BANK VALUATION[1]

this version: February 13, 2001

1. Introduction

In this document we discuss:

1. What's the bank's cash flow?
2. FCF valuation approaches to bank balance sheets and income statements
3. Bank cost of capital, WACC
4. Two examples of a valuation
   - FCF valuation
   - Dividend projection as a residual

2. Analyzing the bank's balance sheet

Banks borrow money (whether in the form of deposits or of loans from other financial institutions or markets) and then lend it out. It follows that when we are valuing or analyzing a bank, we should distinguish between the bank's borrowing *for the purpose of making loans* and the bank's *permanent debt*. (This is not to say that this distinction can always be made in practice.)

The valuation process

One way of viewing valuation is through the use of the accounting paradigm, but using market values. We rewrite the balance sheet by moving the current liabilities from the liabilities/equity side to the asset side of the balance sheet:

[1] This is a *very preliminary* draft of something which may eventually become part of a second edition of Benninga/Sarig's *Corporate Finance: A Valuation Approach*. At this stage only Simon Benninga bears responsibility for the mistakes! I want to thank a number of people for helping me make my thoughts clearer: Dave Martin, Oded Sarig, students in my recent New York Institute of Finance course in Singapore. Special thanks go to Hernán Burde of Pistrelli, Diaz-Arthur Andersen (Buenos Aires).

If you have comments/suggestions/case materials, please write me at **benninga@wharton.upenn.edu**.

USING THE BALANCE SHEET AS AN ENTERPRISE VALUATION MODEL					
ORIGINAL BALANCE SHEET					
Assets		**Liabilities**			
Cash and marketable securities		Operating current liabilities			
Operating current assets		Debt			
Net fixed assets		Equity			
Goodwill					
Total assets		**Total liabilities and equity**			
THE ENTERPRISE VALUATION "BALANCE SHEET"					
Assets		**Liabilities**			
Cash and marketable securities					
Operating current assets		Debt			
- Operating current liabilities					
= Net working capital			=PV(FCFs discounted at WACC)		
Net fixed assets		Equity			
Goodwill					
Market value		**Market value**			

Thus to value a company, we set:

$$Market\ value = Initial\ cash\ balances + \sum_t \frac{FCF_t}{(1+WACC)^t}$$

If we are valuing the equity of the firm, we subtract the value of the debt:

$$Equity\ \ value = Market\,value - Debt$$

$$= Initial\ cash\ balances + \sum_t \frac{FCF_t}{(1+WACC)^t} - Debt$$

$$= \sum_t \frac{FCF_t}{(1+WACC)^t} - (Debt - Initial\ cash)$$

Note that this means that we can write the enterprise balance sheet in a slightly different form:

THE ENTERPRISE VALUATION "BALANCE SHEET"					
A slight variation (cash netted out from debt)					
Assets		**Liabilities**			
Operating current assets		Debt - cash & Mkt. securities			
- Operating current liabilities		= Net debt			
= Net working capital	◄		=PV(FCFs discounted at WACC)		
Net fixed assets		Equity			
Goodwill					
Enterprise Value		**Enterprise Value**			
Note that both variations on the enterprise valuation "balance sheet"					
give the same equity value.					

Applying this to banks

The same logic we have used above can be applied to banks. There are some important differences between banks and "ordinary" companies, however:

- **On the asset side**: For an "ordinary" company, Cash and Marketable Securities are usually a store of value (like negative debt), whereas for a bank most marketable securities (and some of the cash) is an operating current asset.
- **On the liability side**: For an "ordinary" company, we put all debt items together, even if—from an accounting point of view—they are current liabilities. Thus:

  Debt = Long-term debt + Notes payable + Current portion of LTD + ...

  For a bank, most (all?) short-term debt items are *operating current liabilities* and are therefore part of the bank's working capital.

Example 1: Summit Bank

Here are the Summit Bank balance sheets for 1996 and 1997:

A BANK BALANCE SHEET (SUMMIT BANK, 1996 and 1997)		
	1997	**1996**
ASSETS		
Cash and due from banks	$30,487	$28,339
Federal funds sold	35,760	20,350
Investment securities		
Securities Available-for-Sale, at fair value	60,476	58,576
Securities Held-to-Maturity, at cost (fair value		
of $45,360,000 and $58,629,000 at		
December 31, 1997 and 1996, respectively)	45,151	58,437
Loans, Net of Unearned Discount	276,069	220,006
Allowance for Loan Losses	-4,065	-2,972
Loans, Net	272,004	217,034
Premises and equipment	7,916	7,105
Accrued income receivable	3,442	3,189
Other real estate	151	166
Other assets	4,407	2,052
TOTAL ASSETS	$459,794	$395,248
	========	========
LIABILITIES AND SHAREHOLDERS' EQUITY		
Noninterest-Bearing Demand	$126,398	$103,695
Interest-Bearing	275,326	241,328
Total deposits	401,724	345,023
Securities sold under agreement to repurchase	14,689	13,209
Accrued interest payable	678	638
Other liabilities	1,591	1,298
TOTAL LIABILITIES	418,682	360,168
Common Stock	8,127	4,041
Capital Surplus	6,251	6,136
Retained Earnings	26,491	24,675
Unrealized Gain on Investment Securities		
Available-for-Sale, Net of Tax	243	228
Total shareholders equity	41,112	35,080
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	$459,794	$395,248

A careful examination of these balance sheets leads to the conclusion that Summit Bank has no permanent debt. Rewriting the balance sheets in the format suggested above gives:

A BANK BALANCE SHEET (SUMMIT BANK, 1996 and 1997)				SUMMIT BANK'S BALANCE SHEETS IN ENTERPRISE VALUE FORM		
	1997	**1996**			**1997**	**1996**
ASSETS				**ASSETS**		
Cash and due from banks	$30,487	$28,339		Cash and due from banks	$30,487	$28,339
Federal funds sold	35,760	20,350		Total investment securities	141,387	137,363
Investment securities						
Securities Available-for-Sale, at fair value	60,476	58,576		Loans, Net	272,004	217,034
Securities Held-to-Maturity, at cost (fair value						
of $45,360,000 and $58,629,000 at				Minus short-term liabilities	-418,682	-360,168
December 31, 1997 and 1996, respectively)	45,151	58,437				
Loans, Net of Unearned Discount	276,069	220,006				
Allowance for Loan Losses	-4,065	-2,972				
Loans, Net	272,004	217,034				
Premises and equipment	7,916	7,105				
Accrued income receivable	3,442	3,189				
Other real estate	151	166				
Other assets	4,407	2,052		Net fixed and other assets	15,916	12,512
TOTAL ASSETS	$459,794	$395,248		**ENTERPRISE VALUE**	$41,112	$35,080
	========	========			========	========
LIABILITIES AND SHAREHOLDERS' EQUITY				**LIABILITIES AND SHAREHOLDERS' EQUITY**		
Noninterest-Bearing Demand	$126,398	$103,695				
Interest-Bearing	275,326	241,328				
Total deposits	401,724	345,023				
Securities sold under agreement to repurchase	14,689	13,209				
Accrued interest payable	678	638		"Permanent debt"	0	0
Other liabilities	1,591	1,298				
TOTAL LIABILITIES	418,682	360,168				
Common Stock	8,127	4,041		Common Stock	8,127	4,041
Capital Surplus	6,251	6,136		Capital Surplus	6,251	6,136
Retained Earnings	26,491	24,675		Retained Earnings	26,491	24,675
Unrealized Gain on Investment Securities				Unrealized Gain on Investment Securities		
Available-for-Sale, Net of Tax	243	228		Available-for-Sale, Net of Tax	243	228
Total shareholders equity	41,112	35,080		**Total shareholders equity**	41,112	35,080
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	$459,794	$395,248		**ENTERPRISE VALUE**	$41,112	$35,080

Summit Bank has no permanent debt capital, so that it is effectively an all-equity enterprise.

Example 2: Mellon Bank

Here is the same exercise for Mellon Bank. Mellon is a much bigger bank with quite a bit of leverage. Here are its balance sheets for 1997 and 1996:

MELLON BANK CORPORATION		
Consolidated Balance Sheet		
(dollar amounts in millions)		
	December 31	
Assets	**1997**	**1996**
Cash and due from banks	3,650	2,846
Interest-bearing deposits with banks	553	419
Federal funds sold and securities under resale agreements	383	460
Other money market investments	72	113
Trading account securities	75	84
Securities available for sale	2,767	4,111
Investment securities (approximate fair value of $2,118 and $2,365)	2,082	2,375
Loans, net of unearned discount of $48 and $57	29,142	27,393
Reserve for credit losses	(475)	(525)
Net loans	28,667	26,868
Customers' acceptance liability	182	238
Premises and equipment	573	569
Goodwill and other intangibles	1,425	1,238
Mortgage servicing assets and purchased credit card relationships	1,075	774
Acquired property, net of reserves of $9 and $10	48	80
Other assets	3,340	2,421
Total assets	44,892	42,596
Liabilities		
Noninterest-bearing deposits in domestic offices	7,975	8,692
Interest-bearing deposits in domestic offices	19,954	19,965
Interest-bearing deposits in foreign offices	3,376	2,717
Total deposits	31,305	31,374
Federal funds purchased and securities under repurchase agreements	1,997	742
U.S. Treasury tax and loan demand notes	447	474
Term federal funds purchased	625	481
Short-term bank notes	330	135
Commercial paper	67	122
Other funds borrowed	278	293
Acceptances outstanding	182	238
Other liabilities	2,252	1,483
Notes and debentures (with original maturities over one year)	2,573	2,518
Total liabilities	40,056	37,860
Trust-preferred securities		
Guaranteed preferred beneficial interests in Corporations' junior		
subordinated deferrable interest debentures	991	990
Shareholders' equity		
Preferred stock	193	290
Common shareholders' equity:		
Common stock--$0.50 par value		
Authorized--400,000,000 shares		
Issued--294,330,960 and 147,165,480 shares	147	74
Additional paid-in capital	1,818	1,866
Retained earnings	2,872	2,480
Net unrealized gain (loss) on assets available for sale, net of tax	33	(1)
Treasury stock of 40,545,114 and 18,518,290 shares at cost	(1,218)	(963)
Total common shareholders' equity (w/o preferred)	3,652	3,456
Total shareholders' equity (includes preferred)	3,845	3,746
Total liabilities, trust-preferred securities, and shareholders' equity	44,892	42,596

When we rewrite the balance sheets in enterprise-value form (putting all the working current liabilities on the asset side of the balance sheet—this involves some judgment calls), we get:

MELLON BANK CORPORATION

ENTERPRISE VALUATION FORM

(dollar amounts in millions)

	December 31	
Assets	**1997**	**1996**
Cash and due from banks	3,650	2,846
Total securities and (net) loans held	34,781	34,668
Subtract: Operating current liabilities	(34,374)	(33,071)
Premises and equipment	573	569
Goodwill and other intangibles	1,425	1,238
Mortgage servicing assets and purchased credit card relationships	1,075	774
Acquired property, net of reserves of $9 and $10	48	80
Other assets	3,340	2,421
Market value	10,518	9,525
Liabilities		
Short-term bank notes	330	135
Commercial paper	67	122
Other funds borrowed	278	293
Acceptances outstanding	182	238
Other liabilities	2,252	1,483
Notes and debentures (with original maturities over one year)	2,573	2,518
Trust-preferred securities	991	990
Total **debt**	6,673	5,779
Shareholders' equity		
Preferred stock	193	290
Common shareholders' equity:		
Common stock--$0.50 par value		
Authorized--400,000,000 shares		
Issued--294,330,960 and 147,165,480 shares	147	74
Additional paid-in capital	1,818	1,866
Retained earnings	2,872	2,480
Net unrealized gain (loss) on assets available for sale, net of tax	33	(1)
Treasury stock of 40,545,114 and 18,518,290 shares at cost	(1,218)	(963)
Total common shareholders' equity (w/o preferred)	3,652	3,456
Total shareholders' equity (includes preferred)	3,845	3,746
Market value	10,518	9,525

The bank's free cash flow (FCF)

Recall that throughout this book we have valued a firm's *permanent capital* by discounting the firm's free cash flows at its weighted average cost of capital. Thus for a firm which has only equity and debt:

$$Enterprise\ value = value\ of\ \ firm's\ Equity + Debt = \sum_t \frac{anticipated\ \ FCF_t}{(1+WACC)^t}$$

The FCF calculations for an industrial company employed elsewhere in the book have to be modified somewhat when considering a financial company. Recall that the standard FCF calculation for an industrial company (see Chapter 2) is along the following lines:

Free Cash Flow Calculation for A Non-Financial Company	
Item	Explanation
Profit after taxes	The starting point for FCF
Add back depreciation	Depreciation is a non-cash expense
Add back after-tax interest	FCF is an *operating* concept; adding back after-tax interest costs neutralizes the effects of interest on the firm's Profits
Subtract out increases in *operating NWC*	NWC is a financial burden on the company which is not accounted for in the Profit; the emphasis on *operating NWC* comes because we include only items like Accounts Receivable, Accounts Payable, Inventories, etc. For purposes of calculating ΔNWC, we do not include changes in Cash (assumed to be a store of value), Notes Payable, Current Portion of LTD, etc.
Subtract increases in Fixed Assets at Cost	This measures the cost of purchasing new productive assets for the company
=Free Cash Flow	

This calculation has to be modified somewhat for a financial company: Since Cash, Loans, Deposits, Short-Term Borrowings, etc. are all part of a bank's productive working capital, we

cannot add back the net interest on these items.[2] On the other hand, the bank's permanent capital includes both its equity and its long-term borrowing.

The question—for a bank as for an industrial company—is: How much *cash* would the company have produced were it an *unlevered entity*. What complicates things for a bank is that its productive assets are debts and loans.

Thus our calculation for a bank's Free Cash flow is:

Free Cash Flow Calculation for A Financial Company	
Item	Explanation
Profit after taxes	
Add back depreciation	Depreciation is usually not a very significant item
Add back after-tax interest on *permanent debt items* (typically Long-Term debt)	This leaves the net interest income on the bank's productive activities—its financial intermediation.
Subtract out increases in *operating NWC*	Since we define the NWC to include deposits, etc., this effectively subtracts the *self-funded* part of the banks operations from the FCF.
Subtract increases in Fixed Assets at Cost	Note that Fixed Assets for banks are typically small relative to total assets.
=Free Cash Flow	

Here's the calculation of Mellon bank's FCF. Note that there is some guesswork involved in attributing the interest expenses between operating current liabilities and debt:

[2] For an industrial company, cash is usually *not* part of operating working capital (there are exceptions, of course: A supermarket needs some money in the till … .) For a bank, however, a significant part of cash balances are clearly a part of working capital. See the calculation of the bank's free cash flow below.

Income statement				Calculation of free cash flow	
	1997	**1996**			**1997**
Interest revenue					
Interest and fees on loans (loan fees of $81, $96, and $79)	2,268	2,253		Profit after taxes	771
Federal funds sold and securities under resale agreements	30	30		Add back amortization and depreciation	223
Interest-bearing deposits with banks	26	36		Add back interest on debt items above, net of taxes	194
Other money market investments	6	7		Subtract increase in fixed assets and other capex	(1,379)
Trading account securities	9	7		**FCF**	(191)
Securities					
U.S Treasury and agency securities	367	392			
Obligation of states and political subdivisions	2	2			
Other	8	12			
Total interest revenue	2,716	2,739			
Interest expense					
Deposits in domestic offices	749	709			
Deposits in foreign offices	129	194			
Federal funds purchased and securities under repurchase agreements	77	94			
Short-term bank notes	8	29			
Other short-term borrowings	97	92			
Notes and debentures	189	143			
Total interest expense	1,249	1,261			
Net interest revenue	1,467	1,478			
Provision for credit losses	(148)	(155)			
Net interest revenue after provision for losses	1,319	1,323			
Noninterest revenue					
Trust and investment fees	1,311	994			
Cash management and deposit transaction charges	242	211			
Mortgage servicing fees	213	180			
Foreign currency and securities trading revenue	118	80			
Credit card fees	97	120			
Information services fees	42	50			
Ganin on sale of corporate trust business	43				
Gain on sale of credit card potfolio		57			
Other income	352	327			
Total fee revenue	2,418	2,019			
Gains on sales of securities		4			
Total non interest revenue	2,418	2,023			
Operating expense					
Staff expense	1,242	1,055			
Net occupancy expense	225	205			
Professional, legal and other purchased services	219	195			
Equipment expense	175	145			
Business development	148	137			
Amortization of mortgage servicing assets and purchased credit card relationships	118	107			
Amortization of goodwill and other intangible assets	105	100			
Communications expense	102	96			
Other expense	175	165			
Trust-preferred securities expense	78	3			
Net revenue from acquired property	(19)	(13)			
Total operating expense	2,568	2,195			
Income					
Income before income taxes	1,169	1,151			
Provision for income taxes	398	418			
Net income	771	733			
Dividends on preferred stock	21	44			
Net income applicable to common stock	750	689			
Effective tax rate	34.0%	36.3%			

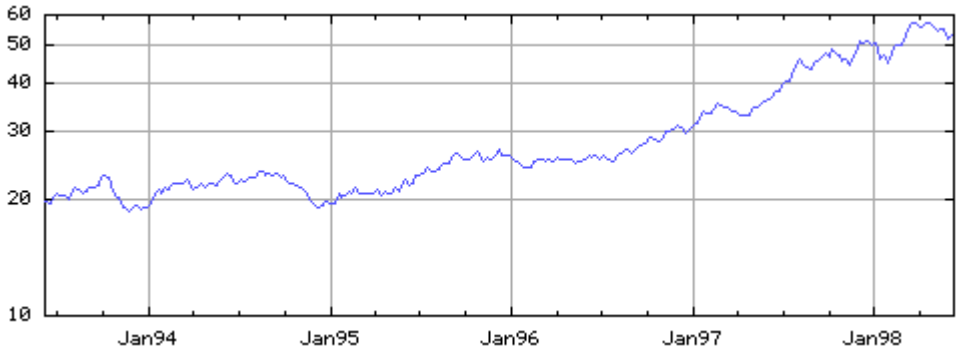
4. Large Bank Corp. buys Small Bank—A valuation example[3]

We now implement this model by examining a possible purchase of Small Bank Inc. by Large Bank Corporation. Our problem will be the valuation of Small Bank. The exhibits at the end of this chapter give some relevant information about the two banks.

In February 1998, the Mr. Daniel Rogers, the CEO of Large Bank Corp., was approached by an investment banker representing Small Bank Inc. Small Bank's board had become convinced that there was no future for Small without its incorporation into a larger corporate structure. Small Bank was a very conservatively financed bank which had 350 offices throughout North and South Carolina. Its loan portfolio was about 70% consumer loans, 20% real estate lending, and 10% commercial loans. Small Bank was largely deposit driven: Of the $9 billion of total assets at year-end 1997, $7.6 billion were deposits, a significant percentage of which were non-interest bearing. Large Bank, by contrast, had $31 billion of deposits out of total assets of $45 billion, but $23 billion of these deposits were interest-bearing. Small Bank's management was concerned that the cost of deposits would rise over the coming years, as their customers started to become more like the sophisticated customers of Large Bank. Furthermore, Small Bank's management knew that there were significant economies of scale in check processing and other "back office" activities which would stem from a merger with a large, efficient organization like Large Bank.

Small Bank's current share price was $45. Its share price history is given below:

SMALL BANK'S STOCK PRICE



Dan Rogers was interested in the deal: Under his leadership, Large Bank Corporation had been aggressive in purchasing numerous smaller banks. It's stock price rise had been very impressive:

[3] This mini case was prepared from actual market data. However, the "merger" is a figment of the authors' imagination … .

LARGE BANK'S STOCK PRICE

Large Bank had also branched out into securities dealership, having purchased one of the major mutual fund organizations. In the course of its expansions, Large Bank had learned some lessons the hard way:

- Only share deals: Large Bank's preferred merger was an exchange of shares and a pooling of interest.
- Only where markets were mutually exclusive
- Only where significant operational gains could be made

Analysis

Mr. Rogers asked one of his financial analysts to perform a "quick and dirty" analysis of a possible merger between the two financial institutions. He wanted to come up with a range of possible values for Small Bank, so that he could then discuss the merger with his chairman. If the chairman and some other leading members of the board's finance committee thought that the proposed merger should be brought to the full board of Large Bank, then an investment banking advisor would be brought in to work with the bank's staff to do a full-blown (and expensive) analysis of the merger.

The model

Large Bank's chief financial analyst built the following model, based only on publicly information and some educated guesses. The critical assumptions of the model were:

- Increasing cost of deposits over time: The market for "free" deposits was thought to be gradually phased out.
- A dividend payout ratio of 50%
- 5% of deposits held as non-interest-bearing cash
- No increase in Small Bank's debt
- A significant decrease in Small Bank's expense ratio (calculated by the analyst as the percentage of expenses out of net interest income). This represented savings in

staffing and computerization—much of Small Bank's back office work could comfortably be accommodated by Large Bank with a significant decrease in costs.

SMALL BANK						
PRO FORMA MODEL						
Cash as percent of deposits	5.0%					
Interest on cash	0.0%					
Interest on other investment securities	6.19%					
Interest on mortgages	8.13%					
Interest on other earning assets	6.71%					
Interest on loans	8.77%					
Interest on deposits	3.51%	3.60%	3.80%	3.90%	4.00%	4.20%
Interest on short-term borrowing	4.72%					
Interest on long-term debt	6.38%					
Loan loss as % of outstanding loans	0.30%					
Noninterest income as % of interest income	25.30%					
Noninterest expense as % of net interest income	70.00%	<-- was 74.35%, but Large Bank analyst thinks this will go down to 70%				
Growth rate of Net Loans	6%					
Growth rate of Deposits	5%					
Depreciation rate	10%					
Income tax rate	35%					
Dividend payout ratio	50%	<-- Like Large Bank's				
	1997	**1998**	**1999**	**2000**	**2001**	**2002**
	(Dollar amounts in thousands, except per-share data)					
Balance Sheet Data						
Cash	$386,832	400,042	420,044	441,046	463,098	486,253
Other investment securities, including						
money market instruments	2,190,106	$2,040,076	$2,135,814	$2,231,712	$2,328,379	$2,425,586
Mortgage loans held for sale	18,953	18,953	18,953	18,953	18,953	18,953
Other earning assets	21,444	21,444	21,444	21,444	21,444	21,444
Loans, net	5,869,914	6,222,109	6,595,435	6,991,161	7,410,631	7,855,269
Land	38,099	38,099	38,099	38,099	38,099	38,099
Other fixed assets	282,956	356,728	396,364	440,405	489,339	543,709
Accumulated depreciation	156,754	192,427	232,063	276,104	325,038	379,408
Net fixed assets and land	164,301	164,301	164,301	164,301	164,301	164,301
Other assets	360,087	360,087	360,087	360,087	360,087	360,087
Total Assets	$9,011,637	$9,227,011	$9,716,078	$10,228,704	$10,766,894	$11,331,894
Deposits	$7,619,842	$8,000,834	$8,400,876	$8,820,920	$9,261,966	$9,725,064
Short-term borrowings	251,687	0	0	0	0	0
Long-term indebtedness	2,826	2,826	2,826	2,826	2,826	2,826
Other liabilities	126,126	126,126	126,126	126,126	126,126	126,126
Shareholders' Equity	1,011,156	1,097,225	1,186,250	1,278,833	1,375,976	1,477,878
Total Liabilities and Shareholders' Equity	$9,011,637	$9,227,011	$9,716,078	$10,228,704	$10,766,894	$11,331,894

SMALL BANK						
PRO FORMA INCOME STATEMENTS						
Interest income		**1998**	**1999**	**2000**	**2001**	**2002**
Interest on cash balances		0	0	0	0	0
Interest on other investment securities		130,924	129,244	135,175	141,135	147,135
Interest on mortgage loans		1,541	1,541	1,541	1,541	1,541
Interest on other earning assets		1,439	1,439	1,439	1,439	1,439
Interest on net loans		530,235	562,049	595,772	631,519	669,410
Total interest income		664,139	694,273	733,927	775,633	819,525
Interest expense						
Interest on deposits		-280,829	-302,432	-335,195	-361,217	-389,003
Interest on short-term borrowings		0	0	0	0	0
Interest on long-term borrowing		-180	-180	-180	-180	-180
Interest on other liabilities???						
Total interest expense		-281,010	-302,612	-335,375	-361,397	-389,183
Net interest income		383,130	391,661	398,552	414,236	430,342
Provision for loan loss		-18,138	-19,226	-20,380	-21,603	-22,899
Noninterest income		168,027	175,651	185,684	196,235	207,340
Noninterest expenses		-268,191	-274,163	-278,986	-289,965	-301,239
Depreciation and amortization		-35,673	-39,636	-44,040	-48,934	-54,371
Income before income tax		264,828	273,923	284,869	298,903	313,543
Provision for income tax		92,690	95,873	99,704	104,616	109,740
Net income		172,138	178,050	185,165	194,287	203,803
Dividends		86,069	89,025	92,582	97,144	101,902
Retained earnings		86,069	89,025	92,582	97,144	101,902

Given the pro formas, the analyst derived Small Bank's anticipated cash flows:

Free Cash Flow Calculations		**1998**	**1999**	**2000**	**2001**	**2002**
Profit after taxes		172,138	178,050	185,165	194,287	203,803
Add back depreciation		35,673	39,636	44,040	48,934	54,371
Add back after-tax interest on permanent debt		117	117	117	117	117
Changes in operating Net Working Capital						
Subtract increases in Cash		-13,210	-20,002	-21,002	-22,052	-23,155
Subtract increases in Fixed Assets at Cost		-73,772	-39,636	-44,040	-48,934	-54,371
Free cash flow		120,947	158,165	164,280	172,352	180,766

The β of Small Bank was estimated to be 0.9. This gave the following valuation:

Beta	0.9					
Risk-free rate	6.19%					
Market risk premium	10.57%					
Discount rate	13.53%					
Projected FCF growth, 1998-2002	10.57%					
Projected FCF growth, 1999-2002	4.55%					
Terminal growth rate of FCF	5.00%					
		1998	**1999**	**2000**	**2001**	**2002**
Free Cash Flow		120,947	158,165	164,280	172,352	180,766
Terminal value						2,224,259
Total		120,947	158,165	164,280	172,352	2,405,025
Value of Small Bank	1,720,203					
Long-term debt	2,826					
Other liabilities??	126,126					
Implied equity value	1,591,251					
Number of Small Bank shares	32,406,000					
Imputed per-share value of Small Bank	49.10					

Calculating the exchange ratio

At the time of the case, Large Bank had 294,330,960 shares worth $58 per share. Large Bank intended to do an exchange offer for Small Bank's shares, and the question about the proper

exchange ratio was discussed. Assuming that the current market valuation of Large Bank is correct, this yields an exchange ratio of

$$x = \frac{calculated\ \ per\ \ share\ valuation\ of\ \ Small\ \ Bank}{current\ \ market\ \ price\ \ per\ \ share\ of\ \ Large\ \ Bank}$$

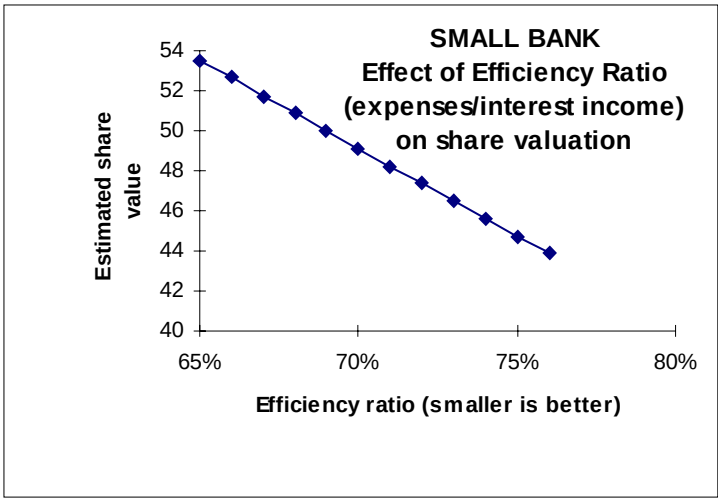
We have to set $\hat{P}$ so that the equity of Large Bank's shareholders and Small Bank's

Doing these calculations yields:

Number of Large Bank shares	294,330,960
Value of Large Bank share	58.00
Market value of Large Bank equity, before merger	17,071,195,680
Exchange ratio, x	0.85
Check	
Number of shares, new entity	321,766,329
Value of equity, new entity ($ million)	18,662,447
Value per share	58.00
Total value of Large Bank ex-shareholders	17,071,195,680
Total value of Small Bank ex-shareholders	1,591,251,406

The analyst also performed a sensitivity analysis of the price and the exchange ratio on the efficiency ratio:

	Share price	**Exchange ratio**
65%	53.50	0.92
66%	52.65	0.91
67%	51.74	0.89
68%	50.89	0.88
69%	49.98	0.86
70%	49.14	0.85
71%	48.23	0.83
72%	47.39	0.82
73%	46.48	0.80
74%	45.64	0.79
75%	44.74	0.77
76%	43.90	0.76



5. An alternative approach to cash flow generation[4]

An alternative way to generate bank cash flows involves implementing the capital adequacy ratios.[5] Implement this approach determines the maximum payout to equity as a residual determined by capital adequacy requirements:

RESIDUAL APPROACH TO BANK EQUITY CASH FLOW

Assets	**Liabilities**
Cash and marketable securities	Operating current liabilities--borrowed funds
Loan portfolio	Debt
Net fixed assets	Equity
Total assets	**Total liabilities and equity**

Next year's equity =

Year t equity
+ % reserve against increase in loan portfolio
+ % margin for business expansion, prudence, etc.

==> Determines maximum payout to equity

[4] I am indebted to Hernán Burde for sharing this idea with me.

[5] These could be based either on BIS requirements or on a VaR approach.

EXHIBITS

SMALL BANK					
	1997	**1996**	**1995**	**1994**	**1993**
	(Dollar amounts in thousands, except per-share data)				
Balance Sheet Data					
Cash	$386,832	$378,171	$397,858	$420,742	$326,136
Money market					
investments	243,162	323,620	235,000	30,000	235,000
Mortgage loans held for sale	18,953	12,771	19,216	13,291	69,173
Other earning assets	21,444	19,672	11,528	8,987	6,263
Investment securities:					
Available for sale	-	-	64,546	-	-
Held to maturity	1,946,944	1,820,949	2,128,220	2,086,030	2,169,771
Loans, net	5,869,914	5,302,026	4,980,154	4,938,334	3,967,218
Other assets	524,388	378,847	385,014	367,998	263,322
Total Assets	$9,011,637	$8,236,056	$8,221,536	$7,865,382	$7,036,883
Deposits	$7,619,842	$7,042,650	$7,056,107	$6,815,841	$6,136,389
Short-term borrowings	251,687	234,488	209,719	179,409	151,859
Long-term indebtedness	2,826	3,876	2,710	3,814	1,008
Other liabilities	126,126	83,765	83,353	59,430	56,126
Shareholders' Equity	1,011,156	871,277	869,647	806,888	691,501
Total Liabilities and					
Shareholders' Equity	$9,011,637	$8,236,056	$8,221,536	$7,865,382	$7,036,883
Operating Results					
Interest income	$631,119	$587,216	$573,599	$503,642	$504,782
Interest expense	222,927	212,298	215,502	161,639	164,959
	----------	----------	----------	----------	----------
Net interest income	408,192	374,918	358,097	342,003	339,823
Provision for loan loss	17,177	17,734	8,341	6,463	6,450
Noninterest income....	103,552	98,450	89,906	84,700	82,540
Noninterest expenses..	303,243	279,310	271,384	252,459	245,767
	----------	----------	----------	----------	----------
Income before income tax	191,324	176,324	168,278	167,781	170,146
Provision for income tax	66,479	59,983	56,679	54,560	54,122
	----------	----------	----------	----------	----------
Net income	$124,845	$116,341	$111,599	$113,221	$116,024
	==========	==========	==========	==========	==========
Dividends declared:					
Preferred	$41	$44	$47	$51	$54
Common	53,710	47,861	46,205	42,108	36,519

Fixed assets: Premises and equipment consisted of (in thousands)		
	December 31	
	1997	**1996**
Land	38,099	34,052
Premises and improvements	169,101	150,831
Furniture and equipment	113,855	102,380
Total cost	323,052	289,259
Accumulated depreciation and amortization	156,754	139,076
Carrying value	166,298	150,183

SMALL BANK			
CONSOLIDATED STATEMENTS OF CASH FLOWS			
	Year Ended December 31		
	1997	**1996**	**1995**
	(In thousands)		
Operating activities			
Net income	$124,845	$116,341	$111,599
Adjustments to reconcile net income to			
net cash provided by operating activities:			
Depreciation of premises and equipment	13,838	13,488	13,462
Gain on sale of premises and equipment	-2,331	-1,263	-1,050
Provision for loan losses	17,177	17,734	8,341
Amortization of investment			
securities premiums	6,431	9,965	12,275
Accretion of investment			
securities discounts	-2,608	-3,426	-6,112
Net decrease (increase) in mortgage loans held for sale	-6,182	6,445	-5,925
Gain on sale of securities	-51	-1,789	-
Amortization of intangible assets	11,327	8,039	7,722
Deferred income taxes	-319	-1,123	-58
Increase in prepaid expenses	-2,801	-5,840	-6,126
Decrease (increase) in interest receivable	-426	11,110	-3,243
Increase (decrease) in interest payable	754	-4,320	19,554
Increase in other accrued expenses	8,152	4,309	4,945
Net cash provided by operating activities	167,806	169,670	155,384
Investing activities			
Proceeds from the sale of available for sale securities	0	64,682	0
Proceeds from the maturity of held to maturity securities	1,324,632	790,173	669,373
Purchase of held to maturity securities	-1,289,206	-489,422	-780,448
Net increase in loans	-80,751	-339,606	-50,122
Purchases of premises and equipment	-14,849	-14,860	-13,691
Sales of premises and equipment	3,891	4,506	7,162
Mortgage servicing rights acquired	-267	-1,351	-1,190
Other intangible assets acquired	-179	-5,869	-16,469
Net cash of acquired banks	38,908	0	0
Other	-5,987	-8,774	-7,526
Net cash used for investing activities	-23,808	-521	-192,911
Financing activities			
Net (decrease) increase in deposits	($76,309)	($13,457)	$240,266
Net increase in short-term borrowings	7,027	24,769	30,310
Principal payments on long-term borrowings	-1,050	-2,097	-1,104
Proceeds from long-term borrowings	0	3,263	0
Common stock purchased and retired	-94,772	-66,311	-5,695
Cash dividends paid:			
Common $1.02 per share-1997, $.95 per			
share-1996 and $.89 per share-1995	-51,468	-47,477	-45,559
Preferred	-42	-45	-48
Proceeds from issuance of common stock	819	1,139	1,473
Net cash (used for) provided by financing activities	-215,795	-100,216	219,643
	---	---	---
Net increase (decrease) in cash and cash equivalents	-71,797	68,933	182,116
Cash and cash equivalents at beginning of year	701,791	632,858	450,742
	---	---	---
Cash and cash equivalents at end of year.	$629,994	$701,791	$632,858

SMALL BANK					
	1997	**1996**	**1995**	**1994**	**1993**
Per Share of Common Stock					
Net income - basic	$2.47	$2.34	$2.19	$2.34	$2.39
diluted	2.45	2.32	2.18	2.33	2.37
Dividends declared	1.05	0.96	0.91	0.85	0.75
Shareholders' equity	19.5	17.91	17.06	15.79	14.19
Market price at year-end	51.69	31.92	27.83	21.33	21.83
Range-High	53.38	32.67	29.33	26.92	27.33
Low	30.83	25.5	21.33	21.08	21.17
Ratios					

Earnings:					
Return on average assets	1.44%	1.43%	1.41%	1.58%	1.68%
Return on average equity	13.1	13.38	13.34	15.76	17.81
Net interest margin	5.2	5.06	5	5.28	5.46
Risk-based capital:					
Tier 1	12.94	13.57	15.42	14.76	16.84
Total capital	13.99	14.66	16.57	15.96	18.09
Capital strength:					
Tier 1 leverage	9.53	6.69	9.63	10.25	9.67
Ratio of average equity					
to average assets	11.01	10.68	10.53	10.04	9.45
Dividends declared as a					
percentage of net					
income (per share, not					
restated for poolings					
of interests)	42.59	41.24	41.42	36.41	31.58
Data for prior years have been restated for material acquisitions accounted for as poolings of interests					

SMALL BANK

AVERAGE BALANCE SHEETS AND INTEREST RATES ON EARNING ASSETS AND INTEREST-BEARING LIABILITIES

	1997		
	Average Balance	Interest Income/ Expense	Rate
ASSETS	(Dollars in thousands)		
Interest-earning assets:			
U.S. Government & its agencies	$1,666,939	$101,710	6.10%
State and municipal obligations (1)	156,908	11,064	7.05%
Other(1)	1,157	127	11.01%
Total investment securities	1,825,004	112,901	6.19%
Loans, net of unearned income:(2)			
Installment	3,766,026	327,645	8.70%
Real estate	1,096,448	96,137	8.77%
Other(1)	849,224	76,956	9.03%
Total loans	5,711,698	500,738	8.77%
Mortgage loans held for sale	13,395	1,089	8.13%
Money market investments	385,995	20,944	5.43%
Other earning assets(1)	21,656	1,453	6.71%
Total earning assets and interest income	7,957,748	637,125	8.01%
Noninterest-earning assets:			
Cash and due from banks	320,875		
Premises and equipment, net	158,610		
Other assets	288,546		
Less allowance for loan losses	-65,934		
Total Assets	$8,659,845		

(1) Income from tax-exempt securities and loans is included in interest income on a taxable-equivalent basis. Interest income has been divided by a factor comprised of the complement of the incremental tax rate of 35% and adjusted for the partial disallowance of interest costs incurred to carry the tax-exempt investments.

(2) Nonaccruing loans are included in their respective categories.

SMALL BANK

AVERAGE BALANCE SHEETS AND INTEREST RATES ON EARNING ASSETS AND INTEREST-BEARING LIABILITIES

			1997	
		---	---	---
			Interest	
		Average	Income/	
		Balance	Expense	Rate
		---	---	---
LIABILITIES AND SHAREHOLDERS' EQUITY		(Dollars in thousands)		
Interest-bearing liabilities:				
Interest checking/savings plan		$1,333,213	$23,016	1.73%
Money market accounts		739,184	22,547	3.05%
Savings deposits		1,141,337	26,062	2.28%
Consumer certificates of deposit		2,403,908	118,654	4.94%
Large denomination certificates of deposit		385,224	20,392	5.29%
		---	---	
Total interest-bearing deposits		6,002,866	210,671	3.51%
Short-term borrowings		254,861	12,040	4.72%
Long-term indebtedness		3,387	216	6.38%
		---	---	
Total interest-bearing liabilities				
and interest expense		6,261,114	222,927	3.56%

Noninterest-bearing liabilities:				
Demand deposits		1,354,254		
Other		91,368		
Common shareholders' equity (memo only)		952,480		
Shareholders' equity		953,109		

Total liabilities and				
shareholders' equity		$8,659,845		
		==========		
Net interest income and				
net interest margin			$414,198	5.20%
			========	

LARGE BANK CORPORATION			
CONSOLIDATED BALANCE SHEET			
dollar amounts in millions, except per share amounts			
		December 31,	
		1997	1996
Assets	Cash and due from banks	3,650	2,846
	Interest-bearing deposits with banks	553	419
	Federal funds sold and securities under resale agreements	383	460
	Other money market investments	72	113
	Trading account securities	75	84
	Securities available for sale	2,767	4,111
	Investment securities (approximate fair value of $2,118 and $2,365)	2,082	2,375
	Loans, net of unearned discount of $48 and $57	29,142	27,393
	Reserve for credit losses	-475	-525
	Net loans	28,667	26,868
	Customers' acceptance liability	182	238
	Premises and equipment	573	569
	Goodwill and other intangibles	1,425	1,238
	Mortgage servicing assets		
	and purchased credit card relationships	1,075	774
	Acquired property, net of reserves of $9 and $10	48	80
	Other assets	3,340	2,421
	Total assets	44,892	42,596
Liabilities	Noninterest-bearing deposits in domestic offices	7,975	8,692
	Interest-bearing deposits in domestic offices	19,954	19,965
	Interest-bearing deposits in foreign offices	3,376	2,717
	Total deposits	31,305	31,374
	Federal funds purchased and securities		
	under repurchase agreements	1,997	742
	U.S. Treasury tax and loan demand notes	447	474
	Term federal funds purchased	625	481
	Short-term bank notes	330	135
	Commercial paper	67	122
	Other funds borrowed	278	293
	Acceptances outstanding	182	238
	Other liabilities	2,252	1,483
	Notes and debentures (with original maturities over one year)	2,573	2,518
	Total liabilities	40,056	37,860
Trust-preferred securities	Guaranteed preferred beneficial interest in Corporation's		
	junior subordinated deferrable interest debentures	991	990
Shareholder's equity	Preferred stock	193	290
	Common shareholder's equity:		
	Common stock--$0.50 par value		
	Authorized--4000,000,000 shares		
	Issued--294,330,960 and 147,165,480 shares (see note)	147	74
	Additional paid-in capital	1,818	1,866
	Retained earnings	2,872	2,480
	Net unrealized gain (loss) on assets available for sale, net of tax	33	-1
	Treasury stock of 40,545,114 and 18,518,290 shares at cost (see note)	-1,218	-963
	Total common shareholders' equity	3,652	3,456
	Total shareholders' equity	3,845	3,746
	Total liabilities, trust-preferred securities and shareholders' equity	44,892	42,596
Note: Common shareholders' equity as issued reflects two-for-one stock split distributed on June 2, 1997			

LARGE BANK CORPORATION				
CONSOLIDATED INCOME STATEMENT				
dollar amounts in millions, except per share amounts				
		year ended December 31		
		1997	1996	1995
Interest revenue	Interest and fees on loans (loan fees of $81, $96, and $79)	2,268	2,253	2,425
	Federal funds sold and securities under resale agreements	30	30	34
	Interest-bearing deposits with banks	26	36	36
	Other money market investments	6	7	2
	Trading account securities	9	7	19
	Securities:			
	U.S. Treasury and agency securities	367	392	305
	Obligation of states and political subdivisions	2	2	3
	Other	8	12	14
	Total interest revenue	2,716	2,739	2,838
Interest expense	Deposits in domestic offices	749	709	663
	Deposits in foreign officess	129	194	226
	Federal funds purchased and securities under repurchase agreements	77	94	125
	Short-term bank notes	8	29	50
	Other short-term borrowings	97	92	109
	Notes and debentures	189	143	117
	Total interest expense	1,249	1,261	1,290
Net interest revenue	Net interest revenue	1,467	1,478	1,548
	Provision for credit losses	148	155	105
	Net interest revenue after provision for losses	1,319	1,323	1,443
Noninterest revenue	Trust and investment fees	1,311	994	906
	Cash management and deposit transactions charges	242	211	191
	Mortgage servicing fees	213	180	122
	Foreign currency and securities trading revenue	118	80	91
	Credit card fees	97	120	90
	Information services fees	42	50	48
	Gain on sale of corporate trust business	43	0	0
	Gain on sale of credit card portfolio	0	57	0
	Other incomes	352	327	222
	Total fee revenue	2,418	2,019	1,670
	Gains on sales of securites	0	4	6
	Total noninterest revenue	2,418	2,023	1,676
Operating expense	Staff expense	1,242	1,055	957
	Net occupancy expense	225	205	205
	Professional, legal and other purchased services	219	195	186
	Equipment expense	175	145	143
	Business development	148	137	136
	Amortization of mortgage servicing assets and purchased credit card relationships	118	107	68
	Amortization of goodwill and other intangible assets	105	100	96
	Communications expense	102	96	86
	Other expense	175	165	170
	Trust-preferred securities expense	79	3	0
	Net revenue from acquired property	-19	-13	-20
	Total operating expense	2,569	2,195	2,027
Income	Income before income taxes	1,168	1,151	1,092
	Provision for income taxes	398	418	401
	Net income	770	733	691
	Dividends on preferred stock	21	44	39
	Net income appplicable to common stock	749	689	652
Per common share	Basic net income	2.94	2.63	2.27
	Diluted net income	2.88	2.58	2.25

Appendix: A Primer on Bank financial statements

In order to develop our intuition, we will do a small (Chapter 2 type) exercise in bank financial statements. On January 1, 1997, Oded and Simon decide to start a bank, which they modestly name after themselves (OdSi Bank). Taking $1000 of their own money, they open a small branch in the their house, lending the money for short periods of time. Their first loan is made immediately for $500; it bears 10% annual interest and is due in 6 months (i.e., the borrowers have promised to repay $525 on June 30). Thus the initial balance sheet of the OdSi Bank looks like:

January 1, 1997--bank inception			
Cash	500	Equity	1,000
Loans	500		
Total assets	**1,000**	**Total liabilities**	**1,000**
Other information:			
The single loan bears interest of 10% annually and is due in 6 months			

June 30, 1997: The loan comes due, along with the $25 interest. The bank's balance sheet looks like:

June 30, 1997			
Cash	1,025	Equity	1,025
Loans	0		
Total assets	**1,025**	**Total equity and liabilities**	**1,025**
Other information			
The $500 loan came due and was paid off--$525			

July 1, 1997: Odsi Bank takes in its first time deposit: $2000 is put into a 6 month time deposit which will pay 4% annually (meaning: OdSi Bank will owe the depositor $2020 at year's end). At the same time, the bank makes a 2 year loan of $1500. The loan bears 12% interest, to be paid semi-annually. The bank also makes another loan of $1500; this loan is for 6 months and bears annual interest of 10% (i.e., the borrowers owe the bank $1575 on December 31, 1997). Here's the new balance sheet:

June 30, 1997			
Cash	25	Deposit	2,000
Loans	3,000	Equity	1,025
Total assets	**3,025**	**Total equity and liabilities**	**3,025**
Other information			
Bank made loan of 1500: 6 months at 10% annually			
Bank made 2-year, $1500, loan with semiannual interest of 12%			
Bank took in $2000, 6-month deposit with 4% interest			

Notice that at this point the bank has a potential liquidity problem, since the time deposit is for 6 months, there could be a liquidity crunch on December 31 if the depositor decides to withdraw her money. Let's illustrate this situation by assuming that on December 31, 1997:

- The depositor of the time deposit demands $2020 (principal plus 2% semiannual interest).
- The borrower of the $1500 6-month loan repays the loan with interest ($1575).
- The borrower of the $1500, 2-year, loan makes his semi-annual interest payment of $90.

Then the bank balance sheet will look like:

December 31, 1997--cash crunch			
Cash	-330	Deposit	0
Loans	1,500	Equity	1,170
Total assets	**1,170**	**Total equity and liabilities**	**1,170**
Other information			
The $2000 deposit is paid back with interest--$2020			
The borrower of the $1500, 6-month 10% loan repays with interest--$1575			
The borrower of the $1500, 2-year 12%, loan makes semiannual interest payment--$90			
Added to equity: $75, $90, -$20			

Notice that under this scenario, the OdSi bank is profitable but has a severe liquidity problem! To eliminate this problem, the owners of the bank could do a number of things: They could inject more equity into the bank, they could borrow money short term, or they could borrow long-term. They decide to do the latter: They take out a 5-year loan of $1000, with annual interest (also payable annually) of 6%. Now the bank balance sheet looks like:

December 31, 1997--Bank takes long-term loan of $1000			
Balance sheet before taxes			
Cash	670	Deposit	0
		Long-term debt	1,000
Loans	1,500	Equity	1,170
Total assets	**2,170**	**Total equity and liabilities**	**2,170**
Other information			
Bank takes 5-year, 6% loan, interest payable annually			

Since it's the end of the year, the bankers do a Profit and Loss Statement and pay taxes (40% of income). The owners also pay themselves a salary of $90 and account for other operating expenses of $10. Finally, although the borrower of the $1500, 12%, loan (recall that this is a 2-year loan made on June 30, 1997) has managed to make his interest payment, the bank anticipates that he will not be able to pay off his loan at maturity; the bank sets aside $150 as a provision for losses on this loan:

Profit and Loss Statement for 1st year of Operation			
Interest revenue	190	<-- 10% on $500, 6-month loan;	
Interest expense	-20	12% on $1500 loan for 1/2 yr; 10%	
Net interest expense	170	on $1500, 6-month loan	
Provision for credit losses	-150	<-- Anticipated loss on $1500 loan	
Operating expenses			
Salaries	-90		
Other operating expenses	-10		
Income before taxes	-80		
Taxes (40%)	32		
Profit after taxes	-48		
Dividends	0		
Retained earnings	-48		
December 31, 1997--Final balance sheet			
Cash	602	Deposit	0
		Long-term debt	1,000
Loans (net of loss provisions)	1,350	Equity	952
Total assets	**1,952**	**Total equity and liabilities**	**1,952**

January 1, 1998: OdSi buys a small office for $200, takes in demand deposits of $3500 (these deposits pay no interest, but OdSi Bank does provide some checking services for the owners—we ignore these in this example). It makes one year loans totalling $10,000 to a number of local businesses at 12% and borrows $7,000 for one year at 7%.

The bank's management also decided on a new policy for holding Cash: It would hold 10% of all Demand Deposits in a zero-interest Cash account; this would be sufficient to meet any sudden demands for cash by depositors. All other cash would be invested in interest-bearing money market funds.

Here's the balance sheet on January 1, 1998:

January 1, 1998			
Cash	350	Demand deposit	3,500
Money market funds	552	Short-term bank notes	7,000
Loans (net of loss provisions)	11,350	Long-term debt	1,000
Fixed assets	200	Equity	952
Total assets	**12,452**	**Total equity and liabilities**	**12,452**
Other information			
Bank buys $200 fixed assets			
Takes demand deposit (0% interest) of $3500			
Lends $10,000 at 12% for one year			
Borrows $7,000 at 7% for one year			

December 31, 1998: The following events happened during 1998:

- OdSi Bank also fixed up its offices; this was accounted for as a $50 capital expense.

- In the middle of the year, the borrower of the problematic $1500 loan still made his interest payment of $90. However, by the end of the year, it was clear that this borrower was in deep financial trouble. In November 1998 the bank settled with this borrower for $1400.
- In anticipation of expanded future borrowing, the bank borrows another $500 in long-term, 5-year, loan at 5.5% annual interest.

The Bank's end-of-year Balance Sheet and Profit and Loss Statement are:

December 31, 1998			
Cash	350	Demand deposit	3,500
Money market fund	2,703	Short-term bank notes	7,000
Loans (net of loss provisions)	10,000		
Fixed assets		Long-term debt	1,500
At cost	250		
Accumulated depreciation	-20		
Net fixed assets	230	Equity	1,283
Total assets	**13,283**	**Total equity and liabilities**	**13,283**
Profit and Loss Statement			
Interest revenue			
12% on $10,000 loan	1,000		
6% on $1500 loan	90		
5% on average money market balances	81		
Interest expense			
6% on $1,000 long-term debt	-60		
7% on $7,000 notes	-490		
Net interest revenue	621		
Provision for credit losses	50	<-- Last year's anticipated loss of $150	
Operating expenses	-100	became an actual loss of $100	
Depreciation	-20	<-- fixed asset has 10 year life, st. line depr.	
Income before taxes	551		
Taxes (40%)	-221		
Profit after taxes	331		
Dividends	0		
Retained earnings	331		
Other information			
Bank makes capital improvements in existing property--$50			
Bank issues another $500 in long-term debt			
$1500 loan made June 1997 paid $90 interest in June 1998; $1400 of principal repaid December 1998			
On December 31, 1998, the bank borrowed an additional $500 of 5-year LT debt @ 5.5%			

It is worth doing a reconciliation of the cash account of the bank:

Reconciliation of cash account, December 31, 1998	
Cash on December 31, 1997	602
Interest revenue for year	1,171
Interest expense for year	-550
Salaries and other operating costs	-100
Taxes paid	-221
New fixed assets bought	-250
$1500 loan paid off (at less than par)	1,400
New short-term debt	7,000
New demand deposits	3,500
New LT debt	500
New loans made	-10,000
Total Cash and Money Market	3,053

Simon Benninga's Note: This primer, which has been around for a while, led to some discussions with readers. Here are some letters which I've received. These comments have not yet been incorporated into the examples:

Subject: RE: Bank Valuation
Date: Fri, 26 Jun 1998 11:17:10 +0200
From: Johnston Don <JohnstonD@ca-ib.com>
To: '"Simon Benninga"' <IMCEAX400-c=GB+3Ba=+20+3Bp=CA-

Thanks for the message. I managed to download and send to the rescue of a Croatian colleague struggling with a bank valuation.

I haven't read the whole thing yet, I'll have a look over the weekend. But I did get to page 3 while riding on the tube yesterday, where I was a bit confused by the Profit and Loss Statement on page 3. First, shouldn't the third line be "net interest revenue"? And I don't follow why the company pays tax on a loss, which tax subsequently appears to reduce the amount of the loss. Shouldn't the tax be 0, meaning a loss of $80 carried to retained earnings? What am I missing?

I work for CA IB Securities Limited, which is the UK subsidiary of CA IB Investmentbank Aktiengesellschaft, formed by the combination of Bank Austria's and Creditanstalt's investment banking operations (which involved firing a good part of the Austrian "old guard," nominating a Hungarian as Chairman of the Management Board, and, more recently, moving the "Center" of the corporate finance business to London). We cover Central and Eastern Europe (broadly defined to include countries like Russia and, er, Turkey). Products basically include M&A, equity capital markets and project/infrastructure finance, plus private placements out of NYC.

Regards,

Don

Subject: Bank Valuation
Date: Wed, 08 Jul 1998 16:27:08 +0800
From: Emily Liu <liue@clsasia.com>
Organization: Credit Lyonnais Securities (Asia) Ltd.
To: benninga@wharton.upenn.edu

Dr. Benninga,

My name is Emily Liu, a Taiwanese who works in equity research in Taiwan. It is very nice of my coworker Manning Doherty who introduced your Corporate Finance A valuation Approach to me and gave me a copy of your Bank Valuation. I have studied it to page 5 and found few errors.

Hope it is helpful to you.

1. On the middle of page 2, the time deposit demands shall be $2040, instead of $2020.
2. The profit and loss Statement on page 5, Interest revenue, 12% on $10,000 loan shall be 1200, not 1000.
3. Reconciliation of cash account in the same page, Total cash and money market shall be 3052.

I also have a question on how the cash is calculated on Page 3 from Balance sheet before taxes to final balance sheet. To my understanding, It seems $670 -$100(expenses)+ $32(Taxes)=$602. Shall the tax $32 be added back, both to cash and Equity?

It is very interesting to know how to calculate the bank's free cash flow, I will keep studying your document. Hope you don't mind I bring up these questions to you.

Best Regards
Emily

Subject: Bank valuation
Date: Mon, 26 Oct 1998 18:27:41 -0800 (PST)
From: Chin-seng Tay <cstay@yahoo.com>
To: benninga@wharton.upenn.edu

Hi
I recently came across your article on Bank Valuation and find it very interesting. I am currently a banking analyst with a European bank-owned stock broking house in Asia. As such, the question of bank valuation is one of the core issues.

I have a question relating to your derivation of the FCF for a bank: Why is loan loss provisioning excluded from the adjustments? The Asian banks are currently under siege from the rising NPLs and loan loss provisions are one of the main reasons why some banks have gone into losses. However, I believe that not all of the loan loss provisions will be utilized in that as the NPL issue recedes there will be write-backs of these provisions.

I hope you can share your views on this.