FRBSF WEEKLY LETTER

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Interest Rate Risk at U.S. Commercial Banks

During the past few years, the composition of U.S. commercial banks' asset portfolios has changed dramatically. Most notably, holdings of securities have grown over 35 percent since the beginning of 1990, while loans to businesses have actually declined over the same period. Some observers argue that if increases in bank securities holdings are concentrated in longer-term issues, then these portfolio shifts may expose banks to increased interest rate risk, especially if rates rise rapidly.

Unfortunately, it is difficult to assess the interest rate risk exposure of the banking system without detailed information on the maturity and cash flow characteristics of bank assets and liabilities. Federal banking agencies have proposed systems to measure this risk, but the data needed to derive these measures are not yet available.

In this *Weekly Letter,* I provide a preliminary assessment of the interest rate risk of U.S. commercial banks using data that are currently available in bank Call Reports. While the measure I derive is incomplete, it does suggest that some of the concerns about bank interest rate risk may be overstated.

Methodology and assumptions

As part of an ongoing effort to assess bank interest rate risk, the Federal Reserve Board has proposed a risk measurement system that is to be implemented beginning in 1994. Under this proposal, banks will provide detailed data on the maturity and cash flow characteristics of their assets and liabilities. Based on these features, one set of risk weights will be assigned to liabilities, and one set will be assigned to each of three categories of assets: amortizing, nonamortizing, and deep discount. Holdings in each category will be multiplied by the appropriate risk factor, which represents the change in the value of the bank's position in that category that would result from a shock to interest rates. Netting risk-weighted assets against risk-weighted liabilities, regulators can determine how much a bank's net worth would change in response to a given parallel shift in interest rates. Under the Fed's proposal, banks may be required to hold more capital against interest rate risk if their risk exposure is considered to be "excessive." (For a more detailed description of an earlier, but similar, interest rate risk measure, see *Weekly Letter* 92-39.)

My measure of bank interest rate risk is based on the March 1993 version of the Fed's proposed methodology. However, several compromises were required because banks currently do not report sufficient information to derive the Fed's interest rate risk measure. First, limited maturity data are available from 1988.Q4 on bank holdings of fixed and floating rate loans, securities, and large CDs in each of four time-to-maturity bands. The Fed's proposed risk measure uses seven time bands. These data are the basis for my interest rate risk calculations.

Second, banks do not currently include data on the cash flow characteristics of their assets. However, whether a loan amortizes or not can significantly affect its interest rate risk. In addition, other characteristics, like prepayment options and interest caps on mortgages, also affect the interest rate sensitivity of these assets. To deal with these issues, it was necessary to make several assumptions. First, I assume that all real estate and personal loans are amortizing, while loans for construction and land development, business loans, and loans to other banks are not. I then calculate the proportion of total loans that are amortizing and nonamortizing, and apply these percentages to each of the four loans-by-maturity categories. For securities, I assume that mortgage-backed securities are amortizing, while all others are not and again

WESTERN BANKING

Western Banking is a quarterly review of banking developments in the Twelfth Federal Reserve District. It is published in the *Weekly Letter* on the fourth Friday of January, April, July, and October.

apply these percentages to the maturity data. The effects of prepayments and other imbedded options are incorporated in the risk-weights proposed by the Fed. In the absence of additional information, I also assume that banks hold no deep-discount assets.

The maturity of deposits is an important issue in determining bank interest rate risk. Deposits with no specific maturity, such as checking and savings accounts, can be thought to have very short maturity since they can be withdrawn on demand. At the same time, however, these deposits are a stable funding source for banks whose rates adjust slowly. Thus, they may have an effective maturity that is quite long. The Fed's proposal gives banks some freedom to allocate their liabilities across the different maturity bands, with guidelines to limit the proportion of deposits in the longer time bands. I follow the proposed guidelines in determining the maturities of bank deposits and other liabilities.

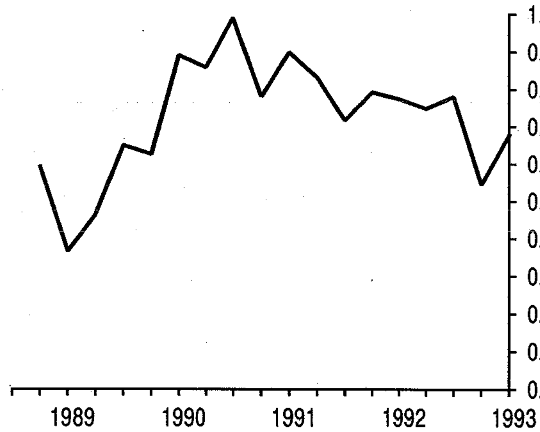
For the risk weights, I use the risk factors in the Fed's most recent proposal. The four time bands for which data are currently available do not match up exactly with the seven bands in the Fed proposal. For the medium-term instruments (1 to 5 years), I use the 3-to-5-year proposed risk weight; for my over 5-year maturity band, I use the Fed's 10-to-20-year risk weight.

Finally, the measure I derive does not include data on off-balance sheet activities. Unfortunately, there are no data to characterize bank's off-balance sheet activities or to determine their maturities. While some argue that off-balance sheet positions pose considerable interest rate risk, others suggest that banks use these activities to hedge against interest rate risks in other positions. The net effect of this omission, therefore, is uncertain.

Results

Using the methodology described above, I estimate the effect on the U.S. commercial banking system of a 200-basis-point across-the-board increase in interest rates. While the effect of interest rate changes would differ if rates rose less or if they fell, this scenario addresses the effect of a large unanticipated positive shock to all interest rates. The interest rate risk measure is the net risk-weighted position, defined as the change in bank net worth resulting from the 200-basis-point rise in all interest rates, divided by total bank assets. Thus, a value of 1.0 would indicate that a 200-basis-point increase in rates would reduce bank net worth by 1 percent of assets. The results of this calculation are presented in the figure for the period from 1988.Q4 to 1993.Q1.

Net Risk-Weighted Position as a Percent of Total Assets
(+200 basis point shock to interest rates)



According to this measure, the interest rate risk exposure of U.S. banks' on-balance sheet activities is 0.85 percent of assets as of early 1993. Since some interest rate risk is inherent in banking, this exposure does not seem "excessive." In fact, the Fed has suggested that interest rate risk below 1 percent of assets is within industry norms. The data suggest that interest rate risk among banks as a group has not increased much in recent years. In fact, the figure shows a slight downward trend in interest rate risk since mid-1990.

Thus, there is evidence that recent portfolio shifts at U.S. banks have not resulted in an increased exposure to interest rate risk. This conclusion comes with two caveats. First, aggregation of individual bank balance sheets may conceal increases in interest rate risk at individual banks. While the figures for the industry as a whole indicate no real systematic shift in interest rate risk among banks, this does not preclude jumps in interest rate exposures at individual institutions. Second, the results presented here omit bank off-balance sheet activities. A better assessment of the risk-enhancing or risk-reducing effects of these activities will have to await the availability of better data from the banking system.

Jonathan A. Neuberger
Economist

REGIONAL BANK DATA

MARCH 31, 1993

(NOT SEASONALLY ADJUSTED, PRELIMINARY DATA)

		DISTRICT	ALASKA	ARIZ.	CALIF.	HAWAII	IDAHO	NEVADA	OREGON	UTAH	WASH.
ASSETS AND LIABILITIES – $ MILLION (ALL COMMERCIAL BANKS)											
ASSETS	TOTAL	490,447	4,843	35,692	324,176	22,258	10,128	13,641	25,247	14,421	40,040
	FOREIGN (RESIDUAL)	28,927	0	0	26,438	2,393	0	0	0	64	32
	DOMESTIC	461,520	4,843	35,692	297,738	19,865	10,128	13,641	25,247	14,358	40,008
LOANS	TOTAL	328,652	2,273	19,808	223,699	13,792	6,756	7,234	17,153	8,440	29,497
	FOREIGN (RESIDUAL)	28,036	5	0	26,644	1,335	0	0	0	0	52
	DOMESTIC	300,616	2,268	19,808	197,054	12,458	6,756	7,234	17,153	8,440	29,445
	REAL ESTATE	159,749	1,071	6,978	116,483	7,303	2,129	2,412	7,073	3,307	12,992
	COMMERCIAL	62,024	716	2,677	39,235	3,261	1,505	802	4,465	1,615	7,747
	CONSUMER	53,845	350	6,014	27,481	1,076	2,041	3,879	3,530	2,779	6,696
	AGRICULTURE	5,308	4	318	2,803	30	626	12	397	151	967
	INTERNATIONAL	85	0	8	77	0	0	0	0	0	0
SECURITIES	TOTAL	74,301	1,995	8,645	40,423	5,049	2,036	3,825	4,401	3,636	4,290
	U.S.T.S.	24,082	875	2,736	11,842	2,817	463	1,676	1,387	835	1,451
	SECONDARY MARKET	38,526	613	4,975	23,193	1,710	910	1,719	2,158	1,817	1,430
	OTHER SEC.	11,693	508	934	5,388	522	663	429	856	985	1,409
LIABILITIES	TOTAL	448,153	4,226	32,305	297,278	20,609	9,376	12,002	22,883	13,109	36,365
	DOMESTIC	419,220	4,226	32,305	270,835	18,215	9,376	12,002	22,883	13,046	36,333
DEPOSITS	TOTAL	394,477	3,543	29,340	265,750	14,794	7,787	9,571	20,181	10,522	32,990
	FOREIGN (RESIDUAL)	26,781	0	0	24,498	2,188	0	0	0	64	32
	DOMESTIC	367,696	3,543	29,340	241,252	12,606	7,787	9,571	20,181	10,458	32,958
	DEMAND	88,812	997	5,915	61,820	2,352	1,358	2,475	3,966	2,111	7,818
	TIME AND SAVINGS	278,884	2,545	23,425	179,432	10,254	6,429	7,096	16,216	8,346	25,139
	NOW	41,200	330	3,434	24,508	1,479	1,017	1,289	3,194	1,490	4,460
	MMDA	94,076	538	7,582	65,902	1,939	1,590	2,370	4,358	1,776	8,021
	SAVINGS	44,735	689	3,407	27,193	3,126	991	1,572	2,206	1,688	3,864
	SMALL TIME	68,030	444	7,528	39,464	2,065	2,239	1,045	5,517	2,693	7,035
	LARGE TIME	30,656	507	1,475	22,291	1,642	592	819	935	698	1,697
OTHER BORROWINGS		31,979	639	2,396	14,143	5,215	1,427	1,357	2,136	2,334	2,332
EQUITY CAPITAL		42,293	617	3,387	26,897	1,649	751	1,639	2,364	1,312	3,675
LOAN LOSS RESERVE		10,204	40	556	7,599	240	108	400	450	198	613
LOAN COMMITTMENTS		196,628	660	28,638	121,232	6,297	3,279	1,941	10,231	7,135	17,214
LOANS SOLD		15,630	25	153	14,805	228	25	68	190	51	86
EARNINGS AND RETURNS – $ MILLION, YEAR-TO-DATE (ALL COMMERCIAL BANKS)											
INCOME	TOTAL	11,228	103	743	7,309	429	211	572	621	326	913
	INTEREST	8,495	84	585	5,564	377	179	283	449	257	718
	FEES & CHARGES	735	6	57	492	12	14	16	47	22	70
EXPENSES	TOTAL	9,212	72	662	6,130	334	162	420	482	251	699
	INTEREST	2,809	24	209	1,811	154	69	72	145	90	235
	SALARIES	2,330	24	169	1,589	85	32	53	144	54	181
	LOAN LOSS PROVISION	846	2	48	628	16	5	86	21	12	28
	OTHER	3,227	22	236	2,102	80	56	209	171	95	256
INCOME BEFORE TAXES		2,016	31	81	1,179	95	49	152	139	75	214
TAXES		780	9	28	495	34	18	51	49	25	70
NET INCOME		1,277	21	40	765	66	26	98	80	46	135
ROA (%)		1.05	1.81	0.45	0.94	1.17	1.06	2.95	1.28	1.32	1.35
ROE (%)		12.08	13.82	4.74	11.37	15.94	14.07	23.90	13.55	14.03	14.69
NET INTEREST MARGIN (%)		4.66	5.09	4.25	4.63	3.98	4.42	6.37	4.86	4.79	4.85
ASSET QUALITY – PERCENT OF LOANS (LARGE COMMERCIAL BANKS)											
LOAN LOSS RESERVE (ALL BANKS)		3.10	1.77	2.81	3.40	1.74	1.61	5.52	2.62	2.35	2.08
NET CHARGEOFFS, TOTAL		1.00	0.23	0.74	1.19	0.16	0.18	2.88	0.55	0.18	0.34
	REAL ESTATE	0.79	-0.08	0.28	1.01	0.09	0.01	0.30	0.38	0.15	0.18
	COMMERCIAL	0.41	0.54	0.57	0.49	0.13	0.07	5.29	0.11	-0.70	-0.13
	CONSUMER	2.91	0.57	1.83	4.08	0.76	0.49	3.95	1.68	0.77	1.12
	AGRICULTURE	-0.02	0.00	0.52	-0.15	0.00	0.15	-0.09	-0.13	-0.11	0.12
PAST DUE & NON-ACCRUAL, TOTAL		5.57	2.90	4.13	6.48	3.35	1.93	7.41	2.43	1.97	4.13
	REAL ESTATE	7.30	3.05	6.64	8.32	3.44	2.43	8.88	2.47	2.65	5.37
	CONSTRUCTION	20.65	3.35	18.85	23.17	11.82	9.29	22.67	5.13	3.01	17.72
	COMMERCIAL	7.59	3.02	11.66	8.98	1.33	2.43	7.46	3.35	3.47	3.21
	FARM	8.49	0.00	20.57	9.19	11.33	3.37	0.00	5.59	10.85	2.73
	1-4 FAMILY REV	1.13	1.14	0.59	1.20	1.51	0.51	0.50	0.33	0.68	1.18
	1-4 FAMILY OTHER	3.05	2.28	2.54	3.42	3.72	1.17	3.49	0.98	1.31	1.34
	MULTI-FAMILY	8.18	1.17	10.90	9.70	1.13	0.74	27.13	0.92	0.18	2.83
	COMMERCIAL	5.46	2.59	6.39	6.12	4.04	1.47	13.31	2.39	2.43	3.86
	CONSUMER	3.34	2.39	2.70	3.90	2.49	1.39	5.78	1.69	1.04	2.59
	AGRICULTURE	5.62	0.00	8.01	5.86	26.88	4.50	4.21	5.42	1.88	4.39
NUMBER OF BANKS		742	8	38	447	17	20	18	48	54	92
NUMBER OF EMPLOYEES		245,225	2,676	19,505	159,606	8,474	4,652	6,212	16,234	7,159	20,707

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MARKET SHARE STATISTICS

DEPOSITORY INSTITUTIONS REQUIRED TO HOLD RESERVES WITH THE FEDERAL RESERVE ON A WEEKLY BASIS

PERCENT OF COMBINED MARKET TOTAL FOR MAY 1993, BY REGION

DEPOSIT TYPE	DISTRICT			ALASKA			ARIZONA			CALIF		
	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU
TOTAL DEPOSITS	55	39	7	71	4	25	92	1	7	48	46	6
DEMAND	90	6	4	99	0	1	96	0	4	89	6	5
NOW	64	28	8	57	6	37	89	0	11	57	36	7
SAVINGS & MMDAS	60	31	9	55	5	41	90	0	10	56	37	7
SMALL TIME	32	65	3	75	8	17	95	1	4	23	74	3
LARGE TIME	43	47	10	96	2	3	91	0	9	37	52	11

DEPOSIT TYPE	HAWAII			IDAHO			NEVADA			OREGON			UTAH			WASH		
	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU
TOTAL DEPOSITS	65	30	5	91	5	4	76	21	3	81	10	9	79	5	16	56	35	9
DEMAND	90	3	7	95	0	5	97	3	0	95	1	4	89	5	6	83	15	2
NOW	66	31	3	92	3	4	78	16	6	84	8	9	82	2	16	65	23	11
SAVINGS & MMDAS	59	34	7	92	4	4	79	16	5	77	10	13	72	3	25	57	27	17
SMALL TIME	54	44	2	88	11	1	43	53	3	77	17	6	81	11	8	39	57	5
LARGE TIME	70	23	7	90	6	5	85	15	0	76	12	12	73	8	19	44	54	2

CB = COMMERCIAL BANKS; SL = SAVINGS & LOANS AND SAVING BANKS; CU = CREDIT UNIONS; MAY NOT SUM TO 100% DUE TO ROUNDING

INTEREST RATES ON DEPOSITS AND LOANS AS OF MAY 1993 (%)

TYPE OF ACCOUNT OR LOAN		DATE	US	DISTRICT	ARIZ	CALIF	HAWAII	IDAHO	OREGON	UTAH	WASH
SAVINGS ACCOUNTS AND MMDAS		MAR 93	2.73	2.87	2.54	2.59	3.03	3.33	2.71	3.09	2.98
		APR 93	2.68	2.81	2.59	2.56	2.81	3.27	2.61	2.99	2.94
		MAY 93	2.65	2.78	2.57	2.54	2.84	3.20	2.50	2.97	2.91
92 TO 182 DAYS CERTIFICATES		MAR 93	3.03	2.93	2.70	2.85	2.50	3.09	2.99	3.05	3.25
		APR 93	2.99	2.89	2.76	2.82	2.33	3.00	2.92	3.05	3.24
		MAY 93	2.98	2.87	2.74	2.80	2.25	2.98	2.96	3.04	3.13
2-1/2 YEARS AND OVER CERTIFICATES		MAR 93	4.52	4.34	3.83	3.95	4.16	5.08	5.01	4.39	4.48
		APR 93	4.47	4.33	3.92	3.94	4.19	4.90	5.01	4.39	4.56
		MAY 93	4.45	4.27	3.81	3.91	4.11	4.90	4.95	4.34	4.54
COMMERCIAL, SHORT TERM*	AVE. RATE		4.80	5.20	6.72	4.92	6.69	7.37	6.49	4.97	5.61
	AVE. MAT. (DAYS)		50	84	N/A	264	N/A	N/A	N/A	35	N/A
COMMERCIAL, LONG-TERM*	AVE. RATE		6.32	9.41	N/A	N/A	N/A	N/A	N/A	8.41	N/A
	AVE. MAT. (MONTHS)		42	46	N/A	N/A	N/A	N/A	N/A	48	N/A
LOANS TO FARMERS*	AVE. RATE		7.52	6.72	6.56	6.63	N/A	8.07	6.82	8.71	6.90
	AVE. MAT. (MONTHS)		15	14	N/A	14	N/A	N/A	N/A	7	N/A
CONSUMER, AUTOMOBILE	AVE. RATE		8.17	8.23	8.4	7.84	N/A	N/A	8.02	8.88	8.17
CONSUMER, PERSONAL	AVE. RATE		13.63	13.87	15	18.19	N/A	N/A	9.21	13.65	11.84
CONSUMER, CREDIT CARDS	AVE. RATE		17.15	17.6	14.9	18.38	N/A	N/A	19.25	14.9	18.3

SOURCES: SURVEY OF TERMS OF BANK LENDING AND TERMS OF CONSUMER CREDIT; MOST COMMON INTEREST RATES ON SELECTED ACCOUNTS.
* DATA ARE COMPOUNDED ANNUAL RATES.