

---

# FRBSF WEEKLY LETTER

Number 94-01, January 7, 1994

## Market Risk and Bank Capital: Part 1

For several years, bank supervisors from major countries have been meeting regularly in Basle, Switzerland, as the Basle Committee on Banking Supervision. There, they discuss and coordinate bank regulatory and supervisory concerns that cut across national boundaries. One major product of this Committee was the 1988 Accord on risk-based capital standards for banks. Although generally successful, a widely recognized defect of those standards is that they reflect only "credit risk," the risk of counterparty default. For example, under the 1988 Basle Accord banks need not hold any capital to protect their investments in long-term government bonds, because such bonds have no default risk. Yet banks may suffer substantial losses on holdings of such bonds if interest rates rise.

In April 1993, the Basle Committee released draft proposals covering so-called "market risks." This broad category of risks encompasses losses that banks suffer due to changes in market-related variables such as interest rates or exchange rates. Currently the proposals are only at a consultative stage. However, with U.S. representatives active on the Basle Committee, it is likely that at least some banks in the United States will be asked to comply with any eventual standards. This *Weekly Letter* is the first of two discussing the new market risk capital proposals. The description of the proposals in this first part highlights the similarities in the key elements. Part 2 discusses whether the proposed standards are likely to work well.

### Three types of market risk

Market risk is defined as the possibility of losses due to price changes that are unrelated to changes in the credit standing of any particular counterparty. The Basle Committee's draft proposals cover three sources of such risk.

The first is risk due to changes in interest rates. The proposed capital standards deal with interest rate risk from traded debt securities—things such as notes and bonds that have well-defined market

prices. As a result, the proposal covers only part of the interest rate risk that banks face; it ignores the effect of changing interest rates on loans and deposits. (The Basle Committee also has proposed a framework for collecting data on interest rate exposure for the whole bank. At present that framework is for information only, and does not incorporate an explicit risk calculation or capital charge.)

The second source of market risk is changes in stock prices. This might seem irrelevant for U.S. banks, since generally they are not permitted to hold stocks. However, the new standards would apply on a consolidated basis to all components of banking firms. In the U.S. and many other countries, some banks are affiliated (for example, through holding companies) with brokerage or investment banking units, for whom equity exposures, and therefore the new capital standards, might be important. In addition, in some countries (such as Germany) banks are permitted to hold equity directly; affiliates of U.S. banks operating in those countries may have substantial holdings of equity shares and other equity-linked instruments.

The third source is exchange rate risk. Some banks have assets and liabilities denominated in foreign currencies. As the prices of those currencies (the exchange rates) change, banks may gain or lose. As with the other market risks, the Basle Committee proposes that banks hold capital to protect against any such losses. Unlike the debt and equity risk proposals, the exchange rate proposal considers all sources of foreign exchange risk, not just the portion due to traded securities.

### Measuring market risk—NAP, GAP, and WAP

For each market risk, the Basle Committee proposes methods for quantifying risk and for calculating the minimum capital to provide adequate protection against any associated losses. The documents describing the proposals are not easy to read; some passages might seem to be written in a kind of "international central

# FRBSF

bankers' code." However, hidden in their murky depths is a single unified conceptual approach to measuring market risk and assessing capital adequacy. This single approach is easiest to explain using foreign exchange risk as an example.

Exchange rate risk arises from loans, securities, deposits, and so on denominated in foreign currencies. The proposal consolidates these exposures into a single hypothetical portfolio for each bank, with one net position in each foreign currency. This constructed portfolio is what would result if all of a bank's business units transferred their foreign currency exposure to the bank's foreign exchange "desk" through internal transactions. Some banks do precisely that, with the desk then responsible for managing the exposure. However, the same principle applies no matter how the risk is actually handled in a particular bank.

Figure 1 provides an example of the resulting consolidated portfolio, based on figures for an actual U.S. bank as of December 1992. Exposures are either "long" or "short." Long positions are those on which the bank gains if the dollar price of the foreign currency rises (the currency appreciates relative to the dollar); longs generally reflect such things as foreign-denominated assets, on which the bank will receive payment in foreign currency. Short positions are the opposite: the bank gains if currencies fall in value. Shorts reflect amounts that the bank owes to counter-

**Figure 1: Typical Bank Foreign Currency Position**  
(in U.S. \$ millions)

<b>Long Positions</b>	
Swiss Franc	56
U.K. Pound	151
Japanese Yen	57
Australian Dollar	10
Total Long	274
<b>Short Positions</b>	
German Mark	17
Canadian Dollar	14
Total Short	31

$$\text{NAP} = 274 - 31 = 243$$

$$\text{GAP} = 274 + 31 = 305$$

$$\text{WAP} = (\text{NAP} \times 50\%) + (\text{GAP} \times 50\%) = 274$$

parties, and depreciation means that the bank can repay with a currency that is worth less in dollar terms. In the example, the bank has total long positions of \$274 million in Swiss Francs, British pounds, Japanese yen, and Australian dollars, and total short positions in German marks and Canadian dollars of \$31 million.

Larger foreign exchange portfolios probably are riskier than smaller portfolios. But what is the relevant measure of size? One possibility is the net value, which I call NAP, for "net aggregate position." NAP is simply the difference between longs and shorts. In the example, NAP is \$243 million (the difference between 274 and 31). Since short positions can finance long positions, NAP reflects the net investment by the bank in its foreign exchange portfolio. A second possible size measure is the gross position, which I refer to as GAP, for "gross aggregate position." GAP is the sum of longs and shorts; in the example, GAP is \$305 million (the sum of 274 and 31).

Regulators in the past have used both GAP and NAP to measure the size—and by implication, the risk—of banks' foreign exchange positions. For example, NAP has been used in Japan, and GAP in Germany. The Basle Committee examined both approaches, and chose yet a third: total long positions or total short positions, whichever is larger. (This method is used by the Bank of England, among others.) Interestingly, the Basle measure of foreign exchange risk is equivalent to a simple fifty-fifty, or equal, weighting of GAP and NAP. This fact can be verified from the example in Figure 1; half the \$305 million gross position plus half the \$243 million net position is equal to \$274 million, which is the total value of the larger long positions.

The result may be called WAP, for "weighted aggregate position." For banks' foreign currency WAP, the Basle Committee implicitly has selected equal 50 percent weights for NAP and GAP, but there is no reason the weights must be equal (and as shown below, other parts of the market risk proposal incorporate different weights). The Basle Committee has proposed a minimum 8 percent ratio of capital to equally weighted WAP for banks' exchange rate risk. In the sequel to this Letter, I will explain why this is a sensible approach.

## The common threads

The Basle Committee applies roughly similar principles for interest rate and stock price risk.

Hypothetical portfolios—one for traded debt and one for equity—are constructed to reflect the bank's total exposure. Whereas the individual positions in the foreign exchange example above were in different currencies, for equity the positions are different issuers, and for traded debt the positions are different maturities. As with foreign exchange, NAP and GAP are computed, weighted, and combined into a single weighted aggregate position; this WAP reflects portfolio size, and is presumed to be related to market risk. Minimum capital for each type of risk is set as a ratio to WAP. These common threads unify the approaches to the three market risks: the use of WAP based on a hypothetical portfolio, and assessment of capital adequacy through a capital ratio applied to WAP. However, the relative weightings for each type of risk differ.

In the equity risk proposal, the Basle Committee places 100 percent weights on each of GAP and NAP, unless the bank's equity portfolio is well diversified; in that case, the weights are 100 percent on NAP and 50 percent on GAP. (This contrasts with the implicit 50 percent weight on each in the foreign exchange proposal.) As with foreign exchange risk, the minimum capital to cover equity market risks is 8 percent of the bank's equity WAP.

The treatment of interest rate risk is much more complicated, but it too turns out to be a version of WAP. A portfolio with net positions in 13 different maturity (or repricing) bands is constructed; the positions are multiplied by duration weights to reflect the interest rate sensitivity of each time band. Long and short positions in the 13 time bands are netted within and across

the bands, with part of the netting then "disallowed" through the application of varying "disallowance" factors. The way the disallowances are calculated, this turns out to be a WAP calculation, in which the amount of the disallowance is related to the weighting: A smaller disallowance factor gives relatively more weight to NAP versus GAP. The weights on NAP and GAP range from 95 and 5 percent, respectively, to 25 and 75 percent. Instead of multiplying the resulting WAP by a capital ratio, the positions in each maturity band are premultiplied by capital charges ranging from 0 to 12.5 percent that reflect their relative volatilities.

#### Summary

This brief overview of the Basle Committee's market risk proposals has glossed over the finer and more devilish details. Two unifying themes of the new market risk proposals have been emphasized: gross and net positions are weighted to measure a bank's exposure to market risks, and minimum capital is a percentage of that weighted exposure. Unfortunately, these common threads may not be clear in the consultative documents; the Basle Committee does not present the approaches as simple variations on the WAP theme.

In the sequel to this *Letter*, I argue that the common threads reflect a sensible approach to market risk, balancing precision and practical simplicity. I also present evidence suggesting that the Basle Committee's approach may work well in practice.

Mark E. Levonian  
Research Officer

