

Research Department
Federal Reserve
Bank of
San Francisco

May 20, 1983

Market Value—Part II

Our *Letter* of last week described the concept of market value accounting and compared it to historical cost accounting for financial institutions. Market value accounting requires that assets and liabilities be expressed in terms of their *present values*, i.e., the discounted-to-the-present values of the cash flows they promise, using *current* estimates of interest rates expected to prevail over the life of the contract. In keeping with the present value concept, income in the current accounting period includes cash flows and realized capital gains/losses as conventionally measured with the addition of the *current period's unrealized capital gains/losses that arise from changes in present values of assets and liabilities*.

In contrast, historical cost accounting requires that assets and liabilities be expressed in terms of their contractual book values. Current income in this system includes only actual cash flows and realized capital gains/losses. Thus, historical cost is "blind" to projected cash flows beyond the current accounting period, while market value accounting includes the implications for present wealth arising from all future contractual cash flows. In this sense, it is superior to historical cost accounting.

In looking beyond the present, however, market value accounting requires estimates of interest rates, prepayments, defaults, and other factors that might affect future cash flows and their present values. These estimates render market value accounting subject to some uncertainty, but nevertheless make it a useful adjunct to book value accounting.

In this *Letter* we turn to some of the problems of market value accounting and to market value estimates of the impact that interest rate swings have had on the net worth of thrifts. The bottom line is that interest rate changes have had large impacts on the

aggregate net worth of S&L's and mutual savings banks, although actual figures are subject to considerable margins of error.

Among financial institutions, S&L's and mutual savings banks stand out by their practice of "lending long and borrowing short." Because lending long commonly involves fixed-rate contracts extending a number of years—like mortgages, for example—the present value of S&L assets is especially sensitive to changes in interest rates, or to what is called *interest rate risk*. The typically shorter maturity of their liabilities on the other hand implies less sensitivity to interest rates. As a result, the net worth of S&L's is particularly sensitive to swings in interest rates. (In contrast, because commercial bank business lending usually is confined to variable-rate and/or short-term contracts, banks are better hedged than thrifts against interest-rate risk.)

Estimates

Calculating market value balance sheets for thrifts under different interest rate environments gives a measure of how market value net worth is affected by the level of interest rates. Perhaps the most thorough study of the market value net worth of thrifts was conducted in 1981 by Richard Kopcke of the Federal Reserve Bank of Boston. Employing alternative assumptions for effective maturities of assets and liabilities, Kopcke made estimates of the divergence between book and market value net worth for Massachusetts mutual savings banks and California S&L's from the late 1970s through mid-1981—a period of an unexpected and unprecedented rise in interest rates.

Whereas aggregate *book value* net worth was approximately 8 percent and 6 percent of total assets for the respective thrift groups in mid-1981, Kopcke's calculations of aggregate *market value* net worth ranged between -1 percent and -12 percent for

Research Department
Federal Reserve
Bank of
San Francisco

Opinions expressed in this newsletter do not necessarily reflect the views of the management of the Federal Reserve Bank of San Francisco, or of the Board of Governors of the Federal Reserve System.

Massachusetts mutual savings banks and between -3 percent and -7 percent for California S&L's. Perhaps as many as two-thirds of thrifts were estimated to have negative net worth at market value, that is, to be technically insolvent if interest rates were to remain at the mid-1981 level! But it is important to appreciate the considerable uncertainty that is attached to these estimates.

Problems in valuing assets

The assets in thrift portfolios consist mainly of fixed-rate mortgage loans. One of the critical issues in calculating the present value of a mortgage is its effective maturity. Mortgages usually are repaid prior to maturity, so that the effective maturity is less than the contracted life of the instrument. One can attempt to estimate the average lives of mortgages based on past experience but there is no reason for future prepayments to conform to past experience. Prepayment options, housing turnover, discrepancies between present and contracted mortgage rates, legal constraints on due-on-sale clauses, and defaults all affect the effective life of a mortgage and hence estimated present value.

Alternative estimates of effective maturity show a considerable range. Data on 26- to 30-year Federal Housing Administration (FHA) insured mortgages were compiled by HUD for the years 1957-76. The probability of prepayment (including default) in a given year was estimated on the basis of actual experience, and this pattern for FHA mortgages has since been referred to as the "100 percent FHA experience." Mortgages following such a pattern would have an average life of 13.1 years. On the other hand, some experiments done by the authors using Government National Mortgage Association (GNMA) passthrough securities, which are backed by FHA mortgages, suggest a shorter effective maturity. These experiments compared the present value of the securities calculated under different assumptions about their maturity with their actual market price.

They suggest that investors priced the GNMA securities on the basis of about a 9-year average life. Apparently, investors price such mortgage-backed securities as fairly short-term instruments, treating the mortgages that lie behind them as effectively medium-term rather than long-term securities. Because of this, high interest rates may have had a less drastic effect on the market values of thrift-held mortgages than is often suspected. Consequently, estimates like Kopcke's of negative net worth may have overstated the seriousness of the thrift situation.

If all lending were contracted at interest rates that varied along with the level of open-market rates, interest-rate risk due to large swings in rates would be reduced. Still, under current arrangements, they would usually not be eliminated since variable-rate lending often is only partially indexed. Contracted rates, especially in the case of variable-rate mortgages, move only partially

with open-market rates and often with pre-specified lags and limits. Present values of such instruments are especially difficult to calculate in the framework of market value accounting. However, the expanding resale market for mortgage passthrough securities should provide a broader information base from which to determine their present values.

Valuing liabilities

Determining the present values of liabilities raises even tougher issues, among which estimating their effective maturities is perhaps the most difficult. Many liabilities such as term fixed-rate deposits present relatively few conceptual problems. But even these deposits normally are subject to early withdrawal at the option of the depositor (usually under penalty). Consequently, their effective maturity depends in part on future interest rate movements, economic conditions, and deposit alternatives.

The more difficult problem centers on determining the effective maturity of "core" (usually, "non-interest sensitive") deposits that can be withdrawn without penalty at the depositor's option. Passbook savings for years have had a maturity of one day although these funds have not been withdrawn despite significant changes in open-market interest rates. What figure does one use for their effective maturity or duration?

Kopcke found that passbooks, NOW accounts, and comparable core deposits made up 40 percent of Massachusetts savings bank liabilities and 16 percent of California S&L liabilities in 1981. Not knowing the effective maturity of these deposits, he assumed alternatives of one year and eight years. The corresponding variations in market-value net worth of Massachusetts savings banks varied from -12 percent to -1 percent, and that of California S&L's

from -7 percent to -3 percent. As this variation in estimates indicates, assumptions about the effective life of deposits are of critical importance.

True net worth

Our analysis concludes that market value accounting must rely on inputs that are highly judgmental. Herein lies its weakness. Assumptions and imprecise calculations must somehow be made if one is to estimate the current net worth of financial institutions. Market value calculations are made implicitly every day in the valuation of equities and are made explicitly whenever mergers, acquisitions, or regulatory actions are contemplated. Historical cost accounting is adequate for showing book values and current cash flows, but it gives little indication of true net worth. Market value accounting offers the potential for coming closer to the truth, although the practical difficulties in making present value estimates in the current state of the art mean that these estimates should not be used uncritically.

Jack Beebe and Matthew Blank

FIRST CLASS

Alaska • Nevada • Oregon • Utah • Washington
Idaho • California • Hawaii

San Francisco
Bank of
Federal Reserve
Research Department

FIRST CLASS MAIL
U.S. POSTAGE PAID
PERMIT NO. 752
San Francisco, Calif.

BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities	Amount Outstanding	Change from	Change from	
			Dollar	Percent
Large Commercial Banks	5/4/83	4/27/83		
Loans (gross, adjusted) and investments*	164,141	406	4,501	2.8
Loans (gross, adjusted) — total#	142,094	452	3,286	2.4
Commercial and industrial	45,541	301	2,278	5.3
Real estate	56,251	6	908	1.6
Loans to individuals	23,631	- 3	223	1.0
Securities loans	2,787	113	662	31.2
U.S. Treasury securities*	8,097	4	2,068	34.3
Other securities*	13,949	- 49	852	5.8
Demand deposits — total#	41,562	2,341	1,686	4.2
Demand deposits — adjusted	28,305	94	1,565	5.9
Savings deposits — total†	65,626	636	34,796	112.9
Time deposits — total#	66,354	- 267	26,103	28.2
Individuals, part. & corp.	59,537	- 80	23,389	28.2
(Large negotiable CD's)	19,670	- 92	14,250	42.0
Weekly Averages of Daily Figures	Week ended 5/4/83	Week ended 4/27/83	Comparable year-ago period	
Member Bank Reserve Position				
Excess Reserves (+)/Deficiency (-)	147	72		55
Borrowings	121	135		17
Net free reserves (+)/Net borrowed(-)	26	- 63		38

* Excludes trading account securities.

Includes items not shown separately.

† Includes Money Market Deposit Accounts, Super-NOW accounts, and NOW accounts.

Editorial comments may be addressed to the editor (Gregory Tong) or to the author . . . Free copies of this and other Federal Reserve publications can be obtained by calling or writing the Public Information Section, Federal Reserve Bank of San Francisco, P.O. Box 7702, San Francisco 94120. Phone (415) 974-2246.