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Western Banks and Derivatives

Financial derivatives have made the headlines in the past year or so, as some companies and local government authorities have suffered spectacular losses related to them. With the headlines has come increasing concern about the riskiness of these instruments. However, investors' successes in using derivatives to hedge *against* risk have received less attention. To provide some balance to the picture, this *Weekly Letter* presents an example of how one type of derivative, an interest rate swap, can be used to reduce risk. The *Letter* also profiles the use of interest rate swaps by Twelfth District and U.S. banks, pointing out how some aspects of this profile can be consistent with a general strategy of using swaps to reduce overall bank risk or to pursue banks' roles as financial intermediaries.

Swaps and risk

Derivatives are financial contracts whose payment terms are derived from the performance of some underlying asset or assets. The payment terms of one type of derivative contract, the simplest type of interest rate swap, depend on the level of an interest rate that remains fixed over the life of the contract and the level of a short-term rate that varies with the market.

A bank can use swaps to hedge against interest rate risk. For example, say a bank has a loan paying a fixed rate of interest and deposits on which it pays a variable rate of interest. The bank faces interest rate risk in that its net return will fall when interest rates rise because it will pay more for deposits but will not receive more on its loan. If the bank wants to reduce this risk, it can engage in an interest rate swap. In particular, the bank can arrange to pay a counterparty (such as another bank) at regular intervals a given "notional principal" times a fixed interest rate equal to the interest rate on the loan. (The notional principal simply is a base for calculating the payments and is not itself exchanged.) In exchange, the bank can receive from the counterparty the same notional principal times an interest rate that varies in the same way as the interest rate on the bank's deposits. With the swap, the bank's fixed rate payments can better match its fixed rate receipts, and its variable rate payments can better match its variable rate receipts.

Of course, swaps, as well as other derivatives, can be used to enhance yield instead of to reduce risk. Usually, when a swap is originated, the reciprocal interest payments more or less offset each other, in present value terms. Therefore, if a bank thinks that interest rates will fall more than the market as a whole predicts, it can enter an interest rate swap agreement in which it makes the variable interest payments. Then, if interest rates fall enough, and the bank does not have other investments offsetting the swap payments and receipts in its portfolio, it will make a profit.

Some of the very largest banks also serve as dealers in swaps by taking the opposite sides of swaps agreements for fees, often for their own business customers. The risk exposure to the dealer bank depends in part on whether it has taken offsetting sides of swaps agreements and in part on the risk of counterparty default.

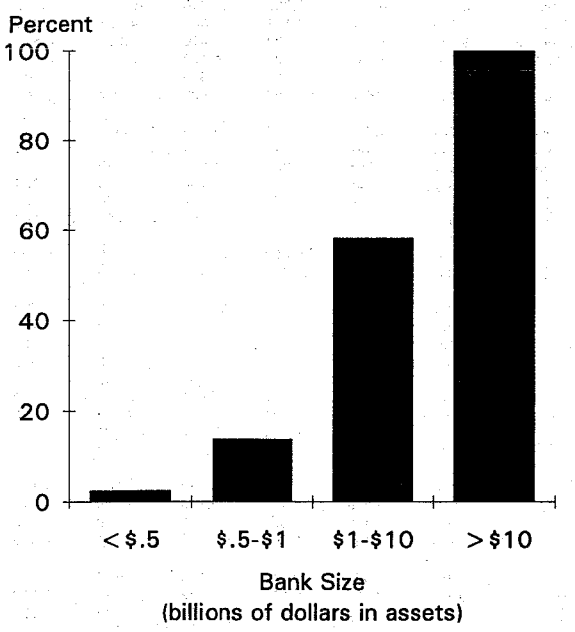
Characteristics of swaps users

The notional value of interest rate swaps at all U.S. banks totaled about $4.4 trillion at the end of 1994. Banks in the Twelfth District accounted for 8.7 percent of the total notional amount, less than their 13.7 percent share of banking assets.

The most striking feature of the swaps profile of banks is the dominance of the very largest banks. As Figure 1 shows, the percent of banks reporting interest rate swaps increases dramatically with

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.

Figure 1
Percentage of District Banks with Interest Rate Swaps in 94.Q4



bank size. In fact, only 8.1 percent of District banks report swaps. Moreover, banks with assets of over $10 billion account for over 95 percent of the notional value of swaps in the District, compared with less than 1 percent at banks with less than $500 million in assets. Some of this difference likely is due to the largest banks acting as swaps dealers. However, the contrast also suggests that there may be fixed costs associated with swaps activity, such as the cost of trained staff to manage swaps and other derivatives instruments.

Pinning down how the banks with swaps are using them is more problematic. Kim and Koppenhaver (1993) look at the relationship between one indicator of interest rate risk, the maturity gap, and the use of swaps by all U.S. banks. The maturity gap is the absolute value of the difference between a bank's assets that will mature or be repriced within a certain time period and its liabilities that will mature or be repriced within the same time period, with this difference divided by total assets. (The calculation of the maturity gap excludes swaps and other derivatives.)

The larger the maturity gap, the greater the sensitivity of the bank's net income to movements in interest rates. If banks are using swaps to hedge this interest rate risk, then banks with larger gaps may have larger swaps positions. Kim and Koppenhaver find that, after controlling for various other factors that affect swaps usage, banks with larger maturity gaps have larger notional amounts of interest rate swaps.

These authors also investigate the importance of some characteristics that may be linked with banks' role as dealers in interest rate swaps. They find that banks with higher ratios of business loans to assets have higher notional amounts of interest rate swaps, indicating the possibility that banks that are especially active in business lending are more apt to act as intermediaries for their business customers' swaps transactions. In addition, they find that banks with positions in interest rate futures have higher notional amounts of interest rate swaps than those without such instruments. Interest rate futures also can be used to hedge against interest rate risk, and it is possible that banks that tend to take on interest rate risk by acting as swaps dealers tend to use futures to hedge that risk.

Conclusion

Interest rate swaps activity among District banks is dominated by the very largest institutions, and most District banks do not have swaps. Evidence on the national level suggests that banks with swaps tend to have larger maturity gaps than banks without swaps. This association and the positive correlation between interest rate futures and swaps activity may be consistent with using swaps as part of a general strategy of hedging interest rate risk. Moreover, the positive correlation between business lending and swaps activity suggests that swaps activity at banks in part is an extension of the traditional intermediation services provided by banks.

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Reference

Kim, Sung-Hwa, and G. D. Koppenhaver. 1993. "An Empirical Analysis of Bank Interest Rate Swaps." *Journal of Financial Services Research* 7 (January) pp. 57–72.

REGIONAL BANK DATA

DECEMBER 31, 1994

(NOT SEASONALLY ADJUSTED, PRELIMINARY DATA)

		DISTRICT	ALASKA	ARIZ.	CALIF.	HAWAII	IDAHO	NEVADA	OREGON	UTAH	WASH.
ASSETS AND LIABILITIES -- $ MILLION (ALL COMMERCIAL BANKS)											
ASSETS	TOTAL	542,287	5,316	42,942	345,178	22,391	12,223	23,356	28,893	17,143	44,845
	FOREIGN	43,665	1	0	41,315	2,292	0	0	14	0	43
	DOMESTIC	498,622	5,315	42,942	303,863	20,099	12,223	23,356	28,879	17,143	44,802
LOANS	TOTAL	368,529	2,759	29,173	229,988	14,913	8,858	16,353	20,883	10,823	34,780
	FOREIGN	31,614	6	0	30,074	1,477	0	0	17	0	40
	DOMESTIC	336,915	2,754	29,173	199,914	13,435	8,858	16,353	20,866	10,823	34,740
	REAL ESTATE	172,106	1,299	9,582	118,111	8,113	2,930	3,154	8,569	4,695	15,652
	COMMERCIAL	65,339	779	3,149	39,383	3,419	1,781	929	5,410	1,899	8,592
	CONSUMER	65,303	509	12,572	20,277	1,141	2,781	11,906	4,458	3,527	8,132
	AGRICULTURAL	6,581	3	412	3,441	33	913	14	489	176	1,101
	OTHER LOANS	27,586	164	3,457	18,702	730	454	350	1,939	527	1,264
INV. SECURITIES	TOTAL	81,116	2,060	8,547	49,011	4,651	1,746	3,840	3,529	3,537	4,194
	U.S. TREASURIES	23,024	1,044	1,783	14,042	1,918	462	1,141	934	627	1,073
	U.S. AGENCIES, TOTAL	22,809	459	2,619	13,601	1,390	543	928	1,013	1,445	813
	U.S. AGENCIES, MBS	15,130	363	2,229	9,016	878	236	554	750	710	394
	OTHER MBS	4,027	137	252	3,258	17	38	62	14	80	168
	OTHER SECURITIES	31,255	421	3,893	18,110	1,326	704	1,709	1,568	1,386	2,140
LIABILITIES	TOTAL	496,625	4,635	39,356	317,166	20,547	11,297	20,862	26,354	15,608	40,800
	DOMESTIC	452,961	4,634	39,356	275,851	18,255	11,297	20,862	26,340	15,608	40,757
DEPOSITS	TOTAL	410,809	4,044	30,894	275,039	13,972	8,878	9,952	21,346	11,956	34,729
	FOREIGN	42,770	0	0	40,249	2,221	0	0	1	139	161
	DOMESTIC	368,039	4,044	30,894	234,790	11,751	8,878	9,952	21,345	11,817	34,568
	DEMAND	100,196	1,179	7,036	67,942	2,415	1,869	3,175	5,151	2,543	8,885
	NOW	42,609	392	3,763	24,728	1,397	1,102	1,518	3,351	1,637	4,721
	MMDA & SAVINGS	132,562	1,395	11,194	86,059	4,365	2,580	3,722	7,097	3,970	12,180
	SMALL TIME	64,260	517	7,446	36,705	1,974	2,392	972	4,970	2,517	6,768
	LARGE TIME	28,005	495	1,455	19,098	1,595	934	564	764	1,145	1,954
	OTHER DEPOSITS	406	66	0	258	5	0	0	13	4	61
OTHER BORROWINGS		30,538	520	1,164	13,983	3,295	1,769	534	2,933	2,224	4,115
EQUITY CAPITAL		45,660	681	3,586	28,011	1,844	926	2,494	2,539	1,534	4,045
LOAN LOSS RESERVE		9,518	42	627	6,845	251	122	385	388	226	633
LOAN COMMITMENTS		258,174	807	51,887	118,925	7,969	3,936	25,199	16,169	13,941	19,340
TIER1 CAPITAL RATIO		0.094	0.188	0.100	0.090	0.103	0.095	0.117	0.095	0.120	0.089
TOTAL CAPITAL RATIO		0.122	0.199	0.121	0.121	0.121	0.113	0.137	0.112	0.135	0.112
LEVERAGE RATIO		0.078	0.126	0.080	0.074	0.080	0.077	0.106	0.084	0.086	0.082
QUARTERLY EARNINGS AND RETURNS (ANNUALIZED) -- $ MILLION (ALL COMMERCIAL BANKS)											
INCOME	TOTAL	12,340	116	967	7,404	468	260	946	687	446	1,046
	INTEREST	9,579	99	756	5,889	398	221	519	521	339	837
	FEES & CHARGES	783	6	62	508	13	17	18	56	25	79
EXPENSES	TOTAL	9,591	88	923	5,816	402	203	492	471	368	828
	INTEREST	3,392	35	260	2,069	167	96	160	179	137	290
	SALARIES	2,362	26	172	1,575	84	34	63	139	72	198
	LOAN LOSS PROVISION	446	1	176	226	18	8	-9	-39	20	45
	OTHER	3,390	26	315	1,945	134	65	278	192	140	295
TAXES		952	9	10	546	27	20	160	80	29	72
NET INCOME		1,797	20	34	1,042	39	38	294	136	49	146
ROA (% ANNUALIZED)		1.36	1.45	0.34	1.23	0.71	1.27	5.52	1.94	1.12	1.32
ROE (% ANNUALIZED)		15.75	11.52	3.78	14.88	8.45	16.22	47.12	21.49	12.73	14.46
NET INTEREST MARGIN (% ANNUALIZED)		4.68	4.78	5.03	4.50	4.20	4.23	6.76	4.88	4.64	4.94
ASSET QUALITY -- PERCENT OF LOANS (LARGE COMMERCIAL BANKS)											
LOAN LOSS RESERVE		2.63	1.41	2.14	3.04	1.68	1.35	2.38	1.91	1.99	1.89
NET CHARGEOFFS, TOTAL		0.51	0.18	0.57	0.50	0.34	0.22	1.85	0.24	0.24	0.29
	REAL ESTATE	0.38	-0.01	-0.09	0.52	0.24	-0.05	-0.35	0.29	0.00	0.04
	COMMERCIAL	0.13	0.11	0.06	0.19	0.53	-0.06	-0.89	-0.37	0.04	0.02
	CONSUMER	2.32	0.76	1.28	4.25	0.81	0.58	2.58	1.02	0.82	0.90
	AGRICULTURAL	0.54	0.00	0.05	0.40	-0.01	0.75	-0.07	-0.16	-0.02	1.47
PAST DUE & NON-ACCRUAL, TOTAL		2.67	2.31	1.85	3.09	2.38	1.61	3.54	1.40	1.56	1.65
	REAL ESTATE	3.76	2.13	1.95	4.62	2.30	1.29	2.52	1.60	1.21	1.77
	CONSTRUCTION	11.82	8.46	2.58	18.74	2.36	1.24	0.74	3.52	1.32	5.80
	COMMERCIAL	4.71	2.27	4.81	5.96	2.28	1.17	4.09	2.59	1.17	1.57
	FARM	4.29	0.00	8.97	4.12	6.37	5.87	0.00	3.86	11.79	2.66
	HOME EQUITY LINES	1.30	0.74	0.80	1.37	1.56	0.40	1.58	0.39	0.82	1.52
	MORTGAGES	2.36	1.47	1.19	2.75	2.78	1.53	1.41	0.95	1.18	0.97
	MULTI-FAMILY	10.52	1.16	0.66	14.93	1.37	0.00	0.04	0.48	0.29	0.00
	COMMERCIAL	1.85	2.49	1.01	1.96	2.94	1.78	2.07	1.37	1.79	1.08
	CONSUMER	2.43	2.10	2.43	2.28	2.72	1.67	3.93	1.28	1.35	1.71
	AGRICULTURAL	2.35	0.00	1.51	1.58	24.72	2.79	2.39	1.39	1.98	4.64
NUMBER OF BANKS		674	8	34	401	16	19	22	44	44	86
NUMBER OF EMPLOYEES		N/A	2,718	20,632	N/A	8,427	4,960	7,918	15,486	8,593	20,557

Research Department

Federal Reserve Bank of San Francisco

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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 FEBRUARY 1995, BY REGION

	DISTRICT			ALASKA			ARIZONA			CALIF			HAWAII			IDAHO			NEVADA			OREGON			UTAH			WASH		
DEPOSIT TYPE	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU	CB	SL	CU
TOTAL DEPOSITS	57	35	8	72	3	25	92	1	8	50	43	7	68	23	9	92	5	4	78	18	5	78	13	10	80	5	16	57	33	11
DEMAND	91	6	3	97	0	3	98	0	2	90	7	3	95	1	3	98	0	2	97	3	0	92	5	3	92	4	4	90	9	1
NOW	66	24	9	62	5	33	88	0	12	60	32	8	69	26	5	89	4	8	78	13	8	80	10	10	82	1	17	67	20	13
SAVINGS & MMDAS	63	26	11	57	4	39	88	0	11	60	31	9	61	25	14	91	4	6	76	15	9	74	13	13	75	2	23	55	27	18
SMALL TIME	32	63	5	75	6	19	93	2	5	23	72	5	56	39	5	89	9	2	42	52	6	72	19	10	77	10	13	41	52	7
LARGE TIME	47	44	10	94	2	4	91	1	8	38	51	11	74	17	9	94	3	3	89	11	0	74	18	8	78	8	14	45	53	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

TYPE OF RETAIL DEPOSIT ACCOUNT OR LOAN		NOV 1992	FEB 1993	MAY 1993	AUG 1993	NOV 1993	FEB 1994	MAY 1994	AUG 1994	NOV 1994	FEB 1995
SAVINGS ACCOUNTS AND MMDAS	U.S	2.90	2.80	2.65	2.55	2.48	2.43	2.50	2.63	2.80	3.09
	DISTRICT	3.05	2.96	2.78	2.67	2.58	2.56	2.65	2.81	2.88	2.96
92 TO 182 DAYS CERTIFICATES	U.S	3.14	3.08	2.98	2.96	2.92	2.93	3.28	3.61	4.22	4.83
	DISTRICT	3.14	3.01	2.88	2.85	2.81	2.83	3.03	3.34	3.84	4.47
2-1/2 YEARS AND OVER CERTIFICATES	U.S	4.70	4.59	4.45	4.40	4.28	4.35	4.89	5.33	6.08	6.52
	DISTRICT	4.49	4.41	4.27	4.19	4.09	4.13	4.58	4.96	5.52	6.02
COMMERCIAL SHORT TERM FIXED	U.S	4.17	4.16	3.91	4.02	3.95	4.03	4.68	5.28	5.67	6.89
	DISTRICT	4.79	4.28	4.19	4.75	4.43	4.95	6.78	5.39	6.32	6.39
COMMERCIAL SHORT TERM FLOATING	U.S	5.91	5.85	5.58	5.53	5.56	5.49	6.32	6.83	7.36	8.50
	DISTRICT	6.59	6.36	5.40	6.48	6.46	6.36	6.38	7.34	7.78	9.17
COMMERCIAL LONG TERM FIXED	U.S	5.97	6.43	6.02	6.21	5.38	5.41	6.17	6.66	7.30	8.20
	DISTRICT	6.44	9.19	10.86	8.05	6.62	6.58	N/A	9.82	N/A	N/A
COMMERCIAL LONG TERM FLOATING	U.S	6.53	6.38	6.47	6.05	5.70	5.98	6.61	6.99	7.59	9.00
	DISTRICT	8.09	8.43	8.55	8.77	7.68	8.16	N/A	N/A	N/A	N/A
CONSUMER, AUTOMOBILE	U.S	8.60	8.57	8.17	7.98	7.63	7.54	7.76	8.41	8.75	9.70
	DISTRICT	8.76	8.98	8.23	8.09	7.70	7.68	7.86	8.15	8.41	9.63
CONSUMER, PERSONAL	U.S	13.55	13.57	13.63	13.45	13.22	12.89	12.96	13.33	13.59	14.10
	DISTRICT	12.83	12.67	13.87	12.69	13.00	12.02	12.26	13.37	12.87	14.55
CONSUMER, CREDIT CARD	U.S	17.38	17.26	17.15	16.59	16.30	16.06	16.15	16.25	15.91	16.24
	DISTRICT	18.29	17.76	17.60	17.58	17.00	17.17	17.61	17.34	16.33	15.60

SOURCES: MONTHLY SURVEY OF SELECTED DEPOSITS, SURVEY OF TERMS OF BANK LENDING, AND TERMS OF CONSUMER CREDIT
MOST COMMON INTEREST RATES ON RETAIL DEPOSITS, WEIGHTED AVERAGE INTEREST RATE ON LOANS