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FEDERAL RESERVE BANK OF KANSAS CITY

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In the Nation and the District

How Fast Can the U.S. Economy Grow?

The New Risk-Based Capital Plan
For Commercial Banks

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Thrifths in the Troubled 1980s: In the Nation and the District **3**

By J. A. Cacy

Under the new minimum capital standards set by federal law, many insolvent and weak thrift institutions will be closed. Yet most thrifts can meet the new capital standards. In recent years, stronger thrifts have taken steps to add to their capital positions by following practices common to the industry prior to the troubled 1980s.

How Fast Can the U.S. Economy Grow? **24**

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Achieving a growing output of goods and services has always been a major goal of U.S. economic policy. Yet the economy suffers when growth is too slow or too fast. A reasonable working assumption for policymakers is that the noninflationary growth potential of the economy lies within the 2 to 3 percent annual range.

The New Risk-Based Capital Plan For Commercial Banks **40**

By William R. Keeton

In the 1980s, many banks shifted to activities that increased their risk of failure. To improve control over bank risk-taking, regulators developed a plan to base each bank's capital requirement on the riskiness of its activities. The plan should have significant favorable effects, but will be limited by the imperfect measurement of capital and risk.

Thriffs in the Troubled 1980s: In the Nation and the District

By J. A. Cacy

The condition of the nation's thrift institutions has been a serious national problem throughout the 1980s. High and volatile interest rates, combined with too much deregulation, have spawned widespread thrift insolvency and failure in all regions of the nation.

The federal legislation recently enacted to deal with thrift industry problems will allow insolvent and weak thrifts to be closed without causing losses to insured depositors. The law is also intended to prevent a recurrence of problems in the future. To further its objectives, the new legislation introduces many changes in regulations affecting thrift institutions. In general, thrifts must now meet more stringent

capital requirements and operate more in line with practices that emphasize the financing of housing.

The persistence and gravity of thrift industry problems and the need for new legislation to deal with them may have created the impression that most thrift institutions are insolvent and soon will be closed. Also, some may be concerned that the new regulations will make it difficult for remaining thrifts to grow and prosper. Special problems encountered by thrifts in the states of the Tenth Federal Reserve District raise additional concerns about the condition of these institutions. District thrifts have not only shared in the difficulties besetting thrifts nationwide in recent years, but have had to contend with weakness in the district's economy.

In view of concerns about the condition and future of thrift institutions, this article reviews the performance and behavior of thrifts in the 1980s and assesses their current condition as reflected in their capital positions. The article

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concludes that a majority of the nation's thrifts now meet minimum capital requirements established by the new legislation. In recent years, moreover, there has been an increase in the number of nationwide thrifts having stronger capital positions. Most Tenth District thrifts meet minimum capital standards, although relatively fewer than across the nation. An additional conclusion is that, compared with institutions having relatively weak capital positions, the more successful thrifts with stronger capital positions have tended to emphasize the financing of housing and, in general, have operated more in line with practices common to the industry prior to the troubled 1980s. That thrifts successful during the 1980s have favored practices that will be encouraged by the new legislation may reduce concerns about the future of the thrift industry.

I. THRIFTS IN THE 1980s: FROM PROSPERITY TO DISASTER

Prior to the 1980s, the U.S. thrift industry enjoyed many years of growth and prosperity. In the early 1980s, however, sharply rising interest rates turned a profitable thrift industry into one with large losses.¹ The industry recovered partially from 1983 to 1985 as interest rates declined. But after 1985, losses on assets and operations caused thrifts to suffer even

¹ Thrift institutions include savings and loan associations and savings banks. The data in this article cover institutions that, during the periods covered, were insured by the Federal Savings and Loan Corporation. Excluded are noninsured institutions along with those insured by the Federal Deposit Insurance Corporation. Additional background on the data is included in the appendix.

greater losses than in the early part of the decade.

Thrift accounting

In discussing the experiences of thrifts during the 1980s, this article focuses on net income, expressed as a percent of assets. This is commonly referred to as return on assets, or ROA. ROA is equal to total income minus total expense; but, for analytical purposes, income and expense items are commonly divided into two groups: items relating to interest and items relating to all other factors. Following this procedure, and expressing all items as a percent of assets, ROA is equal to net interest income (NIM), minus net noninterest expense, (NNIE).² NIM is equal to interest income minus interest expense, while NNIE is equal to noninterest expense minus noninterest income. Noninterest expense consists of operating expense and nonoperating expense, while noninterest income consists of noninterest operating income and nonoperating income. In summary:

$$\begin{aligned} \text{ROA} &= \text{NIM} - \text{NNIE} \\ \text{NNIE} &= \text{OE} + \text{NOE} - \text{NIOI} - \text{NOI} \end{aligned}$$

where ROA = net income
 NIM = interest income minus interest expense
 NNIE = net noninterest expense, that is, noninterest expense minus noninterest income
 OE = operating expense, which consists of employee com-

² This formulation ignores income taxes.

TABLE 1
Income and expenses, 1977-88
U.S. thrift institutions
 (Percent of assets)

	<u>1977-79</u>	<u>1980-82</u>	<u>1983-85</u>	<u>1986-88</u>
Net income (ROA)	0.70	-0.42	0.25	-0.58
Net interest income (NIM)	1.43	-0.03	0.93	1.30
Net noninterest expense (NNIE)	0.41	0.53	0.53	1.88
Noninterest operating income	0.79	0.64	0.96	0.70
Nonoperating income	0.08	0.33	0.55	0.54
Operating expense	1.22	1.39	1.70	2.00
Nonoperating expense	0.06	0.11	0.34	1.13
Regulatory capital*	5.58	3.69	4.38	4.09
GAAP capital*	—	—	3.18	3.36
Tangible net worth*	—	—	0.86	1.54
Deposits	82.42	77.54	80.84	77.44

*Year at end of period used for calculation

Note: For 1986-88 period, percent of tangible assets (total assets minus goodwill and other intangibles), except for regulatory and GAAP capital. For regulatory capital, percent of total assets. For GAAP capital, percent of GAAP assets. For other periods, percent of total assets, except for GAAP capital and net worth ratios in 1983-85 period.

Source: Federal Home Loan Bank Board

- pensation and related expense
- NOE = nonoperating expense, which consists mainly of provisions for losses on assets
- NIOI = noninterest operating income, which includes fees and net income from service corporations and related operations
- NOI = nonoperating income

Pre-1980: Thrifts grow and prosper

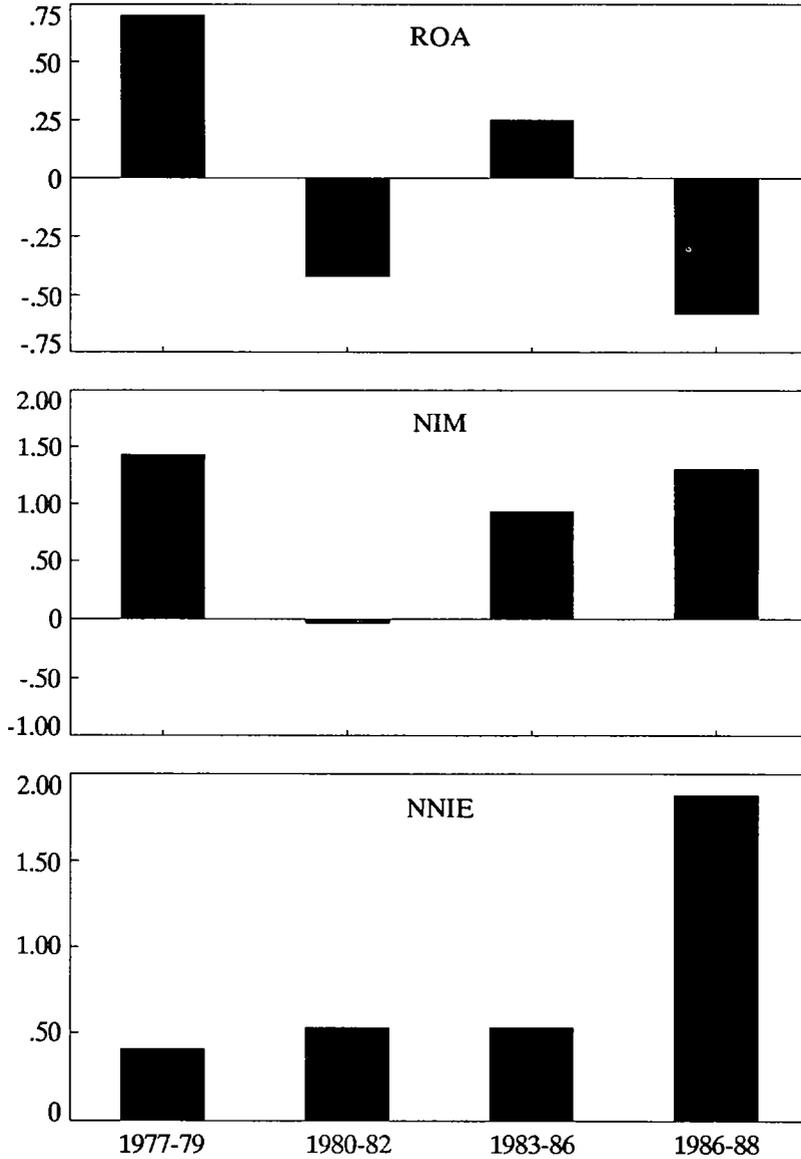
During much of the post-World War II era, the nation's thrift institutions enjoyed almost uninterrupted growth and prosperity. From 1965 to 1979, for example, assets held by thrifts

increased at an annual rate of 10.6 percent, exceeding nominal GNP's growth rate of 8.8 percent for the same period. Thrifts were consistently profitable during this long growth period. Their return on assets averaged 0.61 percent and never fell below 0.44 percent on a yearly basis. The late 1970s were particularly profitable years. From 1977 to 1979, industry ROA averaged 0.70 percent (Chart 1, Table 1).

Even during prosperous years, however, thrifts encountered problems. For example, thrifts underwent periods of disintermediation, when rising interest rates caused deposit outflows, cost increases, and sluggish growth in quality earning assets. From 1965 to 1979, deposits and capital grew less rapidly than assets, causing the industry to become increas-

CHART 1

Return on assets, net interest income, and net noninterest expense, 1977-88
U.S. thrift institutions



Source: Federal Home Loan Bank Board.

ingly dependent on borrowed funds. During this period, the industry's deposit-asset ratio declined from 85 percent to 81 percent, while the capital-asset ratio dropped from 6.8 percent to 5.6 percent.

1980-82: Prosperity ends abruptly

The long period of prosperity for thrifts ended abruptly in the early 1980s. Large losses replaced profitability, as the thrift industry's ROA averaged -0.42 percent from 1980 to 1982, 112 basis points less than the average of the previous three years (Chart 1, Table 1).

Profitability declined during this period, primarily because interest rates soared. Higher interest rates immediately increased the cost of funds for thrifts. In the short run, thrifts could not increase their interest income because most of their assets were long-term fixed-rate mortgages. As a result, the thrift industry experienced a sharp decline in net interest income (NIM). This decline in NIM accounted for most of the drop in ROA during the 1980-82 period, compared with the late 1970s, as NNIE remained steady during the two periods (Chart 1, Table 1).

Thrifts' losses in the early 1980s were accompanied by continued deterioration in the capital position of the industry. The industry's capital-asset ratio declined almost two full percentage points from 1980 to 1982. Thrifts' deposit base also continued to erode (Table 1).

1983-85: Thrifts begin a recovery

The period from 1983 to 1985 saw a partial recovery of the thrift industry's fortunes. Return on assets averaged 0.25 percent during this period. Although lower than in the late

1970s, this was a substantial improvement over the losses experienced in the early 1980s.

The major factor accounting for the 1983-85 recovery was the same factor, working in reverse, that caused the 1980-82 deterioration. Just as the earlier rise in interest rates boosted interest expense and reduced NIM, the decline in interest rates of the 1983-85 period lowered interest expense and increased NIM. The rise in NIM accounted for all of the improvement in ROA during the 1983-85 period compared with the early 1980s. Net noninterest expense was the same during the two periods (Chart 1, Table 1).

The improved performance made it appear that the thrift industry was returning to healthier days. A number of factors supported this perception. For example, thrifts bolstered their capital and deposit bases during the 1983-85 period (Table 1).

Despite improving capital-asset and deposit-asset ratios, however, the industry's capital position remained inadequate, especially when properly measured. Capital as measured by generally accepted accounting principles (GAAP) was considerably lower than regulatory capital at the end of 1985. Tangible net worth was even lower than GAAP capital. GAAP capital consists of paid-in capital plus retained earnings minus deferred losses on assets and excludes questionable items included in regulatory capital, such as certificates issued by regulatory authorities. In addition to the items excluded by GAAP capital, tangible net worth excludes goodwill and other intangible assets. At the end of 1985, the GAAP capital-asset ratio was 3.18 percent, more than one percentage point less than the regulatory capital-asset ratio. The tangible-net-worth ratio was an even lower 0.86 percent.

Nevertheless, the profitability of the 1983-85 years improved the outlook for the thrift industry. Contributing to a better outlook for thrifts were added operational tools, including the ability to use adjustable-rate mortgages, the authority to invest in a wider range of assets, and the authority to compete for sources of funds not earlier available.

1986-88: Profitability sinks again

After 1985, the thrift industry's recovery turned out to be illusory. Instead of establishing a base for full recovery, conditions in the industry from 1983 to 1985 were actually sowing the seeds of disaster. Those seeds grew to fruition during the 1986-88 period, producing greater losses than those of the early 1980s. ROA averaged -0.58 percent during the three years ending in 1988, 83 basis points below the previous three-year period and lower than in the early 1980s.

As in the 1980-82 period, profitability plunged from 1986 to 1988—but this time for very different reasons. In sharp contrast to the early 1980s when a decline in NIM caused ROA to fall, NIM actually increased in the 1986-88 period. NIM averaged considerably higher from 1986 to 1988 than during the two previous three-year periods and not much lower than in the prosperous late 1970s (Chart 1, Table 1).

The 1986-88 losses were associated with a large increase in net noninterest expense, which rose 131 basis points to more than offset the improvement in NIM. The increase in NNIE was caused primarily by two factors. One was an increase in nonoperating expense. Nonoperating expense began to soar during the 1986-88 period, when thrifts began making pro-

visions for the losses on assets acquired during the 1983-85 period. The second factor was a decline in noninterest operating income. Many thrifts suffered declines in earnings or losses on their service corporations and related activities during the 1986-88 period. Furthermore, operating expense rose during this period.

Despite the losses suffered by thrifts from 1986 to 1988, the average capital position of the industry improved somewhat. Both the GAAP capital-asset ratio and the tangible-net-worth ratio rose from the end of 1985 to the end of 1988 (Table 1). However, the tangible-net-worth ratio remained at a low level.

II. THE CAPITAL POSITION OF THRIFTS IN THE LATE 1980s

Does the low tangible-net-worth ratio in the industry signal that most thrifts were insolvent or nearly so at the end of 1988? How many strong thrifts remain? This section examines the capital position of thrifts in early 1989 and describes changes that occurred in their position from the end of 1985 to early 1989.

To examine their capital positions, thrifts are divided into groups according to their ratios of tangible net worth to tangible assets. One group contains insolvent thrifts that have tangible-net-worth ratios below zero. A second group consists of solvent thrifts that have positive tangible-net-worth ratios. The remaining groups are overlapping subgroups of the solvent groups. One of these subgroups contains only those thrifts able to meet the minimum capital standards established by the new legislation. These thrifts have tangible-net-worth ratios in excess of 1.5 percent. Another subgroup contains only those thrifts that have

tangible-net-worth ratios in excess of 3 percent and therefore meet the more stringent standards that will be phased in over the next few years.³ A final subgroup contains strong thrifts that have tangible-net-worth ratios in excess of 6 percent.

In summary, the groups are as follows:

Tangible net-worth ratio	Designation
Below zero	Insolvent
Over zero	Solvent
Over 1.5	Meet minimum standards
Over 3.0	Meet stringent standards
Over 6	Strong

Most thrifts meet capital standards

One finding of the examination is that a large majority of thrifts were solvent in early 1989, and most of these were able to meet the current minimum 1.5 percent capital standards. In March 1989, 82 percent of thrifts were solvent, and 77 percent had tangible-net-worth ratios of 1.5 percent or more (Table 2). Thrifts

³ The new legislation requires thrift institutions to have "core" capital equal to at least 3 percent of assets and tangible capital equal to at least 1.5 percent of assets. In general, tangible capital is equal to paid-in equity capital plus retained earnings minus goodwill and other intangibles. Core capital generally is defined as paid-in equity capital plus retained earnings minus intangibles plus "supervisory goodwill." Some supervisory goodwill will be allowed during a transitional period that ends December 31, 1994. In other words, institutions that meet the 1.5 percent tangible capital requirement but whose tangible capital is less than 3 percent of assets will be able to use goodwill in meeting the 3 percent core capital requirement during the phase-in period. Thrifts must also meet a risk-based capital requirement similar to the requirement for commercial banks. This risk-based requirement is not treated in this article.

meeting minimum capital standards accounted for a solid majority—65 percent—of total thrift assets.

Another finding is that considerably more than half of thrifts were able to meet the more stringent 3 percent capital standards. Nearly 67 percent had tangible-net-worth ratios in excess of 3 percent. These institutions held about 45 percent of all thrift assets.

A third finding of the examination is that there were a substantial number of strong thrifts with tangible-net-worth ratios over 6 percent. Strong thrifts numbered 1,146, or 39 percent of the total, at the end of March 1989. These institutions accounted for 15 percent of total thrift assets.

Many thrifts improve capital positions

Perhaps as important as the capital position of thrifts in early 1989 is the way the situation has changed over the past three years. The data on capital positions show a significant increase in the percentage of higher capital thrifts and a higher percentage of assets accounted for by them. For example, the percentage of strong thrifts increased from 25 percent at the end of 1985 to 39 percent in early 1989 (Table 2). Assets held by these thrifts rose from 9 percent to 15 percent. Similar increases occurred in the percentage of thrifts meeting minimum capital standards and in the percentage meeting the more stringent requirements.

While some of the increase in the percentage of higher capital thrifts was due to the demise of insolvent and lower capital thrifts during the period, not all of the improvement was accounted for in this way. Much of the gain was accounted for by improvements in the

TABLE 2
Capital positions, 1985 and 1989
U.S. thrift institutions

<u>Ratio of tangible net worth to tangible assets</u>	<u>Number of Institutions</u>			
	<u>December 31, 1985</u>		<u>March 31, 1989</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
Total	3,246	100.0	2,938	100.0
Below zero	691	21.3	541	18.4
Over zero	2,555	78.7	2,397	81.6
Over 1.5	2,293	70.6	2,252	76.7
Over 3	1,828	56.3	1,959	66.7
Over 6	820	25.3	1,146	39.0
	<u>Assets held</u>			
	<u>December 31, 1985</u>		<u>March 31, 1989</u>	
	<u>Amount</u>	<u>Percent</u>	<u>Amount</u>	<u>Percent</u>
	<u>(\$ Billions)</u>		<u>(\$ Billions)</u>	
Total	1,038	100.0	1,317	100.0
Below zero	329	31.7	313	23.8
Over zero	709	68.3	1,004	76.2
Over 1.5	590	56.8	856	65.0
Over 3	357	34.4	596	45.3
Over 6	97	9.3	195	14.8

Source: Federal Home Loan Bank Board

capital positions of individual thrifts. This is shown by the fact that, while the total number of thrifts declined 308 from the end of 1985 to early 1989, the number meeting minimum capital standards declined only 41. Moreover, the number meeting the more stringent standards rose somewhat and the number having strong capital positions increased substantially

(Table 2).

The evidence suggests that thrifts initially in the lower capital categories became weaker during the three-year period, while thrifts initially in the higher capital categories became stronger. No doubt, many thrifts experienced a sharp deterioration in their positions and, of course, many of these met their demise during

the period. At the same time, the increase in the number of higher capital thrifts indicates that many thrifts strengthened their capital positions. Presumably, as the capital position of many insolvent and very weak thrifts worsened, some of these below-minimum-requirement institutions took steps to strengthen their positions and moved above the 1.5 percent threshold. Also, some above-minimum-standard but weak thrifts (those in the 1.5-to-3 percent category) moved above the 3 percent threshold, and many healthy thrifts (in the 3-to-6 percent category) further strengthened their positions and moved above the 6 percent capital position into the strong group.

III. PERFORMANCE AND PRACTICES OF STRONG AND WEAK THRIFTS IN THE 1980s

The new legislation requires that thrifts place greater emphasis in the future on the financing of housing.⁴ Will this requirement, combined with the higher capital requirements,

⁴ The new law tightens the "qualified thrift lender" test that is used to determine whether a depository institution is eligible for tax benefits and access to low-interest Federal Home Loan Bank advances. The previous requirement that 60 percent of a thrift's loans be generally for home financing will be stiffened to 70 percent. Also, thrifts will have to maintain 55 percent of their assets in a pool of loans and investments that is more closely connected to home financing and improvement than was previously used for the 60 percent test. Consumer loans and some other nonresidential investments will count toward the 70 percent limit. Also, the 70 percent test will be measured against all of a thrift's assets except its premises and furnishings, liquid assets such as reserves required by regulators, and "good will." The new test will take effect July 1, 1991.

make it difficult for thrifts to grow and prosper? To gain some insight into this question, this section examines the behavior and experiences during the 1984-88 period of thrifts with different capital positions. The section examines profitability, the composition of assets and liabilities, and the return on assets and cost of funds. The examination finds that higher capital thrifts have emphasized the financing of housing and, in general, have followed traditional practices common to the industry prior to the 1980s.

The section focuses on the four groups: insolvent institutions with tangible-net-worth ratios below zero, weak thrifts with tangible-net-worth ratios between zero and 3 percent, healthy institutions with tangible-net-worth ratios between 3 and 6 percent, and strong thrifts with tangible-net-worth ratios in excess of 6 percent.

Strong thrifts earn more profits

During the 1984-88 period, a major difference between thrifts with different capital positions was their relative profitability. Strong and healthy thrifts experienced high positive ROAs during the period; weak thrifts experienced low positive ROAs; insolvent thrifts suffered large losses (Table 3).

As expected, the variation in ROAs among thrifts with different capital positions reflects, in part, differences in nonoperating expense and noninterest operating income. These differences show up most clearly when comparing the insolvent group with the other three categories. Higher nonoperating expense at lower capital thrifts, especially in the insolvent group, reflects the greater losses on assets suffered by these institutions. Lower noninterest operating income at insolvent thrifts was due to large

TABLE 3
Income and expenses by capital position, 1986-88
U.S. thrift institutions
 (Percent of tangible assets)

	Ratio of tangible net worth to tangible assets			
	Below zero (Insolvent)	Zero to 3 (Weak)	3 to 6 (Healthy)	Over 6 (Strong)
Net income (ROA)	-3.19	.20	.64	.97
Net interest income (NIM)	.33	1.21	1.76	2.44
Net noninterest expense (NNIE)	3.72	1.11	.97	1.14
Noninterest operating income	.46	.79	.83	.79
Nonoperating income	.69	.57	.45	.34
Operating expense	2.27	1.85	1.84	1.93
Nonoperating expense	2.60	.61	.41	.34

Source: Federal Home Loan Bank Board

losses on their service corporations and related activities.

A difference not necessarily expected among thrifts with different capital positions was that lower capital thrifts experienced relatively low NIMs. In this case, the difference varied across all four categories, as NIMs ranged smoothly from a robust 2.44 percent at strong thrifts to an anemic 0.33 percent at insolvent institutions (Table 3). Since a decline in NIM was not responsible for the decline in ROA experienced by thrifts as a group in recent years, one would not necessarily expect lower capital thrifts to have experienced relatively low NIMs during the 1984-88 period.

It turns out, however, that the lower NIMs of lower capital thrifts were indirectly related to higher losses on assets and operations. Two factors accounted for the lower NIMs at lower capital thrifts, and both factors were indirectly

related to their losses on assets and operations. First, lower capital thrifts maintained relatively low ratios of loans and investment securities to assets (L&I-A), which held down interest income and contributed to low NIMs. The low L&I-A ratios of lower capital thrifts were caused in part by the high volumes of repossessed assets carried on their accounts. The latter, in turn, developed in connection with high losses on assets.

A second factor contributing to the lower NIMS of lower capital thrifts was that their interest expense was boosted by relatively high ratios of purchased funds (deposits plus borrowing) to assets (PF-A). The high PF-A ratios were caused by the low (or negative) capitalization of the lower capital (or negative capital) thrifts. The latter, in turn, arose in connection with losses on assets and operations. Again, the indirect connection is evident between lower

NIMs and higher losses on assets and operations.⁵

Asset and liability composition differs

Thrifts with different capital positions differed in ways other than profitability during the 1984-88 period. In particular, thrifts were distinguished by the composition of their assets.

As already noted, one striking difference among thrifts was their ratio of loans and investment securities to assets. Higher capital thrifts maintained sharply higher L&I-A ratios. During the 1984-88 period, loans and investment securities as a percent of assets averaged 94 percent at strong thrifts, 92 percent at healthy thrifts, 90 percent at weak thrifts, and 84 percent at insolvent thrifts (Table 4). Service corporations, goodwill and deferred losses, repos-

sessed assets, and all other assets individually accounted for relatively low percentages of the assets of higher capital thrifts.

Ratios to total assets, however, give a somewhat distorted picture of the thrift industry. Lower capital thrifts necessarily have higher ratios of goodwill and deferred losses because these items are subtracted from total assets to arrive at tangible net worth. However, the relationship between capital position and the importance of loans and investment securities remains after correcting for this distortion by examining the composition of tangible assets, which is equal to total assets minus goodwill and deferred losses. Thus, loans and investments as a percent of tangible assets ranged from 95 percent at strong thrifts to 89 percent at insolvent thrifts (Table 4). At the same time, service corporations, repossessed assets, and other assets accounted for the larger percentage of tangible assets at lower capital thrifts than at higher capital thrifts.

Another very important difference among thrifts with different capital position was the composition of their portfolio of loans and investment securities. Higher capital thrifts devoted a larger percentage of their portfolios to residential mortgage loans, with the percentage ranging from 70 percent for strong thrifts to 63 percent for insolvent thrifts. Higher capital thrifts also allocated a larger percentage of their portfolios of loans and investment securities to investment securities, and they devoted a smaller portion to loans other than residential mortgages (Table 4).

The makeup of portfolios of residential mortgage loans also varied for thrifts with different capital positions. Higher capital thrifts devoted a larger percentage of these portfolios to permanent whole mortgages and a smaller

⁵ This discussion may be clarified by noting that

$$\text{NIM} = \frac{R - E}{A} = (\text{GROA}) \left(\frac{L+I}{A} \right) - (\text{COF}) \left(\frac{\text{PF}}{A} \right),$$

where R = interest income
 E = interest expense
 GROA = gross return on assets = interest income ÷ loans + investment securities
 COF = average cost of funds = interest expense ÷ purchased funds
 L+I = loans plus investment securities
 PF = purchased funds = deposits + borrowing

For thrifts with both positive net income and positive capital, those having relatively high purchased funds and low capital ratios may have relatively high return on equity ratios (ROE). For this reason, the differential between the ROEs of positive but lower capital thrifts and of higher capital thrifts during the 1984-88 period was less than the differential between their ROAs.

TABLE 4

**Composition of assets and liabilities, return on assets, and cost of funds,
by capital position, 1984-88, U.S. thrift institutions (Percent)**

<u>Composition of assets</u>	<u>Ratio of tangible net worth to tangible assets</u>			
	<u>Below zero (Insolvent)</u>	<u>Zero to 3 (Weak)</u>	<u>3 to 6 (Healthy)</u>	<u>Over 6 (Strong)</u>
<u>Percent of total assets</u>				
Loans plus investment securities	84.0	90.0	92.3	94.1
Repossessed assets	2.7	0.9	0.6	0.4
Service corporations	2.0	1.9	1.4	0.9
Goodwill and deferred losses	5.7	1.8	0.7	0.5
Cash	1.2	1.3	1.3	1.2
Other assets	4.3	4.1	3.7	2.8
<u>Percent of tangible assets</u>				
Loans plus investment securities	89.1	91.7	93.0	94.6
Repossessed assets	2.8	0.9	0.6	0.4
Service corporations	2.1	1.9	1.4	0.9
Cash	1.2	1.3	1.3	1.2
Other assets	4.6	4.2	3.7	2.8
<u>Percent of loans plus investment securities</u>				
Residential mortgage loans	63.3	68.4	68.6	70.2
Other loans	22.9	18.8	17.5	13.4
Investment securities	13.8	12.9	13.9	16.4
Below grade (% of investment sec.)	4.1	7.4	4.1	5.5
<u>Percent of residential mortgages</u>				
Construction	4.2	4.5	4.7	4.1
1-4 family (% of construction)	53.4	57.0	63.7	77.4
Permanent whole mortgages	64.4	64.8	75.1	79.8
1-4 family (% of per. whole mort.)	87.0	84.5	85.6	91.2
Mortgage-backed securities	31.5	30.7	20.3	16.1
<u>Composition of liabilities</u>				
<u>Percent of tangible assets</u>				
Deposits plus borrowing	103.7	95.6	93.3	89.0
<u>Percent of deposits plus borrowing</u>				
Deposits	81.3	78.9	84.6	91.6
<u>Percent of deposits</u>				
Insured deposits	91.0	82.1	85.0	90.9
CDs	1.0	4.5	1.6	0.8
<u>Gross returns and cost of funds</u>				
<u>Gross return on assets</u>				
Loans	10.46	10.13	10.20	10.21
Investment securities	8.26	8.39	8.39	8.50
Loans plus investment securities	10.16	9.91	9.94	9.94
<u>Cost of funds</u>				
Deposits	8.19	8.11	7.98	7.86
Borrowing	8.88	8.79	8.99	8.83
Total	8.32	8.26	8.13	7.94
Yield spread	1.83	1.65	1.81	1.99
Source: Federal Home Loan Bank Board				

percentage to mortgage-backed securities. Also, higher capital thrifts favored single-family over multifamily mortgages, especially in the area of construction loans.

Systematic differences on the liability side of the balance also developed between higher capital and lower capital thrifts during the 1984-88 period. One difference, noted earlier, was that the ratio of purchased funds to total tangible assets (total liabilities plus tangible capital) was lower for thrifts with relatively high capital positions (Table 4).

Another difference in the composition of thrift's liabilities relates to the amount of funds obtained from deposits and borrowing. Strong and healthy thrifts obtained a higher percentage of their purchased funds from deposits than did either weak or insolvent thrifts. Insolvent thrifts, however, obtained more of their funds from deposits than did weak thrifts, no doubt reflecting the difficulty insolvent thrifts had in finding borrowing sources. Also, higher capital thrifts obtained more of their deposits from insured deposits. As expected, insolvent thrifts obtained a relatively large portion of their deposits from insured accounts, presumably due to depositor reluctance to place uninsured funds in insolvent institutions. This factor also suggests why a minuscule portion of funds obtained by insolvent institutions was through negotiable CDs. However, strong thrifts relied less heavily on negotiable CDs than did weak and healthy institutions (Table 4).

Returns and cost of funds differ

A final difference among thrifts with different capital positions was in the area of returns earned on assets and the cost of raising funds. These differences, while relatively small, are

significant enough to note. In general, the three solvent thrift groups tended to have slightly lower gross returns on their loans and investments than did insolvent thrifts. A more distinct pattern is evident with regard to the cost of funds. Higher capital thrifts paid less for their deposits than did lower capital thrifts, with the cost of deposits increasing smoothly from 7.86 percent for strong thrifts to 8.19 percent for insolvent thrifts. A similar pattern holds for total cost of funds, except that weak thrifts paid slightly more than insolvent thrifts. Due to the lower cost of funds, the yield spread was highest at strong thrifts and higher at healthy thrifts than at weak thrifts. However, the higher gross return on assets at insolvent thrifts boosted their yield spread above that of both weak and healthy institutions.

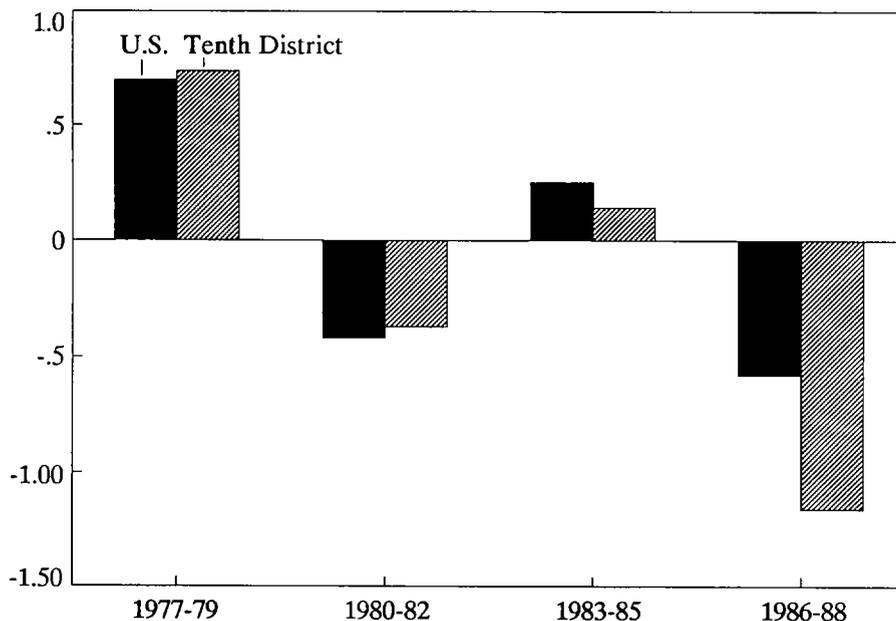
IV. TENTH DISTRICT THRIFTS IN THE 1980s

Prior to the mid-1980s, trends experienced by thrift institutions in the states of the Tenth Federal Reserve District mirrored the trends nationwide. During the 1986-88 period, however, district thrifts suffered significantly larger losses than their nationwide counterparts, due in part to weak economic conditions in the Tenth District. As a result, in early 1989, there were proportionately fewer higher capital thrifts in the district than in the nation. The pattern of differences in profitability, in asset and liability composition, and in gross returns and cost of funds between higher capital and lower capital thrifts during the 1984-88 period was roughly similar at thrifts in the district and nationwide.

CHART 2

Return on assets, 1977-88

U.S. and Tenth District thrift institutions



Source: Federal Home Loan Bank Board.

Pre-1986 experience mirrors the nation

The operating performance of district thrifts was almost the same as that of thrifts across the nation prior to the early 1980s. During the last three years of the 1970s, for example, ROA at district thrifts averaged 0.74 percent, compared with the national average of 0.70 (Chart 2). At the end of 1979, the deposit-asset and capital-asset ratios of district thrifts were comparable to their nationwide counterparts.

During the first three years of the 1980s,

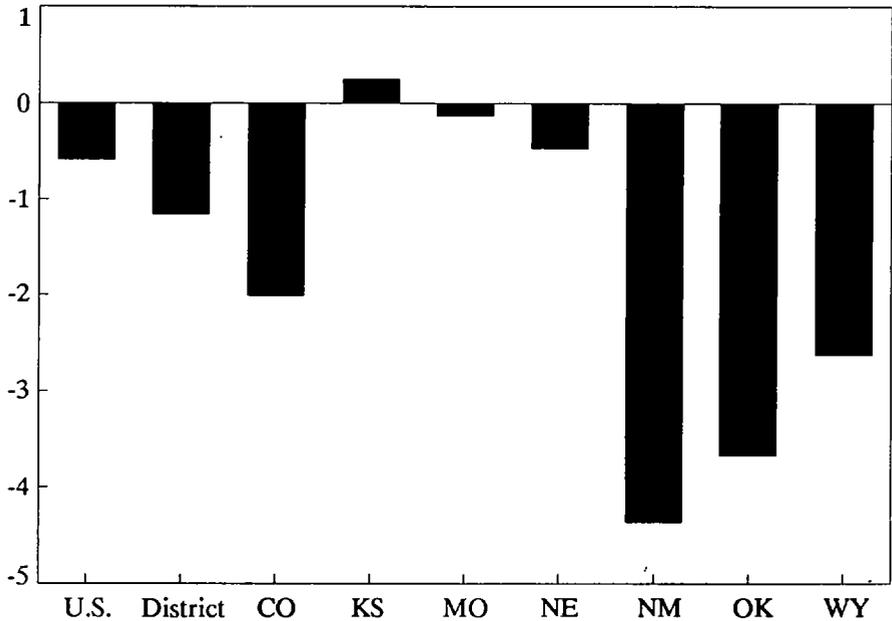
moreover, profitability declined similarly at district thrifts and thrifts nationwide. The return on assets for district thrifts averaged -0.37 percent from 1980 to 1982, compared with a -0.42 percent average nationwide (Chart 2).

District thrifts also experienced the partial recovery of ROA enjoyed by nationwide thrifts during the 1983-85 period. The return on assets at district thrifts averaged 0.14 percent during this period, only slightly lower than ROA across the nation.

CHART 3

Return on assets, 1986-88

U.S. and Tenth District thrift institutions



Source: Federal Home Loan Bank Board.

District thrifts' losses increase after 1985

Unlike earlier periods, however, the experience of district thrifts from 1986 to 1988 differed considerably from that of thrifts nationwide. Losses at district thrifts were substantially greater. Return on assets at district thrifts averaged -1.16 percent, representing losses of more than twice the national average (Chart 2).

The extent of the losses varied considerably across the seven district states. At one end of the scale, thrifts in Kansas enjoyed a positive

ROA of 0.21 percent during the period. Thrifts in Missouri and Nebraska posted ROAs less negative than both the district and national averages. Thrifts in Colorado, New Mexico, Oklahoma, and Wyoming, however, suffered negative ROAs sharply higher than district and nationwide averages, with New Mexico's -4.36 percent being the largest (Chart 3, Table 5).

Accounting for much of the weakness in ROAs at district thrifts during the 1986-88 period was a high NNIE, which averaged 2.19 percent, compared with 1.88 percent nationwide. The higher NNIE at district thrifts

TABLE 5
Income and expense, 1986-88
U.S. and Tenth District thrift institutions
 (Percent of tangible assets)

	<u>Net income (ROA)</u>	<u>Net interest income (NIM)</u>	<u>Net non- interest expense (NNIE)</u>	<u>Non- interest operating income</u>	<u>Non- operating income</u>	<u>Operating expense</u>	<u>Non- operating expense</u>
United States	-.58	1.30	1.88	.70	.54	2.00	1.13
Tenth District	-1.16	.86	2.19	.62	.53	1.80	1.55
Colorado	-2.01	.95	3.19	.35	.48	1.93	2.09
Kansas	.25	.75	.51	1.02	.70	1.44	.79
Missouri	-.13	1.31	1.60	.34	.57	1.65	.86
Nebraska	-.46	1.00	1.67	.49	.50	1.78	.88
New Mexico	-4.36	-.09	4.52	1.29	.45	2.34	3.92
Oklahoma	-3.67	.36	4.30	.72	.29	2.26	3.05
Wyoming	-2.63	.76	3.59	.40	.50	2.53	1.96

Source: Federal Home Loan Bank Board

reflected higher nonoperating expense and lower noninterest operating income. The impact of these factors was partly offset by lower operating expense (Table 5).

One reason for the greater losses on assets (and therefore the higher NNIE and lower ROA) at district thrifts was the weak economic conditions in the district, particularly the weak conditions in the oil industry. Average nonoperating expenses were particularly high in Colorado, Oklahoma, and Wyoming, states dependent on the oil industry. Thrifts in Kansas, Missouri, and Nebraska, where oil is relatively less important, suffered below-average nonoperating expense. New Mexico, although not greatly dependent on the oil industry, diverged from this pattern, experiencing a high nonoperating expense (Table 5).

In addition to a relatively high NNIE, ROA at district thrifts was further depressed during the 1986-88 period by a relatively low NIM. NIM rose at district thrifts during the period, but less sharply than nationwide. As a result, NIM averaged only 0.86 percent at district thrifts, 44 basis points less than the national average. The low NIM was caused in part by factors related to the greater losses on assets experienced by these institutions. Thus, a relatively high percentage of district thrifts' assets were repossessed assets, leaving a low percentage for loans and investment securities. Also, the ratio of deposits plus borrowing to tangible assets was relatively high at district thrifts, reflecting their low capital position.

The more pronounced drop in ROA suffered by district thrifts during the 1986-88

period resulted in a greater erosion of their capital positions and deposit bases. From the end of 1985 to the end of 1988, the district GAAP capital-asset ratio declined to 1.6 percent, compared with a 3.2 percent ratio nationwide. The district's tangible-net-worth ratio was only 0.3 percent at the end of 1988, compared with a 1.5 percent ratio nationwide.

District has fewer higher capital thrifts

Greater losses suffered by district thrifts from 1986 to 1988 reduced the proportion of higher capital thrifts in the district in 1989, compared with the proportion of higher capital thrifts nationwide. Nevertheless, by the end of March 1989, a solid majority—about 64 percent—of district thrifts could meet the minimum 1.5 percent standard. These institutions held over half of the district thrift's assets (Table 6). Also, about half of district thrifts could meet the stringent 3 percent standard, and a third held a strong capital position with a net-worth ratio in excess of 6 percent. Those meeting the stringent standard held 38 percent of assets, while the strong thrifts held 20 percent.

As across the nation, the proportion of strong district thrifts and the percentage of assets held by them increased from the end of 1985 to early 1989. However, the proportion of district thrifts meeting stringent and minimum capital standards declined during the period. The percentage of assets held by these two groups of district institutions also declined (Table 6).

The tendency for initially strong thrifts to strengthen their positions and initially weaker thrifts to become weaker was less pronounced at district thrifts than at thrifts nationwide. In

contrast to nationwide experience, the number of insolvent thrifts in the district increased, while the number of thrifts meeting both minimum and more stringent capital requirements declined. However, the number of strong thrifts in the district increased.

Higher and lower capital thrifts differ in the district

The pattern of differences between higher and lower capital thrifts from 1984 to 1988 was generally similar in the district and nationwide, although the district patterns were not as distinct. As across the nation, higher capital thrifts in the district enjoyed greater profitability than lower capital thrifts. Also following the national pattern, lower capital thrifts in the district had higher nonoperating expenses and lower noninterest income than did higher capital thrifts. Lower capital thrifts also had lower NIMs, due to lower ratios of loans and investments to assets and higher ratios of purchased funds to assets. Finally, the district pattern was similar to thrifts nationwide with regard to the composition of assets, the makeup of liabilities, the gross return on assets, and the cost of funds (Table 7).

V. SUMMARY AND CONCLUSIONS

Thrift institutions in the United States, including those in the seven states of the Tenth Federal Reserve District, have endured troubled times in the 1980s. After enjoying many years of growth and prosperity prior to 1980, the thrift industry's profits turned into losses as interest rates soared in the early years of the decade. Although thrifts enjoyed a partial

TABLE 6
Capital positions, 1985 and 1989
Tenth District thrift institutions

Ratio of tangible net worth to tangible assets	Number of Institutions			
	December 31, 1985		March 31, 1989	
	Amount	Percent	Amount	Percent
Total	296	100.0	266	100.0
Below zero	62	21.0	79	29.4
Over zero	234	79.0	187	70.3
Over 1.5	205	69.3	172	64.3
Over 3	159	53.8	133	49.6
Over 6	70	23.7	88	32.7

	Assets held			
	December 31, 1985		March 31, 1989	
	Amount (\$ Billions)	Percent	Amount (\$ Billions)	Percent
Total	74	100.0	89	100.0
Below zero	16	21.1	31	34.3
Over zero	58	78.9	58	63.7
Over 1.5	49	61.7	50	56.7
Over 3	29	39.5	34	38.4
Over 6	14	18.4	17	19.6

Source: Federal Home Loan Bank Board

recovery during the mid-1980s, conditions during that period were actually setting the stage for another round of even greater losses during the late 1980s. The losses suffered by thrifts throughout the 1980s sharply eroded the average capital position of the industry.

During most time spans, the performance of Tenth District thrifts has mirrored that of their counterparts nationwide. Since 1985,

however, district performance has deviated considerably from national norms. Due importantly to weak economic conditions in the district, relatively more district thrifts have sustained greater losses. As a result, district thrifts suffered an even greater deterioration in their average capital position than did thrifts nationwide.

The federal legislation recently enacted to

TABLE 7

Composition of assets and liabilities, return on assets, and cost of funds, by capital position, 1984-86, Tenth District thrift institutions (Percent)

<u>Composition of assets</u>	<u>Ratio of tangible net worth to tangible assets</u>			
	<u>Below zero (Insolvent)</u>	<u>Zero to 3 (Weak)</u>	<u>3 to 6 (Healthy)</u>	<u>Over 6 (Strong)</u>
Percent of total assets				
Loans plus investment securities	86.1	91.8	93.5	94.5
Repossessed assets	3.0	1.5	1.0	0.8
Goodwill and deferred losses	4.9	0.9	0.4	0.3
Service corporations	1.3	1.3	1.4	0.7
Cash	0.9	0.9	0.9	0.9
Other assets	2.3	2.3	1.8	1.7
Percent of tangible assets				
Loans plus investment securities	90.5	92.6	93.9	95.0
Service corporations	1.4	1.3	1.4	0.7
Repossessed assets	3.2	1.5	1.0	0.8
Cash	1.0	0.9	0.9	0.9
Other assets	3.9	3.6	2.8	2.8
Percent of loans plus investment securities				
Residential mortgage loans	64.7	64.1	66.4	73.5
Other loans	22.2	23.3	16.1	11.8
Investment securities	13.1	12.6	17.6	14.8
Below grade (% of investment sec.)	4.5	3.5	3.1	0.0
Percent of residential mortgages				
Construction	2.9	3.3	3.9	1.3
1-4 family (% of construction)	60.6	58.9	50.8	81.9
Permanent whole mortgages	61.8	60.1	45.1	71.4
1-4 family (% of per. whole mort.)	89.8	85.8	86.7	95.8
Mortgage-backed securities	35.4	36.6	51.0	27.3
<u>Composition of liabilities</u>				
Percent of tangible assets				
Deposits plus borrowing	103.5	95.9	93.7	90.7
Percent of deposits plus borrowing				
Deposits	83.8	78.0	78.4	87.2
Percent of deposits				
Insured deposits	92.5	87.2	86.6	91.4
CDs	0.3	0.5	1.6	0.4
<u>Gross returns and cost of funds</u>				
Gross return on assets				
Loans	10.13	9.97	9.94	9.93
Investment securities	8.23	8.05	8.73	8.22
Loans plus investment securities	9.87	9.70	9.71	9.67
Cost of funds				
Deposits	8.28	8.27	8.33	8.07
Borrowing	9.13	9.04	9.05	8.59
Total	8.41	8.44	8.48	8.14
Yield spread	1.46	1.26	1.24	1.53

Source: Federal Home Loan Bank Board

deal with thrift industry problems will allow insolvent and weak thrifts to be closed without causing losses to insured depositors. The law is also intended to prevent a recurrence of problems in the future. In furtherance of this objective, the legislation requires that thrifts meet more stringent capital standards and operate more in line with practices that emphasize the financing of housing.

Under the new legislation, many insolvent and weak thrifts that suffered losses and capital erosion during the 1980s will be closed. However, a large majority of thrifts are able to meet the minimum capital standards established under the new law. Furthermore, most thrifts can now meet the higher standards that will be effective after a transition period, and, in fact, a substantial number of thrifts hold strong capital positions. While the capital positions of many thrifts deteriorated in recent years, many thrifts took steps to add to their capital. As a result, the percentage of higher capital thrifts has increased since the end of 1985.

Some observers have expressed concern that the provisions in the law requiring greater emphasis on the financing of housing could dampen the future growth and profit potential of the thrift industry. In recent years, however, stronger thrifts have emphasized the financing of housing and, in general, have followed practices common to the industry prior to the troubled 1980s. Compared with their lower capital counterparts, higher capital thrifts have generally favored loans and investment securities over other types of assets, such as investments in service corporations. Higher capital

thrifts have also allocated a larger percentage of their portfolio of loans and investment securities to residential mortgage loans rather than to other types of loans. Furthermore, higher capital thrifts have allocated a higher portion of their residential mortgage loans to permanent whole mortgages rather than to construction loans or pass-through securities. On the liability side of the balance sheet, higher capital thrifts have obtained a relatively large share of their funds from deposits rather than from borrowing, and they have obtained a relatively large share of their deposits from accounts that were fully insured. Finally, higher capital thrifts have paid less for their deposits than have lower capital thrifts.

It appears, therefore, that one management success formula for thrift institutions in recent years has been to emphasize the financing of housing and to rely more on traditional industry practices. This does not necessarily mean that other approaches were not (or could not have been) equally successful. Nor does it mean that all thrifts following the formula were successful or that had others followed it, they would have been successful. Finally, a success formula for the past may not be one in the future. It may be that success in the coming environment will require thrift institutions to deviate more from traditional practices.

Nevertheless, it is instructive to reiterate that thrifts that remained relatively strong during the difficult 1980s tended to emphasize the financing of housing encouraged by the new legislation and, in general, relied more on practices common to the industry prior to the 1980s.

Appendix Background of the Data

The data used in this article cover thrift institutions (savings and loan associations and savings banks) that were insured by the Federal Savings and Loan Insurance Corporation (FSLIC) during the period studied. The data are based on reports submitted by thrift institutions to the Federal Home Loan Bank Board.

For years prior to 1984, the data were obtained from *Combined Financial Statements*, various issues, published by the Federal Home Loan Bank Board. For the 1984-89 period, the data were obtained from a data base maintained by the staff of the Board of Governors of the Federal Reserve System. This data base, in turn, was obtained from the Federal Home Loan Bank Board and consists of quarterly balance sheet and income statement data on individual thrifts.

In using this data base to arrive at the various ratios used in the article, the ratios were first calculated for each year. In arriving at the yearly ratios, income statement items were summed across the four quarters of the year, while balance sheet items were averaged for the four quarters. The resulting totals were then

used to calculate the various ratios. For example, to obtain ROA for the Tenth District for 1984, net income reported by district thrifts for each of the four quarters in 1984 was summed to arrive at the district net income for the year. Then, the assets were summed across the four quarters and divided by four to arrive at average district assets for 1984. Finally, district net income was divided by district assets to arrive at the district ROA for the year. To obtain multiyear ratios, the yearly ratios were averaged. In some cases, ratios for earlier years in a period were not available. In these cases, the multiyear data are based on the years for which data were available.

It should be noted that the data have not been adjusted for mergers and liquidations. In some cases, this results in some distortion in the data. For example, income statement items may not be consistent with balance sheet items for merged institutions for the period during which the merger occurs. An additional source of potential distortion is that the data contain some institutions that were receiving assistance from FSLIC during the period covered.

How Fast Can the U.S. Economy Grow?

By C. Alan Garner

The pace of economic growth is frequently a source of concern to policymakers, economists, and the general public. Economic growth creates business opportunities, generates new jobs, and raises the standard of living. When growth is too slow, the economy loses valuable output of goods and services, and the unemployment rate rises. When growth is too fast, pressures on the labor market and industrial capacity often lead to higher inflation. Thus, either excessively slow growth or excessively rapid growth can have undesirable effects.

How can policymakers know whether economic growth is too slow or too fast? Policymakers cannot base their decisions solely on current economic conditions, such as inflation and unemployment, because there is no

guarantee these conditions will continue into the future. And current policy actions can only change future economic conditions because the effects of policy actions build gradually over time. Rather than basing policy only on current conditions, therefore, policymakers need to ask whether future growth is likely to be faster or slower than the economy's sustainable growth rate. This sustainable rate is the growth rate of potential real output, a measure of the economy's ability to produce goods and services.

However, economists differ on the outlook for potential real output growth over the next several years. Some analysts believe sluggish labor force growth and poor productivity gains will allow potential output to grow only 2 percent annually. Other analysts believe strong investment spending and structural changes in the economy will produce faster potential output growth, possibly as fast as 5 percent annually. Such diverse projections create substantial uncertainty for monetary and fiscal policymakers.

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This article argues that a reasonable working assumption for policymakers is that potential real output will grow between 2 percent and 3 percent annually over the next five years. The first section of this article explains why potential output growth is relevant to policy decisions affecting both short-run economic performance and long-run improvement in the standard of living. The second section shows that increases in the labor force and labor productivity are the major sources of potential output growth, and explains how these factors combined in the 1970s and 1980s to slow potential output growth. Finally, the third section argues these sources are likely to produce potential real output growth in the specified range over the next several years, implying little or no change from the growth experience of the 1970s and 1980s.

I. POTENTIAL OUTPUT GROWTH AND ECONOMIC POLICY

Achieving a growing output of goods and services has always been a major goal of U.S. economic policy. However, economists have learned that growing output is not always consistent with price stability, another major policy goal, because the inflation rate rises when a high level of economic activity strains the nation's productive capacity. The concept of potential real output has been useful to monetary and fiscal policymakers in reconciling the goals of growing output and price stability.

What is potential output?

Potential output is the level of real output at which there is no tendency for the inflation rate to change. When actual real output rises

above potential output, labor markets tighten and less efficient plant and equipment are brought into operation. As a result, production costs rise, leading to higher inflation rates for finished goods and services. Conversely, when actual real output falls below potential output, labor markets become less tight and inflationary pressures moderate.

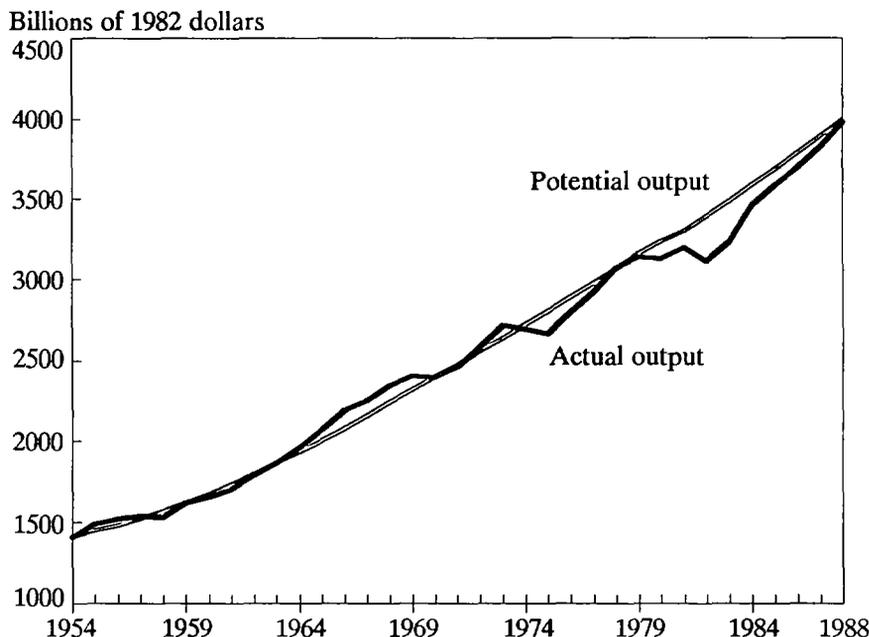
Potential real output has trended upward historically. This has occurred because the nation's ability to produce rises with growth in labor input and improvements in labor productivity. Growth of labor input is best measured by the change in total hours worked but can be approximated by growth in the labor force. Labor productivity refers to the output of goods and services that can be achieved with given labor input. Labor productivity has generally increased throughout U.S. history because of improvements in the quality of labor and increases in the quantity and quality of capital.

Estimates of potential real output by the Congressional Budget Office (CBO) along with actual real output for 1954-88 are presented in Chart 1.¹ Such estimates reveal an important fact about potential real output: cyclical fluctu-

¹ The Congressional Budget Office estimates potential output using Okun's law, a statistical relationship first proposed by Arthur Okun (1962). This procedure estimates potential real output by removing purely cyclical fluctuations from observed output using deviations in the unemployment rate from full employment.

The CBO measures real output by gross domestic product in constant 1982 dollars. Gross domestic product measures output by factors of production located in the United States, whether or not U.S. residents own these factors. Thus, gross domestic product differs from gross national product in that net factor income from abroad is excluded. The CBO methodology for estimating potential output is described in Congressional Budget Office 1987.

CHART 1
Actual and potential real output



Note: Real output is measured by gross domestic product in 1982 dollars.

Sources: Congressional Budget Office, Department of Commerce.

tuations can cause actual real output to differ from potential real output for sustained periods.² Real output exceeded its potential

level in 1964-69 and 1972-73 but fell well below its potential level in 1974-76 and 1980-87. By 1988, the long expansion of the 1980s had brought real output close to its potential level.

² This article assumes that fluctuations in real output can be usefully characterized in terms of a cyclical component and a trend component. Some recent macroeconomic studies—for example, Campbell and Mankiw 1987, and Nelson and Plosser 1982—have challenged this traditional view of the business cycle. However, the traditional view has also received support from such studies as Clark 1987 and Cochrane 1988.

As shown in Chart 2, the CBO estimates indicate the nation's productive capacity has grown more slowly in the 1970s and 1980s than in the 1950s and 1960s. Potential real output grew at a 3.1 percent average annual rate from 1954 to 1988. But the annual growth rate of potential real output fell from 3.7 percent in

CHART 2

Potential output growth, selected period averages



Note: Real output is measured by gross domestic product in 1982 dollars.

Sources: Congressional Budget Office, Department of Commerce.

1960-69, to 3.1 percent in 1970-79, and to 2.7 percent in 1980-88.

Short-run policy considerations

Recent interest in potential output growth has partially been due to short-run concerns about business cycle policies. With the economy operating near its potential output in 1988, policymakers and business forecasters became concerned that further rapid growth might cause inflation to accelerate. But after a gradual

tightening of monetary policy reduced the economic growth rate, concern shifted in mid-1989 to whether growth was too slow. Episodes like this point out the need for a reliable estimate of the growth rate of potential output. Such an estimate would help monetary and fiscal policymakers judge the appropriateness of the strength in economic activity.

Policymakers can use potential output as a guide to adjust monetary and fiscal policy. Potential output is a useful benchmark for policymakers because it is the highest output

that can be achieved without inflation accelerating. Thus, if the economy is initially operating far below potential output, policymakers may ease policy for a while to gain valuable production of goods and services. But as the economy approaches and exceeds potential output, policymakers may tighten policy to keep inflation from accelerating. However, monetary and fiscal policy cannot guarantee the economy will always operate at its potential output because economic growth also depends on a wide range of factors that U.S. policymakers cannot control, such as a change in world oil prices or in the economic policies of foreign governments.

Reliable estimates of the growth rate of potential output are also useful to monetary policymakers in setting monetary growth ranges that are consistent with sustainable growth and price stability. The Federal Reserve currently sets growth ranges for the M2 and M3 measures of the money supply. To set money growth ranges that will be consistent with price stability, policymakers must adopt growth ranges that allow total spending to grow at the same rate as potential output of goods and services, thereby avoiding excessive demand that would bid up product prices and wage rates. In recent years, however, money growth rates have not always been related dependably to the growth rate of total spending. Thus, policymakers have found it necessary to monitor a wide range of other economic information, including interest rates, exchange rates, business activity, and inflation.³

³ Partly because the monetary aggregates have not been related as closely to economic activity as in the past, some economists have argued that policymakers should stabilize

Long-run policy considerations

Recent interest in potential output growth has also been due to a growing concern about long-run policies to improve the standard of living. Achieving potential output growth is necessary if Americans are to enjoy a rising living standard in the future. Because the living standard can be measured by real output per person, potential real output must grow faster than the population in order for living standards to improve. The slowdown of potential output growth in the 1970s and 1980s did not reduce the U.S. living standard but did slow its rate of improvement. As a result, some observers have asked whether economic policies should be changed to increase the nation's productive capacity (Garner 1988).

Policy proposals to improve the living standard focus on government taxation and spending, regulatory policies, and institutional reforms. Monetary policy cannot raise the standard of living over the long run because monetary policy has only short-run effects on real output. But various tax and spending policies could permanently raise potential real output per person. For example, reducing the large federal budget deficit would make more domestic savings available for private investment in plant and equipment. Reducing the

the growth rate of nominal GNP, GNP measured in current-dollar terms. Knowing the growth rate of potential output would be useful to advocates of this approach. For a nominal GNP target to be consistent with price stability, total spending must grow at the same rate as potential real output so that additional demand for goods and services is promptly met by additional production without creating inflationary pressures. Thus, the estimated growth rate of potential real output ultimately would determine the target for nominal GNP growth. For a more detailed analysis of nominal GNP targeting, see Kahn 1988.

budget deficit would also improve the U.S. trade deficit, thereby encouraging domestic firms to expand their productive capacities. And cuts in the tax rate on interest income and corporate profits might provide greater incentives for domestic saving, also making more resources available to increase private investment and, therefore, potential real output.

In summary, recent interest in the growth rate of potential output has been motivated by both short-run policy concerns about the business cycle and long-run policy concerns about the living standard.

II. SOURCES OF POTENTIAL OUTPUT GROWTH

To provide policymakers with useful estimates of potential output, economists must examine the sources of real output growth. These sources became a major policy issue in the 1970s and 1980s because of the slowdown in potential output growth, which occurred not only in the United States but also in other industrial countries (Maddison 1987). Economists still disagree to some extent about the explanation for this worldwide slowdown in growth. But economists agree that increases in the labor force and improvements in productivity are the primary sources of potential output growth.

Analyzing economic growth

A useful way of analyzing economic growth is to determine the contributions from changes in the quantity of labor and changes in labor productivity. Growth of labor input primarily reflects growth in the labor force, the number of people who are either employed or

seeking employment. However, labor productivity growth reflects various factors.

Labor productivity grows because of improvements in the quality of labor, increases in the amount of capital, and improvements in the quality of capital.⁴ An increase in the quantity of capital goods raises potential real output because workers are more productive when they have additional equipment and structures with which to work.⁵ Increases in the quality of labor and capital typically reflect improvements in knowledge about how to produce and distribute goods and services.

⁴ The effect of these factors on real output can be seen from the equation

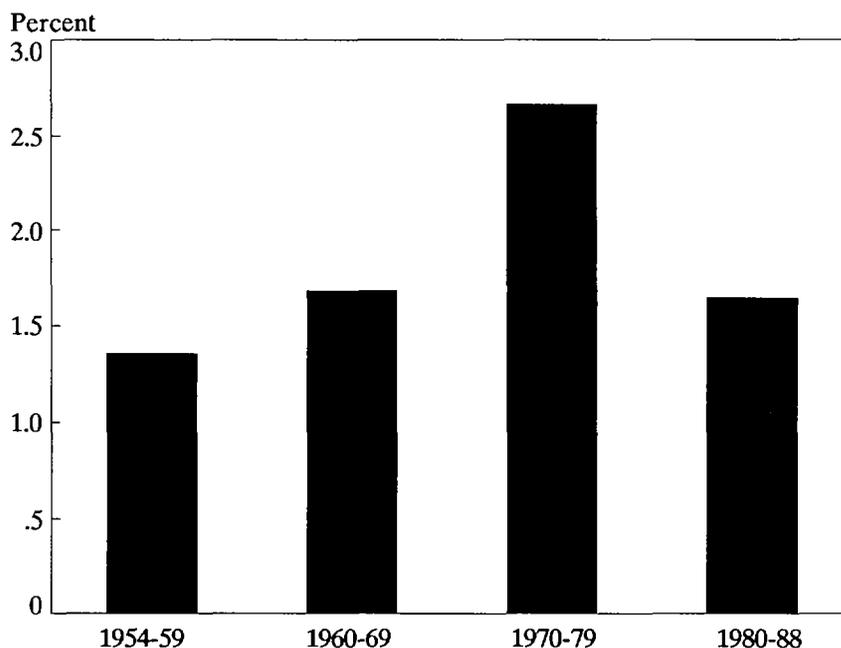
$$Y = L (E/L) (K/E) (Y/K),$$

where Y is real output, L is labor hours, E is labor input in units of constant efficiency, and K is the capital stock. L and E differ because labor hours is an imperfect measure of labor input. For the same number of hours, a worker's true labor input could differ depending on the worker's skill, training, and effort. L is the usual measure of labor input because efficiency measures of labor input are not readily available. Such efficiency measures have been constructed in some academic studies, however. The ratio K/E reflects the amount of capital per efficiency unit of labor. The ratios E/L and Y/K reflect the quality of labor and the quality of capital, respectively.

Although this decomposition is a useful way of organizing a discussion of the sources of growth, some factors may affect more than one of these terms. For example, some kinds of technological change may improve both the quality of labor and the quality of capital. In addition, new technology is sometimes embodied in new capital goods, thus requiring higher investment spending.

⁵ Another framework for analyzing economic growth, known as growth accounting, includes an explicit measure of capital input. Thus, growth accounting treats capital and labor symmetrically as sources of output growth. Other influences on potential output growth are then viewed as increasing total factor productivity, the productivity of a composite unit of capital and labor. Applications of growth accounting include Denison 1985 and Maddison 1987. Some studies, such as Rasche and Tatom 1977, also treat energy as a separate factor of production.

CHART 3
Labor force growth, selected period averages



Source: Bureau of Labor Statistics.

Growth in the quantity of labor

A primary source of U.S. potential output growth in recent years has been expansion of the labor force. Chart 3 shows the annual growth rate of the civilian labor force from 1954 to 1988. The labor force grew at a strong 2.7 percent annual rate in the 1970s—the fastest in any decade since the 1900s—before declining to a 1.7 percent rate in the 1980s (Caton 1989).

Labor force growth during this period

reflected two major factors: the maturing of the postwar baby-boom generation and greater labor force participation by women. Although the baby-boom generation began entering the labor force in the late 1960s, the peak effect occurred in the 1970s. However, the maturing of the baby-boom generation continued to swell the labor force into the 1980s. In addition, women entered the labor force in growing numbers in the 1970s and 1980s. The percentage of women in the civilian labor force increased from 43 percent in 1970 to 57 per-

cent in 1988.⁶

Growth of labor productivity

The strength of labor force growth in the 1970s and early 1980s was largely offset, however, by sluggish growth of labor productivity. The poor performance of labor productivity cannot be blamed entirely on any one factor but, instead, reflects adverse developments in each of the major sources of productivity growth.

Changes in labor quality. Slower improvements in labor quality may have contributed to the sluggish productivity growth of the 1970s and early 1980s. Labor quality depends on both the educational level and experience level of workers. To some extent, poor productivity growth in recent years may have reflected a declining experience level in the U.S. labor force. Increasing numbers of baby boomers and females entered the work force in the 1970s and 1980s. Such workers are less experienced than veteran workers and, therefore, tend to be less productive. Some observers have argued that educational attainment has also declined in recent years, dampening worker productivity.⁷

Growth in the quantity of capital. Weaker growth in the quantity of capital may also have

contributed to the slowdown in productivity growth. Workers are generally more productive when they have a greater quantity of equipment and structures with which to accomplish their tasks. The total quantity of business equipment and structures at a given point in time is called the capital stock. Thus, an increase in the capital stock per worker raises potential real output of goods and services. But the capital stock can increase only if net investment—the difference between total investment spending and the depreciation of existing capital goods—is positive.

Sluggish net investment spending has probably been an important cause of the slowdowns in productivity growth and potential real output growth. Chart 4 shows that real net investment slowed in the 1970s and slowed even more sharply in the 1980s. The slower growth of net investment spending coincides roughly with the slowdown of potential real output growth in the 1970s and 1980s.⁸ In addition, investment in the United States has been relatively weak compared with other industrial countries. Cross-country comparisons of economic growth suggest that countries with strong investment spending also have strong growth rates of potential real output. For example, Hatsoopoulos, Krugman, and Summers (1988) found Japan's high growth rates were partially due to the country's high rate of investment per worker.

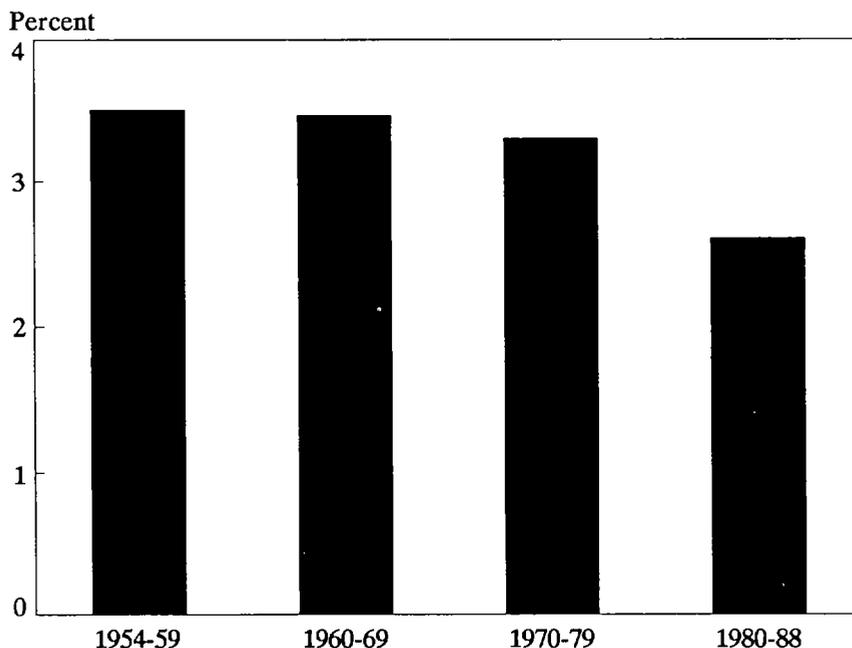
⁶ Female labor force participation has increased throughout the postwar period. The effect of higher female participation has been offset to some degree by a decline in male labor force participation, reflecting a trend toward earlier retirement. In addition, a decline in the average workweek slightly reduced the growth rate of total labor hours.

⁷ Denison 1985 discussed the contribution of education to economic growth and computed an education index for the business sector. However, similar indexes are not available for other sectors of the economy.

⁸ Gross investment, total investment spending without subtracting depreciation, has been more stable over time. Some economists argue that the ratio of gross investment to GNP gives a more accurate picture of investment trends because depreciation is difficult to measure. However, Faust (1989) found the conclusion that investment has been weak in the 1980s would not be overturned even if there are large errors in measuring depreciation.

CHART 4

Net investment as a percent of GNP, selected period averages



Note: The chart shows net nonresidential fixed investment as a percent of GNP. Net investment and GNP are measured in 1982 dollars.

Source: Department of Commerce.

The weak growth of U.S. real net investment in recent years reflects a variety of causes. The severe recession in the early 1980s and strong import competition in the mid-1980s discouraged investment in new plant and equipment by U.S. manufacturers. Moreover, a low national saving rate and strong credit demands have kept real interest rates, interest rates adjusted for expected inflation, high by historical standards. Some research also suggests the United States has had relatively high taxes on the income from capital, thereby reducing after-tax returns and thus the incentive to invest in

plant and equipment.⁹

Another possible explanation for the slowdowns of productivity growth and potential output growth in the 1970s and early 1980s is that a large part of net investment in this period may not have actually increased the nation's productive capacity. For example, investment in pollu-

⁹ The arguments that the U.S. tax system discourages saving and investment are summarized in Hatsopoulos, Krugman, and Summers 1988. A cross-country comparison of capital income taxes by King and Fullerton (1984) found the United States had high taxes on the manufacturing sector.

tion control equipment was included with fixed investment in the government statistics but did not directly increase the capacity to produce goods and services that are counted in GNP. In addition, Baily (1981) argued that the large increases in oil prices in the 1970s made much of the existing U.S. capital stock obsolete. Some of the measured net investment in the 1970s and early 1980s may, therefore, have gone to replace obsolete equipment rather than increase the capital stock.

Reduced government outlays on roads, airports, and other infrastructure projects also may have slowed the growth of labor productivity and potential real output in the 1970s and 1980s. Capital goods owned by the government often provide services to private firms and households, thereby increasing the efficiency and potential real output of the private sector. For example, government expenditures on a new road reduce transportation delays, increasing the productivity of business travelers and speeding the delivery of finished products and spare parts. However, public works outlays have declined from around 2.3 percent of GNP to around 1.0 percent over the past two decades (Koretz 1989).¹⁰ Thus, both government and private investment have been relatively sluggish in recent years and may have contributed to the slower growth of labor productivity in the 1970s and early 1980s.

Changes in the quality of capital. Technological progress can improve the quality of capital goods and thereby increase labor productivity even when the quantity of capital is unchanged. Scientific discoveries and inven-

¹⁰ Aschauer 1988 provided statistical evidence that an increase in government infrastructure investment would raise private sector productivity.

tions sometimes transform basic production processes or create new kinds of goods and services. For example, semiconductor technology spawned new industries and revolutionized many existing products. But besides such major technological breakthroughs, labor productivity also benefits from a stream of lesser innovations, such as small improvements in machinery design and in the organization of the workplace. Although some innovations require investment in new plant and equipment, others—for example, a new agricultural chemical—may boost productivity without substantial investment spending.

A slowdown in the pace of technological innovation in the 1970s may have reduced productivity growth and, thus, potential output growth in the 1970s and early 1980s. Research and development expenditures peaked as a percentage of real GNP in the mid-1960s and declined through much of the 1970s. Such a decline would be expected to reduce productivity growth with a time lag because several years may be necessary to incorporate new technologies into the production process. Moreover, the effectiveness of industrial research and development spending may have declined during this period, with the result that a given amount of research and development expenditures produced fewer or less important innovations.¹¹

¹¹ Some economists argue that the decline in research and development spending probably had little effect on productivity growth, since the spending declines were mostly in defense and space research rather than private industrial research. Empirical estimates of the effect of research and development spending on productivity growth vary substantially. For a survey of studies on this issue, see Wolff 1985. Evidence supporting a decline in the effectiveness of research and development spending can be found in Baily and Chakrabarti 1988, and Englander, Evenson, and Hanazaki 1988.

In summary, potential real output grows because of increases in the quantity of labor and improvements in labor productivity. Labor productivity can improve because of a higher quality of labor, more capital per worker, or a higher quality of capital. The strong expansion of the labor force in the 1970s and early 1980s was a major source of potential output growth. However, poor labor productivity gains caused potential output growth to slow during this period.

III. PROJECTIONS OF POTENTIAL OUTPUT GROWTH

Policymakers need projections of potential real output growth in order to put the economy on an appropriate growth path. But future potential output growth is uncertain because unexpected changes in the size of the labor force and in labor productivity can alter the nation's future productive capacity. For example, an unexpected increase in taxes could reduce the profitability of net investment spending and thus slow future growth of labor productivity. For policy planning purposes, a useful projection period for potential output might be about five years—long enough to include most foreseeable effects of current policy actions yet short enough to keep other sources of uncertainty within reasonable bounds. Policymakers and their staffs, therefore, must anticipate changes in the underlying sources of growth to produce reliable projections of potential output.

Factors affecting future growth

Over the next five years, the major sources of potential output growth are likely to have somewhat different effects than in the 1970s and

early 1980s. The growth of labor input is expected to slow because of demographic factors, but growth of labor productivity may improve somewhat.

Slower growth of the labor force will probably reduce potential real output growth over the next five years. Fewer young people will be reaching working age in this period because the baby boom was followed by a sharp decline in fertility rates in the late 1960s and early 1970s.¹² Thus, about 3.2 million people will turn 18 years of age in 1994, down from 4.3 million people in 1979. In addition, the labor force participation rate of women is unlikely to grow as fast in coming years as in the 1970s and 1980s. For many age groups, the participation rate of women is already approaching the participation rate of men. As a result, labor input—a major source of potential output growth in the recent past—will probably grow more slowly over the next five years.

Stronger growth of capital input, however, may boost labor productivity and potential output growth over the next five years. Net investment spending has recovered recently because the improvement in the U.S. trade balance has raised industrial output and capacity utilization. As a result, a larger capital stock will be available to produce real goods and services. In addition, the growth of capital input may increase because of a shift in the composition of business investment. In recent years, firms have been spending relatively more on producer durable equipment, such as computers and trucks, and relatively less on industrial struc-

¹² The number of births per thousand females in the 15-44 age bracket fell from 117.8 in 1960 to 87.1 in 1970 and 66.1 in 1975.

tures, such as factories and warehouses. The former provide a larger immediate input of capital services per dollar invested.¹³ And, finally, capital input growth may be boosted by a higher saving rate, which could arise if the maturing baby-boom generation begins to save more in preparation for retirement.¹⁴

Potential real output growth also may benefit from other factors affecting labor productivity growth. For example, as the baby-boom generation ages, the average experience level of the U.S. work force will rise, possibly increasing labor productivity.¹⁵ In addition, the competitive pressures from imported goods and a wave of mergers and acquisitions are causing U.S. industry to restructure and become more efficient. Increased use of computers in design and manufacturing could also increase productivity growth. And the apparent decline in the effectiveness of research and development spending in the 1970s may have been a temporary phenomenon that will be reversed in the

future. Thus, there is some basis for expecting a recovery in productivity growth in the years ahead.

However, recent statistics do not offer clear evidence that labor productivity growth will improve over the next five years. Productivity growth in the manufacturing sector has rebounded from the sharp slowdown in the 1970s. Moreover, the United States has recently been one of the leaders in manufacturing productivity growth among the major industrial countries.¹⁶ But productivity growth remains anemic in other large sectors of the economy, such as services and construction. Thus, although some recent developments have been encouraging, the outlook for economy-wide labor productivity growth over the next five years remains uncertain.

Projections through 1994

Monetary and fiscal policymakers need more than just a qualitative discussion of the future sources of growth to do their jobs correctly. For example, monetary policymakers need numerical projections of potential real output if they are to put the economy on an appropriate growth path and establish monetary growth targets consistent with this path. Such projections can be obtained by extrapolating past trends in potential real output or by adding up the anticipated effects of movements in the various sources of output growth.

¹³ For example, a company could spend \$10 million on machinery that yields \$2 million worth of capital services each year but wears out after only a few years. Or the company could spend the same \$10 million on a factory that yields \$1 million worth of capital services each year over a longer period. Either project might be a good investment depending on the circumstances, but the machinery would provide a larger amount of capital services in the years immediately after the investment.

¹⁴ The maturing of the baby-boom generation has not yet had any clear effect on the saving rate, however, and it is possible that any future effects will be small.

¹⁵ Some growth-accounting studies have found that changes in the average age of the work force have relatively little effect on potential real output, however. For example, Denison 1985 concluded that changes in the age-sex composition of the labor force did not contribute much to the productivity slowdown in the 1970s.

¹⁶ According to Neef and Thomas (1988), manufacturing productivity grew at a 3.3 percent annual rate over the 1979-87 period, up substantially from the 1.4 percent annual rate in 1973-79. Moreover, the United States and Japan had about equal average rates of manufacturing productivity growth in the 1984-87 period.

TABLE 1
Projected potential real output growth, 1990-94
 (percent)

<u>Real GDP</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
Congressional Budget Office	2.5	2.4	2.4	2.4	2.4
<u>Real GNP</u>					
Data Resources (DRI)	2.4	2.4	2.3	2.3	2.2
Council of Economic Advisers (CEA)	3.2	3.3	3.2	3.2	3.2
Difference between CEA and DRI projections	0.8	0.9	0.9	0.9	1.0

Note: GDP is gross domestic product. GNP is gross national product. For an explanation of the difference between these two output measures, see footnote 1.

Sources: Congressional Budget Office, Data Resources/McGraw-Hill, 1989 *Economic Report of the President*.

Alternative projections of potential real output growth over the next five years differ substantially. Table 1 presents three alternative projections of potential real output growth over the 1990-94 period.¹⁷ Both the Congressional Budget Office and Data Resources Incorporated (DRI) project that potential real output will grow by slightly less than 2.5 percent annually over the next five years.¹⁸ In contrast, the

Council of Economic Advisers (CEA) under the Reagan administration projected that potential real output would grow by about 3.2 percent annually over this period. Such differences clearly are large enough to be important to policymakers. For example, the difference between the CEA and DRI growth rate projections averages 0.9 percent annually and would result in a 4.6 percent difference in the level of potential real output after five years.

The reasons behind these differences become clearer if the DRI and CEA projections of potential output growth are contrasted in greater detail. The CBO projections will not be considered here because the CBO obtains its numbers by extrapolating recent trends in potential output, making no assumptions about future movements in the underlying sources of growth. Because the remaining two projections

¹⁷ The CBO projections were obtained directly from the Congressional Budget Office. The other projections for potential output growth were taken from Caton 1989 and Council of Economic Advisers 1989.

¹⁸ The CBO projections are for gross domestic product in 1982 dollars. In contrast, the DRI and CEA projections are for gross national product in 1982 dollars. The differing definitions of real output are unlikely to affect the basic facts that the CBO's projections are quite similar to DRI's and quite different from the CEA's.

are derived by somewhat different methods, even the assumptions by DRI and the CEA about underlying sources of growth cannot always be compared precisely. However, a major area of disagreement between the two projections can be identified.

Growth of labor input does not appear to be the major source of disagreement between the DRI and CEA projections. DRI projects that nonfarm labor hours will grow at a 1.3 percent annual rate over the 1990-94 period. In contrast, the CEA projects nonfarm hours will grow at a 1.6 percent annual rate from the third quarter of 1988 to the fourth quarter of 1994. Because these projections are reported over different time periods, it is difficult to compare the figures exactly. However, the labor input projections appear to be relatively close and would account for a small part of the difference between the DRI and CEA potential output projections.

Most of the difference between the DRI and CEA projections is due to a large difference in the anticipated growth rate of labor productivity. DRI projects that output per hour will grow at an average rate of 1.3 percent annually over the 1990-94 period. In contrast, the CEA expects a 2.0 percent average annual change in output per hour. This difference of 0.7 percent annually in labor productivity growth is the primary source of disagreement between the two potential output projections.

The two alternative views about labor productivity growth do not reflect major disagreements about contributing factors. Although the CEA does not provide a numerical breakdown of the sources of productivity growth, a variety of factors are mentioned, including the aging of the baby-boom generation, an increase in the amount of capital per worker, tax reform to

reduce distortions in investment decisions, and government initiatives to encourage education and research. DRI has noted many of the same factors but apparently has assigned them less quantitative significance.

Which set of labor productivity growth projections is more plausible? A reasonable test is how the projected productivity growth compares with historical productivity growth. The CEA projections assume labor productivity growth will return to its average rate over the 1948-81 period. However, it may be more reasonable to assume labor productivity will grow at roughly the same rate as in the recent past rather than an average rate over a long historical period. The next five years will more closely resemble the recent past with respect to such factors as the educational system, the regulatory climate, and technology. By the CEA's own figures, output per hour rose at a 1.4 percent annual rate from the third quarter of 1981 to the third quarter of 1988. Therefore, recent labor productivity growth has been much closer to the DRI assumption than that of the CEA.

The DRI potential output projection thus appears somewhat more plausible than the CEA projection because of a more realistic assumption about labor productivity growth. As noted in the previous section, there are some reasons to expect better productivity performance over the next five years than in the 1970s and early 1980s. However, there is also little reason to expect a dramatic departure from the productivity performance of the mid-to-late 1980s. Such reasoning also casts doubt on the projections of MacReynolds (1988) and others, who expect rapid labor productivity gains to ignite potential output growth of 5 percent or more annually.

How trustworthy are such projections?

Any projection of potential output growth is subject to uncertainty. One reason is that the economy is occasionally hit by unpredictable shocks. Although some of these shocks have only temporary effects on output growth, others might well change potential output growth over a five-year period. A second reason is that many sources of potential output growth are difficult to measure accurately. As a result, economists have imperfect estimates of the historical contributions of these sources to output growth and may even have an incorrect impression of recent changes in these factors.

Because of the uncertainty, policymakers and business planners should think in terms of a likely range of growth rates for potential output. As noted earlier, projections of potential output growth vary from around 2 percent annually to as high as 5 percent annually. But potential output growth exceeding 3 percent annually is unlikely, given the outlook for labor productivity growth. Thus, a reasonable working assumption is that potential real output will grow between 2 percent and 3 percent annually over the next several years. The reasonableness of this assumption is evidenced by the fact that both the DRI and CBO projections lie near the center of this range.

Even though a range from 2 percent to 3 percent may seem fairly wide, average potential output growth over the next five years might be outside these bounds. Potential output growth might average less than 2 percent annually if slower growth of labor input were accompanied by a slump in productivity growth similar to that in the 1970s. Growth might be above 3 percent annually if, instead, the supply-

oriented tax cuts and tax reforms of the 1980s produced much faster growth of labor productivity. However, recent economic performance offers little support for either of these possibilities.

Policymakers can feel reasonably confident that average potential output growth will be between 2 percent and 3 percent annually over the next five years. Such estimates can be useful to monetary policymakers in gauging the sustainability of current economic growth rates and in setting growth ranges for the monetary aggregates. In addition, such estimates can help fiscal policymakers establish long-run policies that will improve the standard of living. But because of the uncertainty, policymakers should monitor actual growth and inflationary pressures to make sure that projections of potential output growth are correct. And policymakers should be prepared to modify their policies if it becomes clear in the future that potential real output growth is substantially weaker or stronger than expected.

IV. CONCLUSION

Projections of potential real output growth can be useful to policymakers because these projections help show when inflation is likely to accelerate or decelerate. But projections of potential real output growth vary primarily because of differing views about the outlook for labor productivity growth. Some of the most optimistic projections of potential output growth assume a high rate of future labor productivity growth that is unlikely to be realized, considering recent moderate productivity gains. A more reasonable working assumption is that potential real output will grow between 2 percent and 3 percent annually over the next five years.

Such a range is consistent with either a continuation of recent labor productivity growth or mild future improvement. However, because such projections are always subject to uncertainty, policymakers should consider other real and financial indicators when assessing the strength of economic growth and inflationary

pressures. And, looking further ahead, policymakers will need to adopt policies—for example, balancing the federal budget and increasing incentives to save—that enhance labor productivity so as to ensure an adequate future standard of living.

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The New Risk-Based Capital Plan For Commercial Banks

By William R. Keeton

Since the beginning of the decade, banks have been required to satisfy minimum capital-asset ratios independent of risk. While these capital requirements have boosted capital-asset ratios, they have failed to prevent an increase in the overall risk of the banking industry—an increase that some observers blame on the stimulus to risk-taking from fixed-rate deposit insurance. Hoping to gain better control over bank risk-taking, regulators have decided to tie banks' capital requirements to their estimated risk while retaining an absolute floor on capital. The new capital standards will be phased in gradually, taking full effect at the end of 1992.

Will the new plan control risk in the banking industry? Some critics argue the plan will

not raise capital requirements enough for risky banks. Others claim the floor on capital will prevent the plan from reducing capital requirements enough for safe banks. Still others argue that banks may not respond as intended to the change in their capital requirements—specifically, banks facing higher requirements may take actions that increase their risk instead of reducing it, while banks facing lower requirements may fail to respond at all.

This article explains the new plan and evaluates its likely effectiveness in controlling risk. The article concludes that the plan will affect a relatively small number of banks, but that these banks are likely to respond in the desired way, improving the regulation of bank risk-taking. The first section gives the historical background of the plan. The second section reviews the key elements of the plan and shows how capital requirements will be determined. The third section estimates the impact of the plan on banks' capital positions and considers banks' likely response to those changes. The

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last section draws on these results to assess the plan's likely effectiveness.

I. HISTORICAL BACKGROUND OF THE NEW PLAN

The current system of capital requirements dates back to the beginning of the decade. Before the 1980s, banks were not required to meet an explicit capital-asset ratio. Instead, regulators used "moral suasion" to induce banks they considered undercapitalized to increase their capital-asset ratios. Although this informal approach to capital regulation worked well for many years, it failed to prevent a gradual decline in bank capital after the 1960s, especially at large banks. Formal capital requirements were imposed in 1981 to reverse that decline.

The current requirements take the form of minimum capital-asset ratios that are independent of risk. At first, requirements varied by size of bank and differed among the three bank regulators—the Federal Reserve, the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC).¹ By 1985, however, the three regulators had agreed to subject all banks to the same requirements, using two measures of capital. The first measure was called "primary" capital and consisted of equity, loan loss reserves, perpetual preferred stock, and mandatory convertible debt. This measure was intended to

reflect a bank's cushion against unforeseen losses, and thus, its protection against failure. The second measure was called "total" capital and included other items that help limit the FDIC's losses in the event of failure—items such as subordinated debt and limited-life preferred stock.² Since 1985, the minimum capital-asset ratios have been 5.5 percent for primary capital and 6.0 percent for total capital. However, a bank can be pressured to exceed these minimums if examiners determine it is unusually risky.

Although the current capital requirements helped reverse the decline in bank capital, they failed to prevent an increase in overall risk in the banking industry. During the 1980s, banks shifted away from assets with little or no default risk, such as Treasury securities, to assets with significant default risk, such as commercial loans. Also, the rate of chargeoffs and delinquencies increased sharply, suggesting that bank loans had become riskier. Finally, over the course of the decade, banks greatly increased their off-balance sheet commitments and guarantees, such as letters of credit, loan commitments, and interest rate and currency swaps. These off-balance sheet instruments were not subject to capital requirements but in

¹ The OCC supervises nationally chartered banks, the Federal Reserve supervises state-chartered banks belonging to the Federal Reserve System, and the FDIC supervises state-chartered banks not belonging to the Federal Reserve System.

² Preferred stock is stock on which dividends must be paid before any dividends on common stock can be paid. Perpetual preferred stock has no maturity date, while limited-life preferred stock does. Mandatory convertible debt is debt that must be converted to common or preferred stock at some future date. Subordinated debt is debt which can be repaid only after the FDIC and uninsured depositors have been paid in full. For further details on the components of primary and secondary capital and the computation of required capital, see Gilbert, Stone, and Trebing 1985.

some cases exposed banks to significant default risk.³

Confronted with these developments, the three regulators began to consider ways of improving the regulation of bank capital. Regulators did not question the need for some form of minimum capital requirement. However, they became convinced that risk would be better controlled by basing each bank's requirement on the riskiness of its activities.

In principle, risk-based capital requirements should improve control over risk-taking in three ways—by reducing risky banks' chances of failing without driving up safe banks' cost of funds, by rewarding banks for shifting to safer activities, and by discouraging risky banks from outgrowing safe banks. Forcing a bank to hold more capital and fewer deposits increases its cushion against losses and reduces its chance of failure. But because deposits have unique transactions features that make them cheaper than equity, forcing a bank to hold more capital also increases its cost of funds. With risk-based requirements, regulators can force risky banks to maintain a greater cushion against losses without forcing safe banks to incur an unnecessarily high cost of funds.⁴ Risk-based requirements can also

³ The increase in asset risk is documented for large banks in Furlong 1988. Furlong also finds that the increase in asset risk more than made up for the increase in capital, raising the risk of failure. Evidence on the growth of off-balance sheet activity can be found in General Accounting Office 1988.

⁴ The transactions advantage of deposits is emphasized in Orgler and Taggart 1983. Some economists dispute this view, arguing that transactions services can be "unbundled" from deposits (Black 1975 and Fischer 1983). However, there are other reasons why deposits may be a cheaper source of funds than equity, making it undesirable to set a high capital

reduce banks' incentive to engage in risky activities by forcing them to hold more capital than they prefer but allowing them to reduce their capital as they shift to safer activities. Finally, even if banks do not shift to safer activities, risk-based requirements can reduce total risk-taking by decreasing risky banks' share of the market. Basing capital requirements on risk raises the cost to risky banks of obtaining new funds and reduces the cost to safe banks, inducing risky banks to grow slower and safe banks to grow faster.

Besides seeking greater control over risk, regulators both here and abroad saw risk-based capital requirements as a way to harmonize capital standards for multinational banks. In international markets, banks subject to loose capital standards had a competitive advantage over banks subject to strict capital standards. Eliminating these differences in capital standards required not only a common definition of capital but also a way of accounting for differences in the riskiness of banks' portfolios.

The new risk-based capital plan took several years to develop.⁵ Regulators in the

requirement for safe banks. For example, equity may have to be raised from outside investors who demand a low share price because they fear that the original owners will manage the bank inefficiently or understate the bank's profits (Jensen and Meckling 1976 and Townsend 1979). Deposits could also be cheaper than equity due to the tax-deductibility of interest. In this case, though, there would be no net gain to society from allowing a safe bank to lower its capital—the reduction in the bank's cost of funds would be offset by a decrease in tax revenues.

⁵ It should be noted that risk-based capital requirements were not an entirely new idea. Before the imposition of formal capital requirements, regulators often used risk-adjusted formulas to evaluate the adequacy of banks' capital. The most complicated of these was the Federal Reserve's ABC (Analyzing Bank Capital) formula, which was developed in the mid-1950s and used for 20 years. For further details, see Crosse and Hempel 1973.

United States and other countries began working on a common set of risk-based requirements in 1986. After lengthy negotiations, a final agreement was reached in June 1988 by the Basle Committee, a group of banking officials from 12 industrial nations meeting under the auspices of the Bank for International Settlements. In early 1989, the Federal Reserve, FDIC, and OCC issued virtually identical plans implementing the agreement, setting deadlines of December 1990 for partial compliance and December 1992 for full compliance. The Basle plan focuses exclusively on credit risk and ignores other forms of risk, such as interest rate risk and liquidity risk. Recognizing these shortcomings in risk measurement, the three U.S. regulators decided to maintain a minimum capital-asset ratio, to ensure that banks with low measured risk but high true risk held enough capital.

II. DESCRIPTION OF THE NEW PLAN

This section describes the new risk-based capital plan in detail. The section first summarizes the key elements of the plan and then shows how a bank's minimum capital requirement is determined.

Key elements of the plan

The new risk-based capital plan contains three key elements—a new definition of eligible capital, a risk-based capital requirement, and a leverage requirement.⁶

⁶ The Federal Reserve and OCC versions of the plan were published in *Federal Register* 1989a and the FDIC version

Definition of capital. An important feature of the plan is that capital is redefined to put greater emphasis on equity and less on loan loss reserves. Two new measures of capital are introduced: a narrow measure that replaces primary capital and a broad measure that replaces the current definition of total capital.

The narrow measure is called Tier 1, or "core," capital and consists primarily of tangible equity—equity net of intangible assets such as goodwill. The main difference between core capital and primary capital is that core capital excludes all loan loss reserves. This change was made because loan loss reserves are often established to cover losses the bank is already expecting, making them unavailable to absorb unexpected losses. Core capital is also more restrictive than primary capital in that it excludes mandatory convertible debt and cumulative perpetual preferred stock.⁷

The broad measure is again called total capital and equals the sum of core capital and "supplementary" capital. The latter measure, also known as Tier 2 capital, includes subordinated debt, loan loss reserves up to 1.25 percent of risk-adjusted assets, and other items counted as primary capital but not core capital. The main difference between the new and current definitions of total capital is that the new definition includes only a limited amount of loan loss reserves, while the current definition includes all loan loss reserves.

in *Federal Register* 1989b. The Federal Reserve also issued a separate version for bank holding companies that differs slightly in the definition of eligible capital.

⁷ Cumulative preferred stock is preferred stock on which unpaid dividends are not "forgiven." In other words, the dividends accumulate over time and must be paid in full before any dividends can be paid on common stock.

Risk-based requirement. The most important innovation in the plan is to tie banks' capital requirements to their estimated credit risk. The first step in the procedure is to allocate assets among four risk categories, each with a different weight designed to reflect the degree of credit risk. The lowest category carries a zero weight and consists of items that have no default risk whatsoever, such as cash, U.S. government securities, and mortgage-backed securities directly guaranteed by the Government National Mortgage Association (Ginnie Mae). The next category has a weight of 20 percent and includes assets believed to have positive but very low default risk—assets such as interbank deposits, general obligation municipal bonds, and mortgage-backed securities guaranteed by the Federal National Mortgage Association (Fannie Mae) or the Federal Home Loan Mortgage Corporation (Freddie Mac). The third category has a weight of 50 percent and includes municipal revenue bonds and first mortgages on homes. The last category carries the maximum weight of 100 percent and lumps together all remaining securities and loans.

A bank's credit risk from off-balance sheet activities is treated in a similar manner. The face value of each off-balance sheet instrument is first converted to an on-balance sheet "credit equivalent" reflecting the bank's credit exposure. For example, a standby letter of credit backing a customer's commercial paper is counted in its entirety, on the grounds that it exposes the bank to the same default risk as a direct loan to the customer. By contrast, only half of the unused portion of a home equity credit line is counted as a credit exposure because the bank does not face any credit risk unless the credit line is drawn down. Once off-balance sheet items have been converted to

credit exposures, they are assigned to one of the four risk categories based on the type of guarantee and the identity of the other party.

The next step in computing a bank's risk-based requirement is to compute "risk-adjusted" assets—the sum of assets and off-balance sheet credit exposures, with each item weighted by the risk weight for its category (0, 20, 50, or 100 percent). A bank that had no off-balance sheet commitments and invested entirely in U.S. government securities would have no risk-adjusted assets because U.S. government securities carry a weight of zero. On the other hand, a bank that had no off-balance sheet credit commitments and invested only in business and consumer loans would have the same risk-adjusted assets as total assets because business and consumer loans carry the maximum weight of 100 percent. Finally, a bank that invested heavily in business and consumer loans and also made substantial off-balance sheet commitments would have more risk-adjusted assets than total assets because off-balance sheet exposures are included in risk-adjusted assets but not in total assets.

In the last step, the bank's risk-based requirement is computed as a percentage of its risk-adjusted assets. Two requirements must be met, corresponding to the two measures of capital—core capital must equal at least 4 percent of risk-adjusted assets, and total capital must equal at least 8 percent of risk-adjusted assets. These minimums do not go into effect until the end of 1992. However, by the end of 1990, banks must satisfy interim ratios of 3.25 percent for core capital and 7.25 percent for total capital.

Leverage requirement. The plan will continue to place a floor on bank capital in the form of a minimum ratio of capital to total assets.

This ratio has come to be known as the "leverage ratio" but is no different in concept from the minimum capital-asset ratios currently in force. Regulators have indicated that the new leverage requirement will be expressed in terms of the new capital definitions and will go into effect in December 1990, the deadline for partial compliance with the risk-based requirements.

As of this writing, regulators have not decided how high the leverage ratio should be or whether there should be separate ratios for core capital and total capital. From the beginning, the OCC has argued for a low leverage requirement and the FDIC for a high requirement. In September, the OCC formally proposed a leverage ratio of 3 percent for core capital, with no separate ratio for total capital.⁸ Because total capital cannot be less than core capital, the OCC proposal would imply an effective floor of 3 percent for total capital. The FDIC did not object to the 3 percent leverage ratio for core capital but argued that there should be a separate and higher leverage ratio for total capital to prevent banks from reducing their capital excessively. The Federal Reserve did not take a position on the issue until late November, when it came out in favor of a 3 percent leverage ratio for core capital alone.⁹

⁸ Passage of the S&L bailout bill in August increased pressure on the OCC to decide on a leverage ratio, due to a provision in the bill that S&Ls meet the same capital standards as national banks, which are supervised by the OCC. A draft of the OCC proposal was issued in early September, and the final proposal was published two months later in *Federal Register* 1989c.

⁹ See Board of Governors 1989. In its statement, the Federal Reserve emphasized that some banks would be expected to operate above the minimum requirements. For further details, see footnote 11.

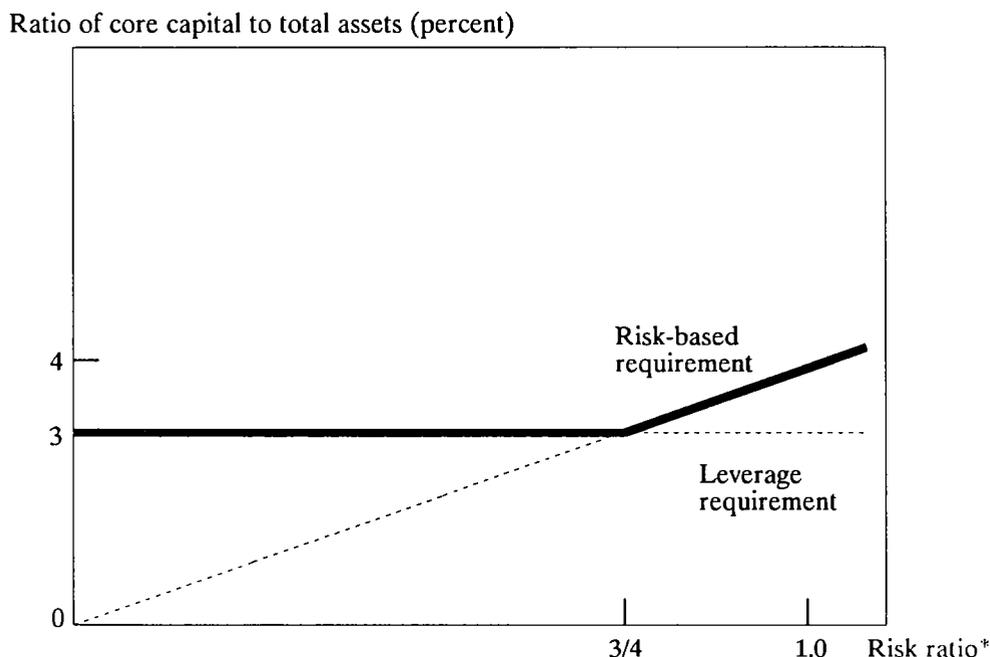
How a bank's capital requirement will be determined

How much capital must a bank hold, given that it faces both a risk-based requirement and a leverage requirement? The leverage requirement will be the relevant constraint for some banks and the risk-based requirement for others. Which requirement is relevant for a particular bank depends on how high its risk-adjusted assets are relative to its total assets.

The interaction of the risk-based requirement and leverage requirement is illustrated in Figure 1 for core capital, the narrower of the two capital measures. The horizontal axis measures the ratio of risk-adjusted assets to total assets. For convenience, this ratio will be called the "risk ratio." The vertical axis measures the ratio of core capital to total assets.

To satisfy the risk-based requirement, banks with higher risk ratios must maintain higher ratios of core capital to total assets. In Figure 1, the risk-based requirement is shown by the upward-sloping line. All banks must maintain a minimum ratio of core capital to risk-adjusted assets of 4 percent. However, the higher a bank's risk ratio, the greater its risk-adjusted assets will be relative to total assets, and thus, the more core capital it will have to hold relative to total assets. As shown in the figure, a bank with a risk ratio of 1.0 must hold core capital equal to 4 percent of total assets. However, a bank that has a risk ratio of zero because it invests entirely in cash and Treasury securities will not have to hold any core capital to satisfy the risk-based requirement. And at the other extreme, a bank that has a risk ratio greater than 1.0 because it has substantial off-balance sheet exposures will have to hold core capital in excess of 4 percent of total assets.

FIGURE 1
Minimum requirement for core capital



*Ratio of risk-adjusted assets to total assets.

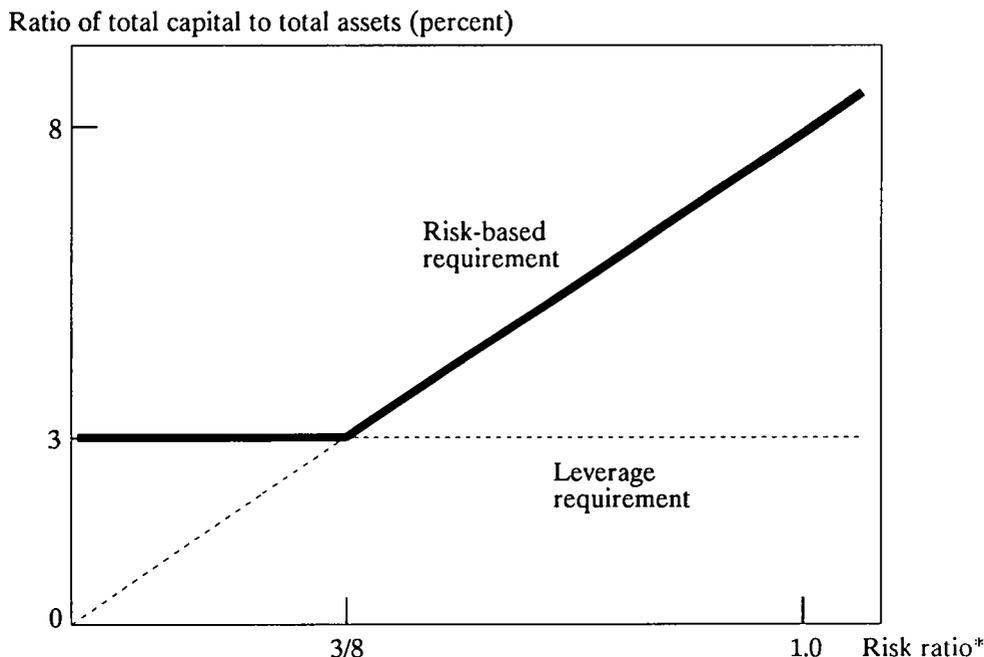
In contrast to the risk-based requirement, the leverage requirement is a constant percentage of total assets. Because the leverage requirement is independent of the risk ratio, it is given by a horizontal line in Figure 1. For purposes of illustration, the leverage ratio is assumed to be 3 percent, as proposed by the OCC and the Federal Reserve.

Because a bank must satisfy both the risk-based requirement and the leverage requirement, its minimum capital requirement will always be the greater of the two. In Figure 1, this means the minimum requirement is given by the heavy kinked line. If the bank has a high

risk ratio (a ratio greater than 3/4), the risk-based requirement will exceed the leverage requirement; therefore, the bank's minimum capital requirement will equal the risk-based requirement. However, if the bank has a low risk ratio (a ratio less than 3/4), the leverage requirement will exceed the risk-based requirement; therefore, the leverage requirement will be the relevant constraint.

Figure 2 shows how a bank's minimum requirement for total capital is determined. The vertical axis of this diagram measures the ratio of total capital to total assets. To satisfy the risk-based requirement, banks must hold total capital

FIGURE 2
Minimum requirement for total capital



*Ratio of risk-adjusted assets to total assets.

equal to at least 8 percent of their risk-adjusted assets. Thus, the minimum ratio of total capital to total assets satisfying the risk-based requirement varies with the risk ratio, equaling 8 percent only for banks with risk ratios of 1.0. For purposes of illustration, Figure 2 assumes the leverage ratio for total capital is 3 percent, as implied by the OCC and Federal Reserve proposals. As in the case of core capital, the bank's minimum requirement for total capital equals the greater of the risk-based requirement and the leverage requirement. Thus, the risk-based requirement is the relevant constraint for banks with high risk ratios (in this case, ratios above

3/8) and the leverage requirement the relevant constraint for banks with low risk ratios (ratios below 3/8).¹⁰

Finally, regulators will continue to pressure a bank to exceed its minimum capital require-

¹⁰ The reason the critical ratio is only half as great for total capital as for core capital is that the leverage requirement is the same while the risk-based requirement is twice as steep. As a percent of total assets, the risk-based requirement equals the risk ratio times the required percentage of risk-adjusted assets—4 percent for core capital and 8 percent for total capital. Thus, the critical risk ratio at which the risk-based requirement just equals the 3 percent leverage requirement is 3/4 for core capital but only 3/8 for total capital.

ment if the bank is judged to be unusually risky. After conducting an on-site examination, for example, regulators could conclude that a bank's management or overall financial condition was sufficiently poor to warrant a level of capital greater than the minimum. Such a bank would be pressured to move above the heavy kinked lines in Figures 1 and 2, so as to reduce its risk of failure.¹¹

III. IMPACT ON BANKS

Since the purpose of risk-based requirements is to raise requirements for some banks and reduce them for others, the plan will naturally affect banks in different ways. This section shows which banks will face higher requirements, which banks will face lower requirements, and how banks will likely respond to the changes in their capital positions.

Overview

The principal factors that will determine how particular banks are affected by the plan are their risk ratio, their reliance on loan loss reserves, and their ability to meet current requirements. The accompanying box illustrates the different ways in which the plan will affect banks' capital positions. Banks that have high risk ratios or rely heavily on loan loss reserves

to meet current capital requirements will suffer a worsening in their capital positions. Such banks will end up with smaller surpluses, bigger shortfalls, or shortfalls instead of surpluses. On the other hand, banks that have low risk ratios and do not rely heavily on loss reserves will gain from the plan, ending up with bigger surpluses, smaller shortfalls, or surpluses instead of shortfalls. Compliance with current requirements also matters because banks that have shown themselves unable to meet current requirements are unlikely to be allowed to take advantage of a reduction in requirements.

Table 1 classifies all banks operating in June 1989 according to whether they meet the current requirements, whether they meet the new requirements, and whether their capital position improves or worsens as a result of the plan.¹² The estimates assume a 3 percent core-capital leverage ratio, with no separate leverage ratio for total capital. The groups are also illustrated in Figure 3. Each point in the diagram corresponds to a different group and indicates the group's average risk ratio and average ratio of total capital to total assets, using the new definition of total capital. In each

¹¹ In November, the Federal Reserve said that the only banks it planned to allow to operate at the minimum were those that were assigned the top CAMEL rating of 1 by examiners and were not experiencing or anticipating significant growth. Under the CAMEL system, banks are rated by examiners from 1 to 5 based on their capital adequacy, asset quality, management, earnings, and liquidity. See Board of Governors 1989.

¹² The estimates are based on data from the June 1989 Reports of Income and Condition, and were provided by John O'Keefe of the FDIC. Because the risk categories and capital components do not exactly match the variables in the Reports of Income and Condition, a number of assumptions had to be made in computing risk-adjusted assets and Tier 1 and Tier 2 capital. These assumptions are available from John O'Keefe on request. All averages reported below are weighted averages, with each bank weighted by its total assets. Also, the definition of total assets used throughout is "adjusted total assets." This is the measure used in the current requirements and equals average book assets over the previous quarter, plus end-of-quarter loan loss reserves, minus disallowed intangibles.

TABLE 1
Classification of banks by capital position
June 1989

	<u>Number of banks</u>	<u>Average total assets¹</u>	<u>Percent of assets</u>
Group 1: Fail both current and new requirements			
a. Bigger capital shortfall ²	289	274	2.5
b. Smaller capital shortfall ²	112	165	.6
Group 2: Satisfy current requirements but fail new requirements	290	3,042	27.6
Group 3: Fail current requirements but satisfy new requirements	95	82	.2
Group 4: Satisfy both current and new requirements			
a. Bigger capital surplus ²	9,630	90	27.1
b. Smaller capital surplus ²	2,528	531	42.0
All banks	12,944	247	100.0

Note: Assumes 3 percent leverage ratio for core capital and no separate leverage ratio for total capital
¹ Millions of dollars, using the definition of total assets on which current requirements are based
² Measured in terms of total capital
Source: FDIC

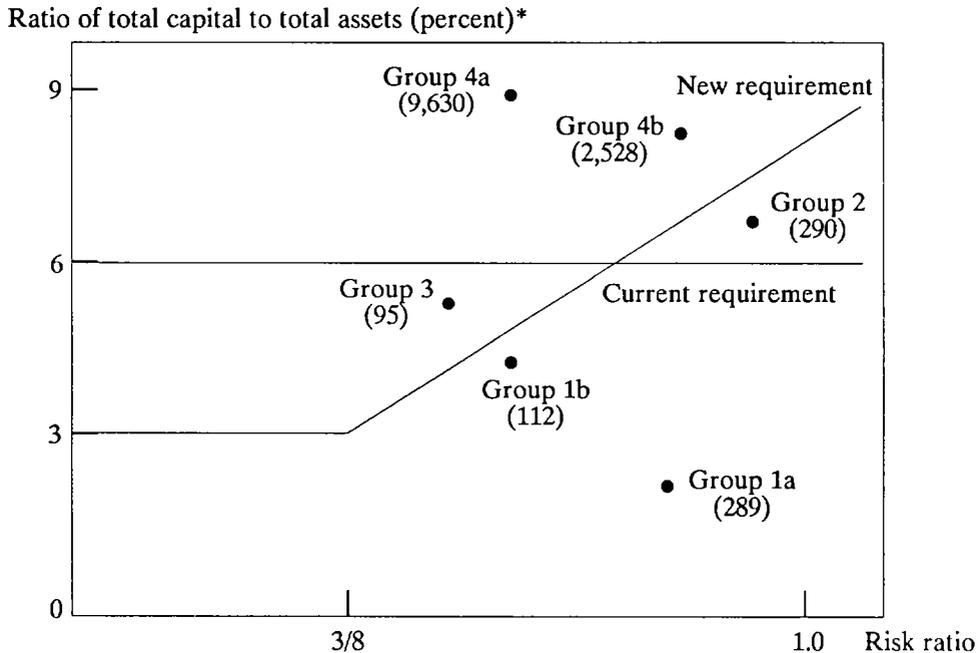
case, the number in parentheses is the number of banks in the group.

Group 1 consists of banks that fail both the current and new requirements. Two subgroups can be identified. The first includes 289 banks that will face a bigger shortfall of total capital under the plan. As shown in Table 1, these banks are slightly above average in size and account for 2.5 percent of all bank assets. The second subgroup includes 112 banks that will

face a smaller shortfall of total capital. These banks are below average in size and hold 0.6 percent of all bank assets.

Group 2 includes 290 banks that satisfy the current requirements but fail the new requirements—banks that will face a shortfall of capital instead of a surplus. Because these banks average over \$3 billion in assets, they account for a relatively large share of all bank assets, 27.6 percent.

FIGURE 3
Group averages



*Using new definition of total capital.

Group 3 consists of 95 banks that fail the current requirements but satisfy the new requirements—banks that will face a surplus of capital instead of a shortfall. Besides being few in number, these banks are small in size. Thus, they account for only 0.2 percent of total bank assets.

Finally, Group 4 consists of banks that satisfy both the current and new requirements. This group, which includes the vast majority of banks, can also be divided into two subgroups. First are 9,630 banks that will face a bigger surplus of total capital. Due to their small average size, these banks account for only 27.1

percent of bank assets. The second subgroup includes 2,528 banks that will face a smaller surplus of total capital. These banks are much larger than banks in the first subgroup and thus account for a bigger share of assets, 42.0 percent.

The rest of this section shows how the plan will affect each of the four groups and considers how banks in each group are likely to respond.¹³

¹³ Although the main question of interest is how the impact of the plan will vary across banks, it is worth noting that capital standards will be tightened in the aggregate, even with

Group 1

The subgroup of 289 banks facing a bigger capital shortfall rely heavily on loan loss reserves to meet current requirements. As shown in Table 2 and Figure 3, the average risk ratio of this subgroup is 0.79, putting their risk-based requirement for total capital only slightly above the current 6 percent requirement.¹⁴ But their reliance on loan loss reserves causes their total capital to fall from 3.6 percent of assets under the current definition to 2.4 percent under the new definition. Thus, the shortfall of total capital rises sharply, from 2.4 percent of assets under the current requirements to 3.9 percent under the new requirements. Reflecting their lack of equity, they also face a shortfall of core capital equal to 1.8 percent of assets.

The subgroup of 112 banks facing a smaller capital shortfall have lower risk ratios and rely less heavily on loan loss reserves. Their average risk ratio is 0.61, yielding a risk-based requirement for total capital well below 6 percent of assets. Also, their total capital falls only slightly under the new definition. Thus, even though they lack sufficient capital to meet the new requirements, their shortfall of total capital falls from 1.4 percent of assets to 0.6 percent of assets. And in contrast to the first subgroup, they face a surplus of core capital of 0.9 percent.

a leverage ratio of only 3 percent. In particular, the surplus of total capital falls from 2.3 percent of total assets under the current requirements to 1.3 percent of total assets under the new requirements.

¹⁴ As a percent of total assets, the average risk-based requirement for the group is $0.79 \times 8.0 = 6.3$ (the average risk ratio times the required percentage of risk-adjusted assets).

TABLE 2
Group 1: Fail both current and new requirements

	(a) Subgroup with bigger shortfall	(b) Subgroup with smaller shortfall
Risk ratio ¹		
On-balance sheet	.69	.57
Off-balance sheet	.10	.04
Total	.79	.61
Ratio of total capital to total assets (percent)		
Current definition	3.6	4.6
New definition	2.4	4.5
Ratio of total-capital surplus to total assets (percent)		
Current requirement	-2.4	-1.4
New requirement	-3.9	-0.6
Ratio of core capital to total assets (percent)	1.5	3.9
Ratio of core-capital surplus to total assets (percent)	-1.8	0.9
¹ Ratio of risk-adjusted assets to total assets		
Source: FDIC		

Although the plan tightens standards for the first subgroup and weakens them for the second, neither subgroup is likely to be much affected by the plan. Most of these banks are financially troubled—either they have recently suffered heavy losses depleting their capital, or

their future prospects are so bleak they cannot raise capital. The banks with a bigger capital shortfall will not find it any easier to meet the new requirements than the current ones. And because they are already under close supervision, the banks with a smaller shortfall may find that the amount they have to boost their capital depends less on the formal requirement than on regulators' judgment as to how much capital they need.

Group 2

As shown in Table 3 and Figure 3, the 290 mostly large banks in Group 2 are distinguished by their high risk ratios.¹⁵ The average risk ratio of 0.94 is higher than for any other group, due partly to the concentration of assets in high-risk categories but mostly to heavy off-balance sheet activity—the off-balance sheet component of 0.22 compares with an average of 0.13 for all banks. The high risk ratio results in a high risk-based requirement. And because banks in Group 2 rely heavily on loan loss reserves, their total capital falls from 7.6 percent of assets to 6.6 percent. Thus, instead of a surplus of total capital of 1.6 percent, they face a shortfall of 0.8 percent. The shortfall does not extend to core capital because core capital accounts for three-fourths of total capital and only half as much core capital is needed to satisfy the requirement.

Banks in Group 2 are likely to respond to the shortfall of total capital partly by reducing

¹⁵ The group includes 248 banks that fail the risk-based requirement but satisfy the leverage ratio, 37 banks that fail both the risk-based requirement and leverage ratio, and 5 banks that satisfy the risk-based requirement but fail the leverage ratio.

TABLE 3
Group 2: Satisfy current requirements but fail new requirements

Risk ratio ¹	
On-balance sheet	.72
Off-balance sheet	.22
Total	.94
Ratio of total capital to total assets (percent)	
Current definition	7.6
New definition	6.6
Ratio of total-capital surplus to total assets (percent)	
Current requirement	1.6
New requirement	-0.8
Ratio of core capital to total assets (percent)	
	4.9
Ratio of core-capital surplus to total assets (percent)	
	1.2
¹ Ratio of risk-adjusted assets to total assets	
Source: FDIC	

their risk ratios. In other words, they will cut back on off-balance activities and shift toward assets in lower risk categories, such as home mortgages and U.S. government securities. If a bank left its portfolio unchanged, it would have to increase its capital-asset ratio to comply with the risk-based requirement. In Figure 3, the bank would have to move up until it reached the kinked line representing the new requirement. At that point, however, the bank's capital-asset ratio would be higher than it preferred. As a result, the bank would have an incentive to reduce its risk ratio and move down

the kinked line to a point closer to its desired capital-asset ratio.

Besides reducing their risk ratios, banks in Group 2 are likely to increase their capital-asset ratios. If a bank did not increase its capital-asset ratio—if the bank simply moved to the left in Figure 3—it would have to reduce its risk ratio well below the level it preferred. Thus, banks are more likely to adjust to the plan by simultaneously reducing their risk ratios and raising their capital-asset ratios than by doing either alone.

The increase in capital-asset ratios will be achieved at least partly through a reduction in assets. Because the higher capital requirement will raise their cost of funds, banks will have an incentive to shed less profitable assets until they can earn enough on remaining assets to cover the increased cost. Thus, instead of raising their capital-asset ratios by substituting capital for deposits, banks are likely to liquidate assets and use the proceeds to reduce deposits and borrowings. Furthermore, since banks will also want to reduce their risk ratios, the assets most likely to be liquidated are those in high-risk categories. For example, banks may sell some of their consumer and business loans, reducing their risk ratios and increasing their capital-asset ratios at the same time.

A final response of banks in Group 2 may be to shift to riskier assets within categories. The increase in capital requirements will raise the effective cost of making loans, forcing banks to increase their loan rates. Large, well-known borrowers may respond to these higher loan rates by seeking credit in the open market.¹⁶ As a result, banks may have to make

a higher proportion of their loans to smaller, lesser-known borrowers. Since these borrowers are likely to be riskier than the borrowers who turn to the open market, the average risk of banks' loan portfolios may increase.

Although such a shift in loan composition cannot be ruled out, the shift is likely to be at least partly offset by the favorable effect of increased capital on banks' incentive to make risky loans. To the extent banks in the second group increase their capital-asset ratios, their shareholders will have more to lose from risky loans that fail to pay off. Thus, even though they may be forced to make more of their loans to lesser-known borrowers, they will have more incentive to screen their loan applicants carefully and reject the ones that are willing to pay high rates but have a high chance of defaulting.

Group 3

The 95 banks in the third group have too little capital to satisfy current requirements but have a low enough risk ratio to exceed the new requirements. As shown in Table 4 and Figure 3, the average risk ratio of 0.52 yields a low risk-based requirement for the group. In addition, the group is little affected by the redefinition of total capital. Thus, instead of facing a shortfall of total capital equal to 0.4 percent of assets, the group will enjoy a surplus equal to 1.2 percent of assets. It does not follow, however, that banks in Group 3 will be allowed to reduce their capital. Since most of the group are financially troubled banks that are already under close regulatory scrutiny, they will probably be pressured by regulators to exceed their formal capital requirements.

¹⁶ Some banks might continue originating loans to their large customers but sell the loans on the open market.

TABLE 4
Group 3: Fail current requirements but satisfy new requirements

Risk ratio ¹	
On-balance sheet	.50
Off-balance sheet	.02
Total	.52
Ratio of total capital to total assets (percent)	
Current definition	5.6
New definition	5.4
Ratio of total-capital surplus to total assets (percent)	
Current requirement	-.4
New requirement	1.2
Ratio of core capital to total assets (percent)	4.7
Ratio of core-capital surplus to total assets (percent)	1.8
¹ Ratio of risk-adjusted assets to total assets	
Source: FDIC	

Group 4

Banks in the last group will be affected very differently by the plan according to whether they face a bigger or smaller surplus of total capital.

Bigger capital surplus. The 9,630 banks in the first subgroup have low risk ratios and rely relatively little on loan loss reserves. As shown in Table 5 and Figure 3, the average risk ratio is only 0.61, reflecting both a high share of assets in low-risk categories and a low level

TABLE 5
Group 4: Satisfy both current and new requirements

	(a) Subgroup with bigger surplus	(b) Subgroup with smaller surplus
Risk ratio ¹		
On-balance sheet	.58	.71
Off-balance sheet	.03	.13
Total	.61	.84
Ratio of total capital to total assets (percent)		
Current definition	9.1	8.6
New definition	9.0	8.1
Ratio of total-capital surplus to total assets (percent)		
Current requirement	3.1	2.6
New requirement	4.0	1.4
Ratio of core capital to total assets (percent)	8.2	6.3
Ratio of core-capital surplus to total assets (percent)	5.2	2.9
¹ Ratio of risk-adjusted assets to total assets		
Source: FDIC		

of off-balance sheet activity. Also, total capital is virtually unchanged by the new definition. The surplus of total capital thus rises from 3.1 percent of assets to 4.0 percent. And thanks to a high equity level, the subgroup enjoys a large

surplus of core capital equal to 5.2 percent of assets.

The only banks that will respond to the lower capital requirement will be those that are currently constrained, in the sense of holding more capital than they would in the absence of any requirement. The banks most likely to be in this position are those that exceed current requirements only slightly—in Figure 3, the ones just above the horizontal line at 6 percent. But as the diagram shows, the subgroup as a whole exceeds current requirements by a wide margin—more than three percentage points. Some banks may maintain surpluses this large because they are worried about falling below the minimum unexpectedly and having to raise capital in a hurry to satisfy regulators. Such banks would react to the plan just like other constrained banks.¹⁷ Given how large the average surplus is, however, it seems likely that many banks are unconstrained, choosing the high capital levels they do, not because they fear falling below the minimum, but because they desire capital for its own sake.¹⁸

The main way constrained banks will respond to the plan is by reducing their capital-

asset ratios. In Figure 3, banks will move downward until they either reach their desired capital-asset ratio or bump up against the kinked line. This adjustment is likely to be achieved at least partly through an increase in assets. Because the reduction in capital requirements will lower their cost of funds, banks will have an increased incentive to expand. Thus, rather than raising more deposits and using all the proceeds to retire equity, they are likely to use some of the proceeds to acquire additional assets.

Some constrained banks may also reduce off-balance sheet exposures and shift to lower risk categories. As Figure 3 shows, any bank that had a risk ratio greater than $3/8$ and reduced its capital-asset ratio the maximum amount would end up constrained by the risk-based requirement. That is, it would bump up against the positively sloped segment of the kinked line. Such a bank would have an incentive to lower its risk ratio so as to reduce its risk-based requirement and move even closer to its desired capital position. Once the risk ratio reached $3/8$, however, the leverage requirement would take over and the bank would have no reason to lower its risk ratio any further.

Smaller surplus of total capital. Compared with the first subgroup, the 2,528 banks in the second subgroup have higher risk ratios and rely more heavily on loan loss reserves. The average risk ratio of 0.84 yields a high risk-based requirement, and the limit on loan loss reserves reduces total capital by half a percentage point. However, the initial level of total capital is high. Thus, the surplus of total capital is reduced but not eliminated, falling from 2.6 percent of assets to 1.4 percent.

Although banks in the second subgroup will not have to respond to the change in

¹⁷ The possibility that capital may serve as a buffer against falling below the minimum is discussed in Keeley 1988 and Wall and Peterson 1987.

¹⁸ Some banks may fear losing intangible assets, such as the bank charter, if they are forced to close (Marcus 1984 and Keeley 1989). If banks in this position also thought they would be unable to raise enough new capital to cover losses and avert failure, they might hold high capital even without any capital requirement. It should also be noted that some banks may hold surplus capital because they are pressured to do so by regulators—for example, because they are considered risky despite their low risk ratios. Such banks would presumably not be allowed to reduce their capital-asset ratios.

requirements, some may do so anyway. Under the plan, the subgroup will enjoy only a moderate surplus of total capital. Some banks may regard their reduced surplus as too small to protect them from falling below the minimum. Such banks will either increase their capital-asset ratios to restore their surpluses or reduce their risk ratios to keep their requirement from going up so much. In Figure 3, they will move up or to the left, farther above the kinked line. However, other banks may not care if their margin of safety is reduced and thus may not respond at all.

IV. EFFECTIVENESS IN CONTROLLING RISK

How successful will the plan be in its ultimate objective of controlling risk? This section concludes that the plan will have significant favorable effects but that these beneficial effects will be limited by the imperfect measurement of capital and risk.

Favorable effects

The most favorable effect of the plan will be to induce a substantial number of risky banks to increase their capital-asset ratios, shift to safer activities, and shrink their assets. Several hundred large banks with high risk ratios will face a capital shortfall as a result of the plan. And at least some other banks with high risk ratios will satisfy the new requirements but find their capital surplus reduced too much for comfort. The majority of these banks probably have high true risk due to the nature of their activities. By inducing them to increase their capital-asset ratios, the plan will limit their chance of failure. And by inducing them to shift toward

safer activities and shrink, the plan will reduce total participation in risky activities by the banking industry.

A second, less certain benefit of the plan will be to allow some safe banks to reduce their capital-asset ratios and grow faster. With a 3 percent leverage ratio for core capital and no separate leverage ratio for total capital, three-fourths of all banks will face a lower capital requirement and increased capital surplus due to their low risk ratios. Many of these banks probably have low true risk. To the extent they are now forced to hold more capital than they prefer, letting them decrease their capital-asset ratio will reduce their cost of funds without appreciably increasing their risk of failure. And by encouraging them to grow faster, the plan will decrease the average risk of the banking industry. It is uncertain, however, how many safe banks will actually reduce their capital-asset ratios and grow more rapidly. Most of the banks already exceed requirements by a wide margin, suggesting they may not respond to the change at all.

Limitations

The idea behind risk-based capital requirements is to make banks with a greater chance of unexpected losses hold a greater cushion against those losses, so as to limit their risk of failure and cost to the FDIC. An ideal risk-based capital plan would therefore include two components—a measure of capital reflecting the bank's true cushion against unexpected losses and a measure of risk reflecting the bank's true chance of experiencing unexpected losses. The new plan is lacking on both counts.

The reason the plan fails to measure capital adequately is that it relies on book-value

accounting. Under book-value accounting, assets and liabilities are recorded at historical cost, and capital is not adjusted for subsequent changes in their true market values. As a result, book capital can understate or overstate a bank's cushion against unexpected losses. If, for example, a bank finances long-term securities with shorter term deposits and interest rates subsequently rise, the market value of the securities will decline more than the market value of the deposits. Book capital will be unchanged, but the bank will be less protected against future losses because its portfolio will be worth less. Similarly, if a bank's loans become delinquent and the bank fails to increase its loan loss reserves enough to cover its higher expected losses, the true value of its loan portfolio will decline but book capital will remain the same. Thus, as before, the bank's book capital will overstate its true protection against failure.¹⁹

One reason the plan fails to measure the risk of unexpected losses accurately is that it focuses exclusively on credit risk. The plan completely ignores interest rate risk—the risk that future changes in interest rates will affect the market value of the bank's assets differently than the market value of its liabilities. Even if the book values of assets and liabilities were adjusted for the effect of past interest rate changes, it would be desirable to make banks that were highly exposed to future interest rate changes hold more capital.

¹⁹ Not surprisingly, empirical studies find that a risk-adjusted capital requirement would perform significantly better if capital were adjusted downward to reflect delinquent or classified loans. See, for example, Belton 1985 and Chessen 1987.

The plan also measures credit risk imperfectly. No distinction is made between loans to highly creditworthy borrowers and loans to borrowers with little credit history or collateral. Also, a highly diversified loan portfolio is treated the same as a portfolio of loans concentrated in one industry or region, even though the concentrated portfolio has greater risk of unexpected default losses.

The fact that banks' capital and risk of unexpected losses are both measured imperfectly means that the risk-based requirement will be too high for some banks and too low for others. Among the banks that will face a capital shortfall are some that should not have to increase their capital or alter their mix of activities—banks whose true likelihood of failure is low. And among the banks that will face an increased capital surplus are some that should not be allowed to decrease their capital—banks whose true likelihood of failure is high.

The leverage requirement will help limit the damage from imperfect measurement of capital and risk, but only by blunting the favorable effects of the plan on risk-taking. On the positive side, a leverage requirement will prevent banks with low risk ratios but high probabilities of failure from reducing their capital-asset ratios excessively. On the negative side, however, even a 3 percent leverage ratio will force some truly safe banks to hold too much capital and will limit banks' incentive to shift to safer activities. With a lower leverage ratio, more banks might specialize in low-risk mortgage lending. And if there were no leverage ratio at all, some banks might give up lending and become deposit-taking specialists, providing transactions services only and investing in government securities with the

same maturity as their deposits.

The only way of resolving the dilemma over the leverage requirement is to move closer to market-value accounting and estimate the risk of unexpected losses more accurately. In announcing the risk-based capital plan, regulators acknowledged the plan's deficiencies in measuring risk and expressed their resolve to remedy those deficiencies over time. As such refinements are made, it may be possible to lower or eliminate the leverage ratio, so as to realize the full benefits of risk-based capital requirements.

V. SUMMARY

The new risk-based capital plan was adopted to stem an increase in the overall risk of the banking industry. In principle, risk-based capital requirements should improve control over risk-taking in three ways—by reducing

risky banks' chances of failing without driving up safe banks' cost of funds, by rewarding banks for shifting to safer activities, and by discouraging risky banks from outgrowing safe banks.

As to be expected, the impact of the plan will vary greatly across banks. Several hundred large banks engaged in risky activities will face a higher capital requirement as a result of the plan. A much larger number of small banks engaged in safe activities will face a lower capital requirement; but because most of these banks already exceed requirements by a substantial margin, it is uncertain how many will respond. On balance, the plan should affect enough banks in the desired way to improve the regulation of bank risk-taking. However, the full benefits of the plan will not be realized until the measurement of capital and risk is improved.

The impact on banks' capital surplus or shortfall

The diagram below shows how the plan will affect the surplus or shortfall of total capital at two hypothetical banks, one with a high risk ratio and the other with a low risk ratio. The diagram is the same as Figure 2, except that it includes a horizontal line at 6 percent representing the current requirement for total capital. For each bank, the x represents the bank's total capital under the current definition and the dot its total capital under the new definition. In both cases, the dot lies below the x , reflecting the tendency for the limit on loan loss reserves to reduce a bank's total capital.

The bank on the right enjoys a surplus of total capital under current requirements (the x lies above the horizontal line corresponding to the current requirement). However, the bank's

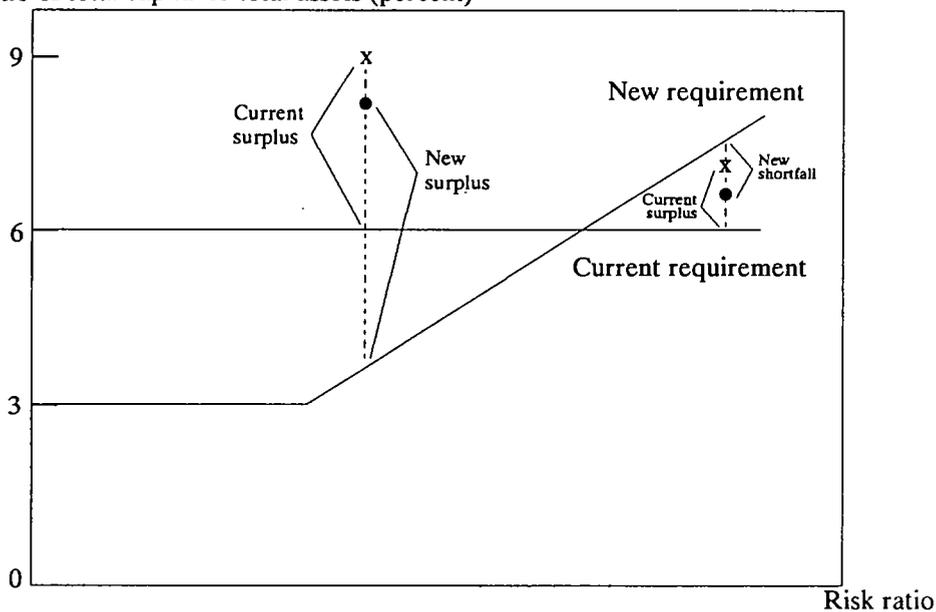
high risk ratio results in a high risk-based requirement. Also, its total capital is reduced by the limit on loan loss reserves. As a result, the bank faces a shortfall of total capital under the new requirements (the dot lies below the kinked line corresponding to the new requirement).

The bank on the left enjoys a surplus of capital under both the current and new requirements. Although its total capital is reduced by the limit on loan loss reserves, it has a low risk-based requirement due to its low risk ratio. As a result, the bank enjoys a bigger surplus under the new requirements than the current requirements (the dot lies farther above the kinked line than the x lies above the horizontal line).

FIGURE A1

Impact on capital positions

Ratio of total capital to total assets (percent)



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