

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.

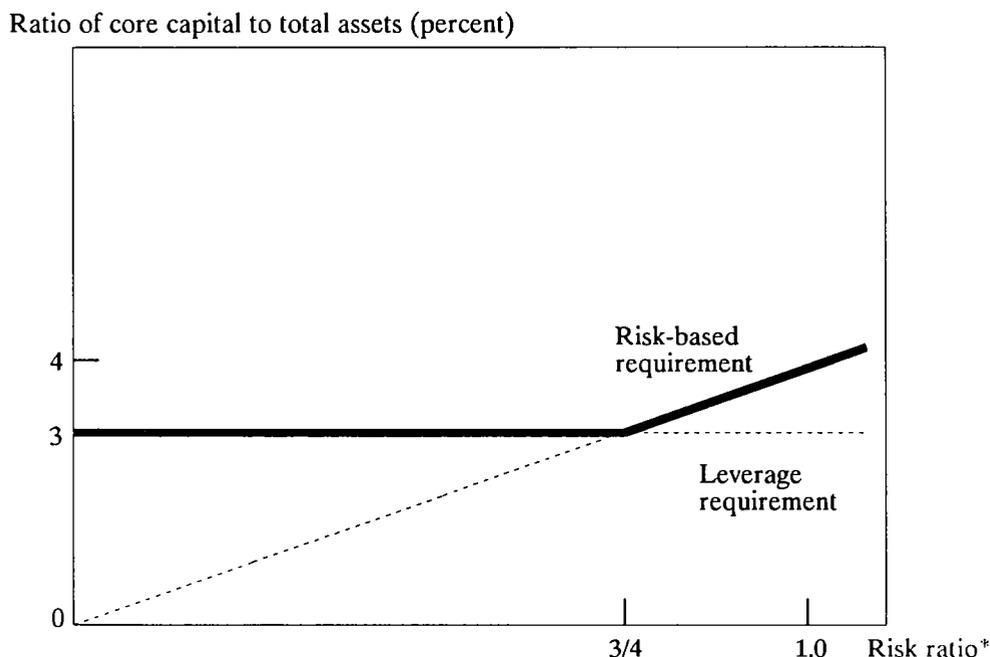
How a bank's capital requirement will be determined

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.

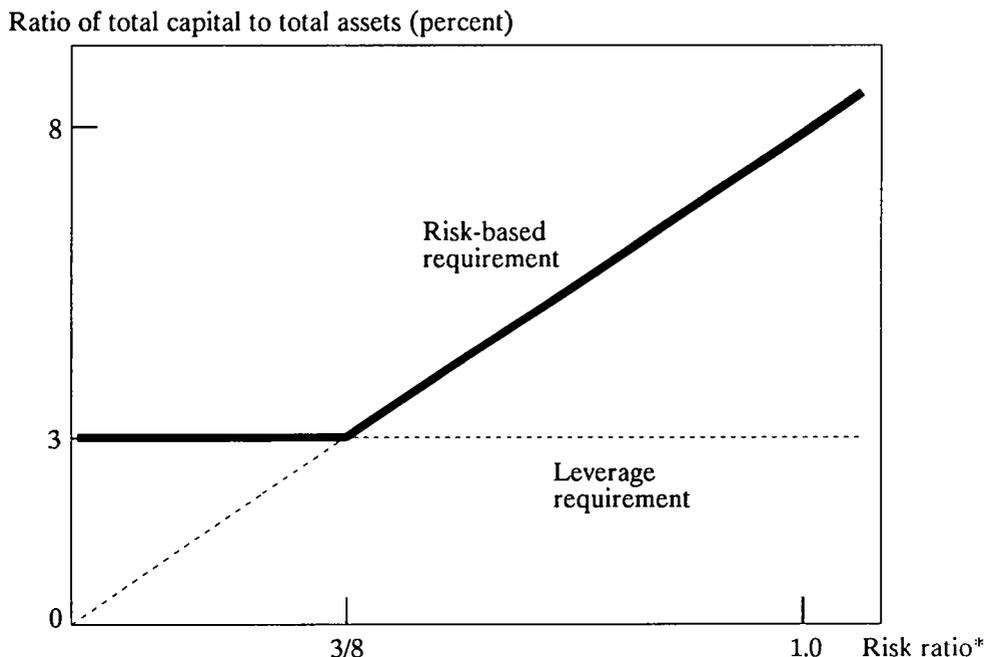
In contrast to the risk-based requirement, the leverage requirement is a constant percentage of total assets. Because the leverage requirement is independent of the risk ratio, it is given by a horizontal line in Figure 1. For purposes of illustration, the leverage ratio is assumed to be 3 percent, as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

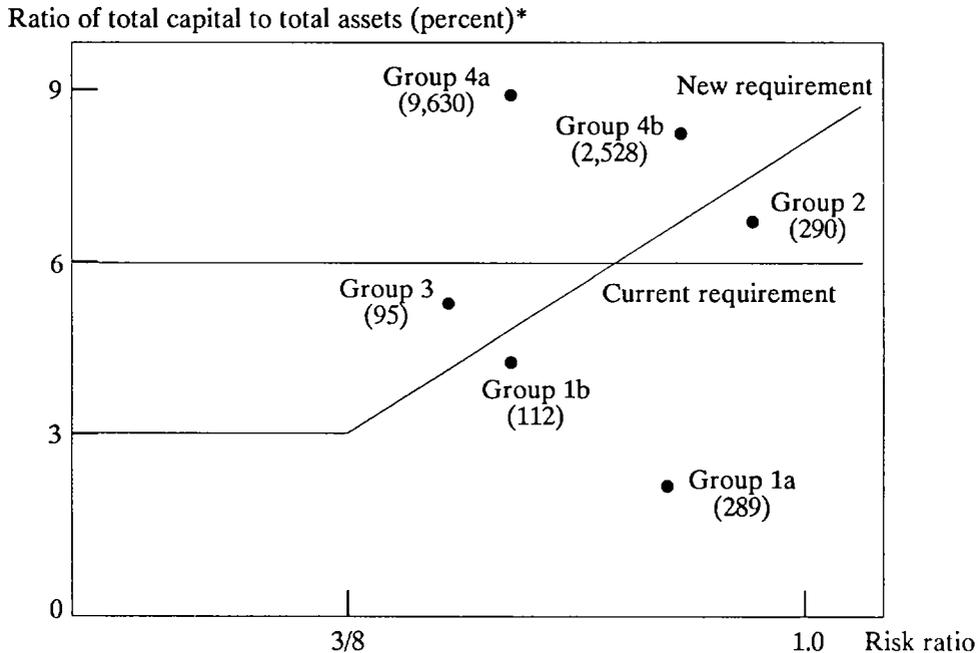
case, the number in parentheses is the number of banks in the group.

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

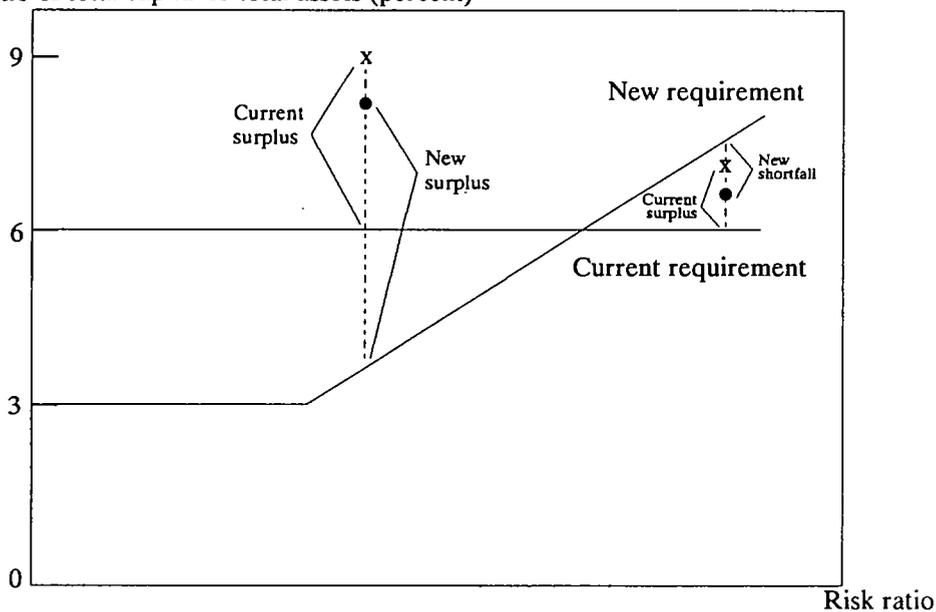
high risk ratio results in a high risk-based requirement. Also, its total capital is reduced by the limit on loan loss reserves. As a result, the bank faces a shortfall of total capital under the new requirements (the dot lies below the kinked line corresponding to the new requirement).

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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