8.10}$$

where EM is the equity multiplier that measures the extent to which a bank's assets are funded with equity relative to debt. To understand the importance of EM, consider two banks, both having total assets (with the same risk features) equal to £50 million and earning a ROA of 1.5 per cent, as shown in Table 8.12.

Table 8.12 **An illustration of the trade-off between solvency and profitability**

Bank	*Total assets (a)*	*Total capital (b)*	*EM = (a) / (b)*	*ROA*	*ROE = EM × ROA*
Bank Alpha	£50,000,000	£5,000,000	10	1.5%	15%
Bank Beta	£50,000,000	£2,500,000	20	1.5%	30%

As illustrated in Table 8.12, there is a trade-off between total capital and ROE. In particular, Bank Alpha displays the highest level of total capital and the lowest level of EM and ROE relative to Bank Beta. However, while the shareholders of Bank Beta will be earning twice as much than those of Bank Alpha, it is not necessarily true that Bank Beta is the most desirable for shareholders as Bank Beta is more risky as it has half the amount of capital backing the same amount of risky assets. There is clearly a **trade-off between safety and returns** to shareholders.

8.4.5 Some limitations of financial ratios

Financial ratios have their own limitations. First, generally one year's figures are insufficient to evaluate the performance of banks, and financial analysts typically look at trends to evaluate the ratios and their fluctuations over a timespan of at least five years. Second, precise comparisons between similar banks may be difficult as they often compete in different markets, have varying product features and customer bases, and so on. As such, ratio analysis may be misleading as it is often difficult to compare 'like with like'. Despite these problems, financial analysts often undertake *peer analysis of* similar banks and this involves the creation of peer groups. Third, ratios do not stand in isolation: they are interrelated. For example, poor profitability may affect liquidity and capital ratios. A bank that performs poorly may have to use its liquid assets (if it has an excess of such assets) to fund future lending thus reducing its liquidity ratios. Large losses may be written out of capital thus reducing capital ratios. Another important factor is that ratios relate to a particular point in time and there are seasonal factors that can distort them. Moreover, figures in the financial statements may be 'window-dressed'; that is, made to look *better than they really are*. (As was the case mentioned earlier, referring to banks over- or under-provisioning for bad loans). Similarly, financial statements may be manipulated and may not reflect accepted accounting procedures. That is why both domestic and international regulatory authorities have pointed out the need for more transparency, disclosure as well as uniformity of bank accounts as the markets become increasingly global. For example, at the EU level all listed companies that are required to publish consolidated accounts are also required to prepare their accounts in accordance with adopted International Financial Reporting Standards (IFRS) for accounting periods beginning on or after 1 January 2005.

8.5 Conclusions

This chapter examined the main items contained in banks' financial statements and introduced the key financial ratios used by banks to compare performance. It also highlighted the role of bank capital, simply defined as the difference between assets and liabilities. Typically, banks are highly leveraged compared to non-financial firms; therefore capital management techniques are vital to ensure the solvency of banking institutions. In the chapter we also briefly discuss the concept of shareholder value creation and the cost of equity capital.

Furthermore, the analysis of the income statement (or profit and loss) account has shown the various sources of income (interest and non-interest) and cost structure for banks and how to determine the profitability. The chapter also focused on the different activities that investment banks perform and how this is reflected in the structure of their financial statements. We noted that investment banks' balance sheet structure and income statements differ substantially from those of commercial banks.

Many different agents operating either internally or externally to the banks (from managers to regulators and credit-rating companies) will be interested in their performance, thus the last part of this chapter introduces a selection of key ratios used to gauge bank performance, focusing particularly on profitability, asset quality and solvency.

Key terms

Balance sheet
Income statement (profit and loss account)
Liabilities
Assets
Capital
Costs
Revenues
Profits
Bank performance
Financial ratio analysis
Return-on-assets
Return-on-equity
Cost–income ratio
Net interest margin
Profit margin
Cost of capital
Shareholder value
Trade-off between safety and returns to shareholders

Key reading

Koch, T.W. and MacDonald, S.S. (2000) *Bank Management*, 4th edn. Orlando, FL: The Dryden Press.

Sinkey, J.F. Jr (1998) *Commercial Bank Financial Management*, 5th edn. London: Prentice Hall International.

Revision questions and problems

1 What is a bank balance sheet? What are the main items in a commercial bank's balance sheet?

2 What is equity capital? What are the functions of capital?

3 What is a bank income statement?

4 What are the main differences between a bank balance sheet and income statement?

5 What are the main differences between commercial and investment banks' financial statements?

6 Using the information contained in Tables 8.4, 8.5 and 8.7, calculate: Barclays' ROA, ROE, NIM and C/I.

7 Explain how to calculate the cost of equity capital for a bank. Outline the main advantages of this approach to bank performance measurement compared to using standard profitability ratios.

8 Explain the trade-off between solvency and profitability.

9 What are the main limitations of bank financial ratios?