United States General Accounting Office

GAO

Report to the Chairman, Committee on Banking, Housing, and Urban Affairs, U. S. Senate, and the Chairman, Committee on Banking and Financial Services, House of Representatives

July 1998

RISK-BASED CAPITAL

Regulatory and Industry Approaches to Capital and Risk

GAO/GGD-98-153

GAO

United States
General Accounting Office
Washington, D.C. 20548

General Government Division

B-275428

July 20, 1998

The Honorable Alfonse M. D'Amato
Chairman
The Honorable Paul S. Sarbanes
Ranking Minority Member
Committee on Banking, Housing, and Urban Affairs
United States Senate

The Honorable James A. Leach
Chairman
The Honorable John J. LaFalce
Ranking Minority Member
Committee on Banking and Financial Services
House of Representatives

Recent years have seen dynamic changes in the financial services industry. As firms have improved their internal measurement of risk, regulators have responded by reexamining their capital regulations. This report summarizes the results of our self-initiated review of regulatory capital requirements and financial firms' approaches to relating capital to risk. Our review focused on regulatory views of the purpose of capital and current regulatory capital requirements, approaches to risk measurement and capital allocation used today by some of the largest financial firms, and regulatory risk-based capital initiatives.

Risk-based capital, although already being used to some degree by regulators of banks, securities broker-dealers, futures commission merchants, and life insurers, is evolving as advances in financial theory and technology enable firms to better understand, measure, and manage their risk. We identify a number of issues concerning future regulatory risk-based capital initiatives of interest to regulators and financial firms.

We are sending copies of this report to the Acting Comptroller of the Currency; the Chairmen of the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, and the Securities and Exchange Commission; the Chairperson of the Commodity Futures Trading Commission; the Director of the Office of Thrift Supervision; the Secretary of the Treasury; and the President of the National Association of Insurance Commissioners. We will also make copies available to others on request.

This report was prepared under the direction of Lawrence D. Cluff, Assistant Director, Financial Institutions and Markets Issues. Other major contributors are listed in appendix XI. If you have any questions, please call me on (202) 512-8678.

Thomas J. McCool
Director, Financial Institutions
and Markets Issues

Executive Summary

Purpose

Recent years have seen dynamic changes in the financial services industry. Through growth, mergers, and acquisitions, coupled with regulatory reevaluation of acceptable activities, financial institutions in different financial sectors are increasingly competing directly for the same business by offering similar products and undertaking similar activities. Advances in financial theory and technology have enabled financial firms to understand, measure, and manage the financial risks they face in their business activities far more effectively than in the past.

As firms have improved their internal measurement of risk, financial regulators have responded by reexamining their capital regulations that require firms to hold minimum levels of capital as a buffer against unexpected losses. Some regulators have already responded to changes in their industries by developing capital standards that attempt to better correlate required regulatory capital with the actual risks firms face in their activities, while other regulators are considering similar changes.[1]

This report is intended to inform Members of Congress and others of both regulatory capital requirements and financial firms' approaches to risk measurement. More specifically, the objectives of this report are to describe, for the banking, securities, futures, and life insurance sectors, (1) regulatory views on the purpose of capital and current regulatory requirements; (2) the approaches of some large financial firms to risk measurement and capital allocation; and (3) issues in capital regulation and initiatives being considered for changes to regulatory capital requirements.

Background

For financial purposes, capital is generally defined as the long-term funding for a firm that cushions the firm against unexpected losses. Losses are caused by exposure to various risks the financial firm faces in its business activities. Although there are different categorizations of risks, in this report, GAO focuses on a set of risks that banks, securities, futures, and life insurance regulators and firms GAO interviewed most frequently identified as the ones they were most concerned with—credit, market,

[1]The term financial regulators refers here to the following: for banks, the Office of the Comptroller of the Currency, the Federal Reserve System, the Federal Deposit Insurance Corporation, and state banking regulators; for securities broker-dealers, the Securities and Exchange Commission (SEC) and state securities regulators; for futures commission merchants, the Commodity Futures Trading Commission (CFTC); and for insurance companies, state insurance departments. The Office of Thrift Supervision, which regulates thrift institutions, is not a focus of this report because the report does not cover thrifts.

liquidity, operational, and business/event; and, for insurance companies only, insurance/actuarial risk.[2]

Financial regulators set minimum standards for the capital that firms are to hold to protect against these risks. Regulatory capital requirements serve to protect customers or depositors and help ensure the stability of financial markets to which they apply by limiting firm failures and resulting losses to customers, depositors, or other firms; they also can affect the efficiency of the financial system by influencing how firms structure and conduct their business. Minimum capital requirements are a tool regulators use in their monitoring activities to identify when regulatory action against a firm is warranted to protect customers or depositors and financial markets. Moreover, financial regulators recognize that a capital requirement is only one, though an essential one, of a larger set of prudential tools used to help protect customers and ensure the stability of financial markets that they regulate.

Large financial firms increasingly have complex structures, including parents, affiliates, and subsidiaries.[3] These component firms may have one or more financial regulators or, in some cases, no regulator. Banks and their holding companies are regulated on a consolidated basis; but, in the securities, futures, and life insurance sectors, only the SEC-registered broker-dealers, CFTC-registered futures commission merchants, and the underwriters or sellers of insurance are regulated, even though these entities are usually part of a larger holding company.

In the past 20 years, a series of market shocks in combination with advances in modern financial theory and information technology stimulated the use of new techniques to help firms, particularly large, diversified ones, better evaluate risks and returns. They also resulted in

[2]Credit risk arises from the potential that a borrower or counterparty (each party to a financial transaction is a counterparty to the other) will fail to perform on an obligation. Market risk arises from broad movements in prices, such as interest rates, commodity prices, stock prices, or foreign exchange rates. Liquidity risk is the potential that a firm will be unable to meet its obligations as they come due because of an inability to liquidate assets or to obtain adequate funding. Operational risk arises from the potential that inadequate information systems, operational problems, breaches in internal controls, or fraud results in an unexpected loss. Business/event risk is the risk of losses due to events, such as credit rating downgrades, breaches of law or regulation, or factors beyond the control of the firm. Insurance/actuarial risk is the risk that an insurance underwriter covers in exchange for premiums, such as the risk of premature death.

[3]In this report, GAO refers to these as large, diversified financial firms.

the creation of new financial products, particularly derivatives.[4] Derivatives permit financial market participants to better manage risk by transferring the risk from entities less willing or able to manage it to those more willing and able to do so. These advances, as well as certain regulatory changes, also spurred competition among different types of financial firms. As a result, firms in traditionally different financial sectors are competing more directly with one another, providing similar products and, hence, facing similar risks in their activities.

To achieve its objectives, GAO reviewed a wide variety of documents and interviewed federal and state financial regulators; academics; rating agencies; self-regulatory organizations (SRO);[5] consultants; trade associations; and a total of 16 large firms in the commercial banking, securities, futures, and life insurance sectors. GAO developed a set of common questions that was used for its discussions with firms in these sectors.

Results in Brief

Capital requirements differ by financial regulator due to differences in the regulators' purpose. In the view of bank regulators, the primary purposes of bank capital standards are to maintain the safety and soundness of the banking and payment systems and to protect the deposit insurance funds.[6] For securities broker-dealers and futures commission merchants,[7] SEC and CFTC view the primary purposes of capital requirements as protecting customers and other market participants from losses caused by a firm failure and protecting the integrity of their markets. Life insurance company regulators view capital standards for life insurers as a way to

[4]Derivatives are financial products that enable risk to be shifted from one entity to another. The value of the derivative is based on an underlying reference rate, index, or asset, such as stocks, bonds, commodities, interest rates, foreign currency exchange rates, and various market indexes. See Financial Derivatives: Actions Needed to Protect the Financial System (GAO/GGD-94-133, May 18, 1994) and Financial Derivatives: Actions Taken or Proposed Since May 1994 (GAO/GGD/AIMD-97-8, Nov. 1, 1996).

[5]On a day-to-day basis, the securities and futures sectors supervise themselves through SROs. Securities and futures subsidiaries of larger firms belong to SROs, which include stock exchanges, futures exchanges, and recognized securities or futures associations. SROs establish rules to govern member conduct and trading, set qualifications for certain market participants, monitor daily trading activity, examine their members' financial health and compliance with rules, and investigate alleged violations of those rules.

[6]Regarding depository institutions, this report focuses on only commercial banks. It does not focus on thrifts, because their capital rules for credit risk are similar to those of commercial banks and thrifts are generally not engaged in trading activities like those of the other financial firms mentioned above.

[7]Broker-dealers are firms that buy or sell stocks, bonds, and other securities for customers or for themselves. Futures commission merchants are firms that buy and sell futures contracts as agents for customers.

help limit insurance company failures and to protect policy holders/claimants.[8] In each industry, firms that do not meet minimum regulatory capital requirements are subject to regulatory action.

Historically, regulators have also based capital regulation on the traditional risks in each financial sector. Bank capital requirements have emphasized credit risk, which has long been the predominant risk for banks because of their lending activities. Capital requirements for securities broker-dealers and futures commission merchants focused on market risk because of the effect changing market prices have on the value of their traded assets and, potentially, customer accounts. In addition to credit risk, capital requirements for life insurers also focused on actuarial risk, which stems from the unique nature of this sector's traditional business.

Within the past decade, both the banking and life insurance sectors adopted new capital requirements that are specifically designed to be more sensitive to exposure to multiple risks. U.S. banking regulators first adopted quantitative credit risk standards that incorporated a formula designed to reflect different gradations of risk. More recently, they issued rules specifically focused on the market risk in the trading portfolios of large banks which took effect in January 1998. The life insurance industry adopted risk-based rules that are formula-based and require that capital be held against exposure to specific risks faced by life insurers.

Securities broker-dealers and futures commission merchants continue to operate under what are called net capital rules that SEC and CFTC use in order to protect customers and other market participants in the financial markets from losses due to firm failures, not from bad investments. These rules are not specifically called "risk-based" like those developed for banking and insurance. However, they explicitly require regulated firms to adjust their capital holdings to account for risks in their activities.

Unlike regulators, whose focus on the capital levels of firms is driven by regulatory public purposes, firms analyze their use of capital to help ensure that they can achieve their business objectives. Capital is provided by investors and by the firm through retained earnings. It enables financial firms to continue to fund operations, earn profits, and grow. It also provides a cushion to absorb unexpected losses. To attract and keep investors, a firm tries to manage the trade-off between decreasing risks

[8]Regarding the insurance industry, GAO focuses only on life insurance companies because some of their activities are the most similar to banks, securities broker-dealers, and futures commission merchants.

and increasing returns. To better assess this trade-off, a number of large diversified firms are using complex risk measurement techniques. Some of these techniques are applied on a firmwide basis, and some are more quantified and statistical than others. Market and insurance/actuarial risks tend to be most amenable to the use of statistical models. Credit and liquidity risks also have quantifiable elements. Operational and business/event risks are very difficult to quantify and are not as readily measured.

Although many large firms GAO spoke with use the results of their risk measurements to set limits on trading activities, some go farther and use them to allocate capital within the firm. These techniques have limitations; however, firms and regulators believe they significantly improve firms' ability to measure and manage their risks. Financial regulators of large banks, securities broker-dealers, and futures commission merchants are increasingly using or are considering the use of firms' own estimates of risk in setting capital requirements.

Through discussions with industry representatives, regulators, and others and review of pertinent literature, GAO identified three principal issues pertaining to regulatory capital requirements that are important when considering possible future changes to these requirements. First, what are the competitive implications for firms stemming from differences in the capital rules of different financial regulators? Second, do differences between regulators' and firms' measurement of risks, their views of how to manage those risks, and their estimates of needed capital, create incentives to manage risks inappropriately? Third, how will financial regulators administer capital rules when the largest firms' operations are increasingly complex and growing differences exist between large and small firms?

Regulatory agencies and SROs are exploring or have proposed a number of initiatives for modifying or changing current capital requirements in the banking, securities, futures, and life insurance sectors. The banking initiatives under consideration range from allowing banks to use credit ratings to determine risk-based capital assessments for some products to allowing banks to set their own target capital levels and then penalizing them if they do not meet their targets. SEC and CFTC are monitoring and evaluating the Derivatives Policy Group's (DPG) voluntary efforts to relate capital to risks.[9] SEC is exploring the use of a statistical modeling approach

[9]The Derivatives Policy Group comprises the six U.S. securities firms most active in the over-the-counter, as opposed to exchange-traded, derivatives market—CS First Boston, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley, and Salomon Brothers.

to calculate net capital requirements to better reflect market risks in broker-dealer activities. In addition, SEC and CFTC are exploring whether the regulatory structure should be changed for over-the-counter (OTC) derivatives dealers. Life insurance regulators are working to modify the interest rate risk component of their risk-based capital requirements, but they have no current plans to change their formula-based approach to setting capital requirements for other risks.

GAO Analysis

Regulatory Capital Requirements Reflect Differences in Regulatory Purposes of Capital

Although there has been a significant amount of convergence in the activities of the largest U.S. banks, securities broker-dealers, futures commission merchants, and life insurance companies, firms in each of these sectors still have different primary financial regulators with different oversight purposes and different regulatory requirements.

Differences in regulatory capital requirements reflect differences in the regulators' views of the purposes of capital and the different historical risks faced by firms in each of the sectors. Bank capital regulation is focused on the continued operation of the banking system and helps ensure that overall payment services and credit provision to customers will not be disrupted. Securities and futures capital regulations are based on whether the liquidation value of a firm, in the event of a failure, would result in sufficient resources to ensure that the claims of customers and other market participants will be met. State insurance regulators impose capital requirements to try to limit insurance company failures to ensure the long-run viability of insurance companies so that they can meet policyholders' claims in the future.

Financial regulators issue rules to be used in determining minimum capital requirements for the firms they oversee; and in varying ways these rules take into account the risks the firms face. Both the banking and life insurance sectors have requirements that are specifically designed to be more sensitive to exposure to certain risks. Bank regulators from industrialized countries adopted rules for credit risk exposure for internationally active banks in 1988 under the auspices of the Bank for International Settlements. Known as the Basle Accord, the rules were fully

implemented in 1992.[10] U.S. federal bank regulators chose to apply these rules to all U.S. banks. The rules are formula-based and apply risk-weights to reflect different gradations of risk to each asset category. Since 1992, there have been a number of amendments, but the most significant one established risk-based capital requirements to cover market risk in bank securities and derivatives trading portfolios. The rule requires that large banks with a significant amount of market risk use their own internal models to provide a measure of the firm's "value-at-risk."[11] The rule establishes minimum requirements for constructing these models, and it specifies how much capital is to be held against market risk. This requirement, which took effect in January 1998, generally pertains only to the largest 15 to 20 U.S. banks with extensive trading activity.

Both SEC and CFTC use net capital rules to limit excessive leverage by the firms they regulate. In addition, they require regulated entities to calculate similar measures of net capital that represent the expected net value of their assets and liabilities during a liquidation. The net capital rules of both regulators measure capital according to standard accounting practices and then adjust this amount to reflect the liquidity of the firm's assets (called "haircuts") to protect against the possible losses a broker-dealer or futures commission merchant could incur if it were liquidated. SEC requires a broker-dealer to maintain the greater of a specified minimum dollar amount or a specified percentage of net capital in two financial ratios. The first SEC ratio, which is usually used by smaller broker-dealers, is based on the ratio of net capital to aggregate indebtedness—the amount owed to customers and other parties with claims against the broker-dealer. The second SEC minimum ratio, which is usually used by large broker-dealers, is based on the ratio of net capital to customer receivables—funds owed to the broker-dealer. Under this requirement, if the firm is also a futures commission merchant, it is also required to satisfy the CFTC minimum capital requirement, which is based on the ratio of net capital to segregated funds—a measure of funds owed to the customers by the futures commission merchant. As one step toward a more risk-based approach, in February 1997, SEC approved the use of a statistical model to

[10]The Bank for International Settlements was established in 1930 in Basle, Switzerland. Its objectives are to promote cooperation of central banks, to provide additional facilities for international operations, and to act as trustee for international financial settlements. The Basle Accord was formulated by the Basle Committee on Banking Supervision. Its members are representatives of the central banks and supervisory authorities of Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

[11]"Value-at-risk" represents an estimate of the maximum amount by which the value of an institution's position in a risk category could decline due to general market movements during a fixed holding period, measured with a specified confidence interval.

calculate capital requirements for listed options and their hedge positions, effective September 1, 1997.[12]

The National Association of Insurance Commissioners (NAIC)[13] approved risk-based capital rules for life insurance companies in 1992. These rules are designed to measure exposure to four major categories of risk used by the insurance industry—asset, insurance, interest rate, and all other business risk.[14] The approach is risk weighted, reflecting different gradations of risk, and is similar in concept to the banking industry's credit risk requirements. The rules require life insurance companies to hold capital against their exposure to the risks listed above.

Bankers, regulators, and industry and rating agency officials GAO spoke with generally believe the current risk-based capital standards for banks are an improvement over the former requirements, but they still have limitations. For example, many of them believe the standards for credit risk are crude and imprecise because the risk-weights are not adjusted for asset quality within broad categories of assets. Representatives of securities firms and other industry participants GAO spoke with felt that because the current requirements of the net capital rule do not correlate well with actual risks in these firms' activities, this constrains their business decisions and affects both the firms' structure and where they conduct certain activities, such as derivatives. In addition, in their view, the net capital rule does not deal well with risk-reducing strategies such as hedging. Life insurance regulators believe the main strength of the life insurance risk-based capital rules is that the rules enable regulators to close a failing company more quickly and easily than they could in the past. Life insurance industry officials GAO spoke with said that the current requirements do not cover all risks equally well and that some changes are needed.

[12]Positions refers to an investor's stake (buying or selling) in a market or particular security. To hedge is to reduce risk by taking a position that offsets existing or anticipated exposure to a change in market prices. Options are contracts that grant the purchaser the right, but not the obligation, to buy or sell a specific amount of the underlying at a particular price within a specified period. Listed options are exchange-traded.

[13]NAIC is the organization of insurance regulators from the 50 states, the District of Columbia, and the 4 U.S. territories. NAIC's basic purpose is to encourage consistency and cooperation among the various states and territories as they individually regulate the insurance industry.

[14]Asset risks are the risks of asset defaults and decreases in market value. Insurance risks, which are unique to the insurance industry, are the risk of underpricing or unfavorable developments in mortality or morbidity. Interest rate risk for insurance companies is the chance that a change in interest rates will result in an insurer not earning enough return on its investments to meet its interest obligations under its various insurance and annuity contracts. The all other business risk category encompasses risks not included elsewhere in the standards.

Some Large Financial Firms Are Using Complex Risk Measurement Techniques to Manage Risks Internally

For firms, capital is a source of long-term funding and provides a cushion to absorb unexpected losses. For the investors in a firm, the capital they invest is put at risk of loss in order to earn a return. For a firm's managers, maintaining the optimal amount of capital is key to maintaining the firm as an ongoing business. To attract and keep investors, a firm tries to manage the trade-off between decreasing risks and decreasing returns.

Bondholders and stockholders assess this risk-return trade-off differently.[15] Bondholders generally seek to limit a firm's risk because they receive a fixed return (as long as the firm is viable). Stockholders generally are willing to accept a higher level of risk because they can receive a higher return as a result of successful risk-taking by the firm.

Over the last decade or so, advances in measuring risk more precisely have led some of the larger, more complex firms in the financial sectors to use new techniques to better manage their risks. In some cases, these risk measurement techniques fit into a larger risk management system. According to the firms GAO interviewed, such systems are used for a variety of purposes, including to set limits on risk-taking, to allocate internal capital according to the measured risk in firm activities, and to better assess profit performance in relation to the risks being taken.

All of the financial service firms GAO spoke with said that advances in technology have enabled them to refine their risk measurement techniques in recent years. Depending on their own requirements that stem from their business mix, these firms may have computer-based risk measurement systems that feed into firm decisions on risk management. Market risk analysis is often the most statistically sophisticated form of risk analysis these firms do. Some firms in each of these sectors said they use internal models to determine the firm's "value-at-risk," which is a measurement of their market risk exposure. Several of the large securities firms GAO spoke with have developed risk measurement computer systems that monitor the risks being taken in different parts of the firm. Capital is then allocated in accordance with the degree of risk being undertaken by each different part of the firm. In conjunction with the use of value-at-risk models, many of the firms GAO spoke with said they also use stress testing,[16] scenario

[15]The stockholders' returns include dividends out of profits from operations and capital gains based on the market value of their shares. Bondholders' returns, in contrast, are based on interest, repayment of principal, and capital gains on the bond.

[16]Stress tests measure the potential impact of various large market movements on the value of the firm's portfolio. Such tests are a useful tool for identifying exposures that appear to be relatively small in the current environment but that grow more than proportionally with changes in risk factors.

analysis,[17] and backtesting[18] as risk management tools. The results of these tests give an indication of the firm's sensitivity to market movements.

The firms GAO spoke with tend to use a variety of techniques, some more statistical and quantifiable than others, to measure credit risk. Liquidity risks are not modeled on a statistical basis, because this risk generally occurs due to a sudden or unexpected event. Instead, liquidity stresses tend to be analyzed using worst-case scenarios developed by each firm. Models for insurance/actuarial risks are more likely statistical in nature and apply many of the same techniques that are used in modeling market risk. Operational and business/event risks are the most difficult risks to measure due to the lack of data necessary for such measurements. One large bank GAO spoke with said that it is using proxies for these two risks in its quantitative risk measurement techniques. Nonetheless, all firms GAO spoke with agree that they have the least confidence in the results of their operational and business/event risk analyses.

Most of the firms GAO spoke with said they have a firmwide risk management framework in place to identify and control risk, and all of their approaches emphasize the importance of top-level management involvement in risk management in their firms. Most of these firms have risk management committees made up of senior managers of the firms. Although they use advanced risk measurement techniques, they all stressed that management judgment and good internal controls are more important than the risk measurement numbers for effective risk management.

In Response to Issues in Capital Regulation, Some Regulatory Change Is Being Considered in Each Financial Sector

Through discussions with industry representatives, regulatory officials, and others and a review of the pertinent literature, GAO identified and categorized a number of issues that are relevant to possible changes in the regulatory capital requirements. The principal issue in the first category, differences among financial regulators, is that although financial firms that were traditionally in different sectors are increasingly offering similar products and taking on similar risks, differences in capital regulation across their primary regulators may have competitive implications for the firms. Issues in the second category, differences between firms and regulators in their approaches to capital and risk, include the concern that because regulatory capital requirements are not adequately sensitive to the

[17]Scenario analysis generates forward-looking "what-if" simulations for specified changes in market factors that quantify revenue implications of such scenarios for the firm.

[18]Backtesting is used retrospectively to evaluate the accuracy of assumptions by comparing system predictions with actual trading results.

risks inherent in particular products or activities, they may create inappropriate incentives for firms in managing their risk. Another issue is the concern that the increased use by regulators of financial firms' internal estimates of risk to set regulatory capital requirements may be inappropriate, because the firms and regulators have different purposes for capital. Issues in the third category, administrative, include whether it makes sense to apply the same approach to capital regulation to firms of all sizes and degrees of complexity, as well as how the regulators can effectively oversee the increasing use of statistical models for regulatory purposes.

Financial regulators are considering some degree of change to regulatory capital requirements in banking, securities, futures, and life insurance. Some of these changes would make regulatory capital requirements more sensitive to the risks in firm activities, while others would represent more fundamental changes in the regulators' approaches to capital regulation. In November 1997, bank regulators issued proposed revisions to the risk-based capital standards that would use credit ratings from rating agencies and possibly alternative approaches to match the risk-based capital assessments for certain products more closely to a bank's relative risk of loss in asset securitizations.[19] Also, in banking, research is being done into an internal models-based approach for credit risk that could potentially supplement or replace the current formula-based requirements.

The "precommitment" approach, if adopted, would represent a more fundamental change to capital requirements. In this approach, a bank would commit to manage its trading portfolio to limit market risk losses over a subsequent interval to a specified amount. If the bank exceeded its limit, it would face penalties that could range from public disclosure to additional capital requirements or monetary fines.

The New York Clearing House conducted a 1-year pilot test of the precommitment approach that was designed to assist the bank regulators and the participants in evaluating and assessing the usefulness and viability of the approach for regulatory capital purposes. Although views of industry analysts differ on the value of such an approach, the 10 bank and bank holding company pilot participants believe that it is a viable alternative to the internal models approach and that it provides strong incentives for prudent risk management and more efficient capital allocation compared to existing capital standards.

[19]Asset securitization is the process by which loans and other assets are pooled and used as collateral for one or more classes of securities, which are then sold. Securitization provides an efficient mechanism for banks to sell loan assets and thereby to make the loan assets more liquid.

There are a number of new risk-based initiatives for securities and futures firms. Since 1995, under the auspices of DPG, six securities firms have been participating in a program in which they use their own models to calculate their "capital at risk"[20] on their over-the-counter derivative activities and voluntarily report the results to their primary regulators. In December 1997, SEC issued a concept release[21] soliciting comments on how the existing haircut structure could be modified and whether the net capital rule should be amended to allow firms to use statistical models in setting capital requirements for a broker-dealer's proprietary positions. Much of a broker-dealer's OTC derivatives activities are currently conducted in unregulated entities. In order to allow broker-dealers to take better advantage of counterparty netting[22] and to adjust the capital rule to better reflect the risks of OTC derivatives, SEC, in a December 1997 initiative, issued a proposed rule that would create a new class of broker-dealers, called OTC derivatives dealers, whose derivatives business would be subject to modified regulatory capital, margin, and other requirements. Also in December 1997, in order to better match capital charges with actual market risk hedging practices employed by broker-dealers, SEC proposed amendments to the net capital rule that would treat most types of interest rate products as part of a single portfolio and would recognize hedges among a number of instruments. As part of its comprehensive regulatory reform efforts to update its oversight of both exchange and off-exchange markets, CFTC published a concept release in May 1998 on issues relating to the OTC derivatives market.

In 1995, two futures exchanges, which are SROs, informally proposed to CFTC a risk-based capital approach that would base capital requirements on "funds at risk" as opposed to the current "funds required to be segregated" approach.[23] CFTC consulted with the exchanges on the parameters of their risk model and positively received the exchanges' proposals. In November 1997, the exchanges adopted a risk-based capital requirement for their members effective January 1, 1998.

[20]"Capital-at-risk" as defined by DPG is conceptually the same as "value-at-risk" used elsewhere in this report.

[21]A concept release is a paper issued by regulators to elicit discussion and comment from the industry and others on a potential regulatory change.

[22]Netting is an agreed-upon offsetting of positions or obligations by trading partners that can reduce a large number of individual obligations or positions to a smaller number.

[23]Funds-at-risk are the initial margin requirements imposed by the various exchanges on all open positions held at those exchanges. Segregation means to keep customer assets physically and accountably separate from assets owned by the futures commission merchant.

Life insurance regulators seem generally satisfied with the current risk-based capital approach for this sector; however, some changes are being studied. Regulators and industry officials told GAO that refinements are being made on an as-needed basis to the risk-based capital formulas; and industry groups are studying alternative, possibly model-based, approaches to the interest rate risk component. They told GAO that they currently have no plans to significantly modify the formula-based approach to the other risk-based capital components at this time.

Recommendations

GAO is not making recommendations in this report.

Agency Comments

The Office of the Comptroller of the Currency, the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Securities and Exchange Commission, and the Commodity Futures Trading Commission provided written comments on a draft of this report. Their comments are discussed in chapter 1. The agencies generally believed the report was comprehensive and balanced. In their comments, the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Securities and Exchange Commission expand on a number of points made in the report pertaining to their industries. The National Association of Insurance Commissioners provided oral comments in which it characterized the report as reasonable. These organizations also provided technical comments, which have been incorporated where appropriate.

Contents

Appendixes

Tables

Figures

Abbreviations

ACLRBC	Authorized Control Level Risk-Based Capital
AI	aggregate indebtedness
AVR	asset valuation reserve
CBOT	Chicago Board of Trade
CEA	Commodity Exchange Act
CFTC	Commodity Futures Trading Commission
CME	Chicago Mercantile Exchange
DPG	Derivatives Policy Group
FCM	futures commission merchant
FDIC	Federal Deposit Insurance Corporation
FDICIA	Federal Deposit Insurance Corporation Improvement Act
FRS	Federal Reserve System
GAAP	Generally Accepted Accounting Principles
GARP	Generally Accepted Risk Principles
NAIC	National Association of Insurance Commissioners
OCC	Office of the Comptroller of the Currency
OECD	Organization for Economic Cooperation and Development
OTC	cover-the-counter
RAROC	risk-adjusted return on capital
SEC	Securities and Exchange Commission
SIPC	Securities Investor Protection Corporation
SPAN	Standardized Portfolio Analysis of Risk
SRO	self-regulatory organization
TAC	Total Adjusted Capital
TIMS	Theoretical Intermarket Margining System
VAR	value-at-risk

Introduction

Through rules known as capital requirements, financial regulators[1] set minimum levels for capital that banks and bank holding companies,[2] securities broker-dealers,[3] futures commission merchants (FCM),[4] and life insurance companies[5] hold as a cushion against unexpected losses that can result from risks faced by these firms in their business activities. Regulatory capital requirements are one tool financial regulators use to help protect customers from losses and ensure the stability of financial markets. In addition to serving these general regulatory purposes, capital requirements can affect the way the financial system functions by influencing how market participants allocate capital resources and conduct business.

Capital requirements can also have competitive effects within the financial services industry, to the extent that capital requirements differ among competing financial institutions and firms. Today, regulators in all sectors have either adopted or are considering changes in capital requirements that compared to earlier approaches, more quickly and precisely respond to changes that occur in a firm's actual risk profile.[6] In addition, some regulators are considering more fundamental changes that would simplify capital regulation. Changes in capital regulation are being undertaken or considered in a highly dynamic financial services industry that is itself undergoing change in response to competitive pressures as well as

[1]The term financial regulators refers here to the following: for banks, the Office of the Comptroller of the Currency (OCC), the Federal Reserve System (FRS), the Federal Deposit Insurance Corporation (FDIC), and state banking regulators; for securities broker-dealers, the Securities and Exchange Commission (SEC) and state securities regulators; for futures commissions merchants, the Commodity Futures Trading Commission (CFTC); and, for insurance companies, state insurance departments.

[2]The bank holding company structure consists of a parent company with one or more subsidiaries that may include banks, thrifts, and other entities providing services that the regulator considers closely related to banking. This report focuses only on commercial banks. It does not focus on thrifts because their capital rules for credit risk are similar to those of commercial banks and thrifts are generally not engaged in trading activities like those of the other financial firms mentioned above.

[3]Brokers are persons who engage in the business of effecting transactions in securities for the account of others, but does not include banks. Dealers are persons who engage in the business of buying and selling securities for their own account, through a broker or otherwise, but does not include banks or persons insofar as they buy or sell securities for their own accounts, either individually or in some fiduciary capacity, but not as part of a regular business. Broker-dealers combine the functions of brokers and dealers. See Section 3(a)(4) and (5) of the Securities Exchange Act of 1934.

[4]An FCM is an individual, association, partnership, corporation or trust that solicits or accepts orders for the purchase or sale of any commodity for future delivery on or subject to the rules of any contract market and that accepts payment from or extends credit to those whose orders are accepted.

[5]In this report, we focus only on life insurance companies because their activities are the most similar to those of banks, securities broker-dealers, and FCMs.

[6]The results of such changes in capital requirements are referred to in banking and life insurance as "risk-based capital."

advances in telecommunications, computer technology, and financial analysis—all of which have led to new and innovative financial products and services. This report is provided to help Members of Congress and others understand current regulatory capital requirements, developments in those requirements, issues these developments raise, and financial firms' approaches to risk measurement.

Background

Banks, securities broker-dealers, FCMs, and life insurance companies increase the efficiency of the economy by facilitating the flow of savings to investment and providing other financial services.[7] As discussed in chapter 3 of this report, these financial firms use capital to manage the trade-off between risks and returns in order to increase the firms' efficiency and maximize the returns for stockholders. The capital that a financial firm holds serves a number of firm-specific purposes—chiefly to provide long-term funding of operations and to protect the firm by serving as a cushion to absorb unexpected losses.

For public purposes, regulators of banks, securities broker-dealers, FCMs, and life insurance companies promulgate capital regulations that set mandatory minimum levels for capital that the firms are to hold as a cushion against unexpected losses. The specific public purposes differ somewhat among the regulators. Generally speaking, however, the financial regulators seek to protect customers of the financial firms from losses and help ensure the stability of financial markets and systems that they regulate. Chapter 2 of this report discusses the capital standards set for banks, securities broker-dealers, FCMs, and life insurance companies and the more specific purposes of each of the financial regulators in setting regulatory capital requirements.

Traditionally, banks, securities broker-dealers and FCMs, and life insurance companies were engaged in mostly different businesses and faced different risks. After the stock market crash of 1929, Congress created a regulatory and industry structure that separated banking, investment banking, and other financial institutions. Banks were restricted to taking deposits, making loans, and other activities closely related to banking.

[7]In modern financial theory, financial firms enhance the efficiency of the economy by providing means of wholesale and retail payments, holding funds for customers or depositors in the form of savings accounts or life insurance policies, providing brokerage services for securities that permit investors to sell financial assets and purchase or invest in other assets, underwriting security issuances by business so that business can acquire investment funds when they are needed and investors can purchase newly issued securities, lending funds as a principal, providing equity capital, or providing risk management services for clients such as futures and foreign exchange services so that business can limit or accept risk taking as called for by their business strategies.

Broker-dealers (the SEC-regulated portion of investment banks) were restricted to brokering securities, underwriting new security issues, and trading securities. Insurance companies continued to be regulated by the states, and their activities were limited to insurance sales and underwriting. As discussed later in this chapter, significant changes have occurred in the financial services industry within the past two decades. As a result, firms that were in traditionally separate sectors are more directly competing with one another; providing similar products; and, hence, facing similar risks in their activities.

Capital Is the Source of Funding That Cushions a Firm Against Losses That Arise From Risks

Capital is most generally defined as the long-term source of funding for a firm that earns a return for investors (debt and equity) and cushions the firm against losses. Such funding is contributed largely by (1) equity stockholders in anticipation of profits and (2) the firm's own returns in the form of retained earnings. In some instances, long-term debt is also considered capital.

Losses cushioned by capital arise from risks that firms face in their business activities. In our work, we found no definitive list of risk categories applicable to all firms covered in our review. For example, the Federal Reserve uses a list of six risk categories, and OCC delineates nine. A group of leading individuals from firms and regulators developed what they termed Generally Accepted Risk Principles (GARP), which lists six risk categories.[8] Most of the financial firms we spoke with told us they use four categories of risk; some said they use as few as three. The listings of risks we reviewed covered much the same causes of possible loss, but they varied in how risks were grouped and in the nomenclature used. This report generally focuses on the following six categories, because regulators and the representatives of financial firms we interviewed identified them as the risks of greatest concern.

- Credit risk is the potential for financial loss resulting from the failure of a borrower or counterparty[9] to perform on an obligation. Credit risk may arise from either an inability or unwillingness to perform as required by a

[8]The Federal Reserve uses credit, market, liquidity, operational, legal, and reputational risks. OCC uses strategic, reputational, credit, interest rate, liquidity, price, foreign exchange, transaction, and compliance. GARP uses credit, market, portfolio concentration, liquidity, operational, and business/event risks.

[9]In any financial transaction, each party is the counterparty to the other.

loan, a bond, an interest rate swap,[10] or any other financial contract. All financial firms face credit risk. For example, banks face credit risks in loans and bonds, insurance companies face credit risks in corporate and municipal bonds, and securities broker-dealers and FCMs face credit risks if other firms that they deal with do not meet their contractual obligations.

- Market risk is the potential for financial losses due to the increase or decrease in the value or price of an asset resulting from broad movements in prices, such as interest rates, commodity prices, stock prices, or the relative value of currencies (foreign exchange). Because all financial firms hold assets, all financial firms face market risks. However, they may not all face all types of market risks.
- Liquidity Risk is the potential for financial losses due to the inability of a firm to meet its obligations on time because of an inability to liquidate assets or obtain adequate funding, such as might occur if most depositors or other creditors were to withdraw their funds from a firm. This is referred to as "funding liquidity risk." Liquidity risk also refers to the potential that a firm cannot easily reverse negative financial positions or offset specific exposures without significantly lowering market prices because of inadequate market depth or market disruptions ("market liquidity risk"). Financial firms face liquidity risk inasmuch as the loss of revenues due to interruptions of cash inflows affects a firm's ability to cover its liabilities as they come due.
- Operational Risk is the potential for unexpected financial losses due to inadequate information systems, operational problems, breaches in internal controls, or fraud. Operational risk is associated with problems of accurately processing or settling transactions and taking or making deliveries on trades in exchange for cash, and with breakdowns in controls and risk limits. Individual operating problems are considered small-probability but potentially high-cost events for well-run firms. Operational risk includes many risks that are not easily quantified but control of which is crucial to the firm's successful operation. Operational risk can be addressed through prudent management oversight of firm operations, including the establishment of internal controls.[11] All firms face some type of operational risk.
- Business/event risk is the potential for financial losses due to events not covered above, such as credit rating downgrades (which affect a firm's access to funding); breaches of law or regulation (which may result in

[10]A swap is an agreement between counterparties to make periodic payments to each other for a specified period. In a simple interest rate swap, one party makes payments based on a fixed interest rate, while the counterparty makes payments based on a variable rate. The contractual payments are based on a notional amount that for most interest rate swaps is never actually exchanged.

[11]Internal controls have limitations and provide reasonable assurance, not absolute assurance, that internal control objectives will be met.

heavy penalties or other costs); or factors beyond the control of the firm, such as major shocks in the firm's markets. Included in business/event risk is a shift in legal status or changes in regulations. All types of financial firms face business/event risk.

- Insurance/actuarial risk is the risk of financial losses that an insurance underwriter takes on in exchange for premiums, such as the risk of premature death. Although this risk is most commonly associated with insurance companies, it can exist in other firms. For example, banks are authorized to underwrite credit life insurance, which is subject to actuarial risk.

These risks can be discussed on a risk-by-risk basis, but the potential effect on a firm's overall financial condition or risk profile cannot be obtained by summing the risks in each category, because risks interact in various ways. That is, the net potential loss from a combination of risks could be greater or less than the sum of potential losses from each individual risk, depending upon the economic relationship among the risks involved. The economic relationship among a firm's risks depends on the correlation among prices of assets—that is, how the prices move in relation to one another—and the business strategies and holdings of the firm.

Because the traditional activities of banks, securities broker-dealers, FCMs, and life insurers differed, each of these types of financial firms once tended to have a correspondingly distinct type of risk profile. The predominant risk for banks was credit risk, for securities broker-dealers and FCMs it was market risk, and for life insurance companies it was insurance/actuarial risk. However, for a variety of reasons discussed later in this chapter, the activities and risks of large, diversified financial firms in the highly competitive financial services industry are becoming increasingly similar.

Various Agencies Are Responsible for Regulating the Capital of Banks, Securities Broker-Dealers, FCMs, and Life Insurers

The scope of authority and oversight practices of financial regulatory agencies vary in a number of ways. The activities of banks, bank holding companies, securities broker-dealers, FCMs, and life insurance companies are regulated and overseen by a number of different types of agencies and organizations.[12] Bank holding companies are regulated by the Board of Governors of the Federal Reserve System (Federal Reserve Board), and banks are regulated on an individual institution basis by various federal and state agencies. Securities broker-dealers and FCMs are regulated by SEC[13] and CFTC,[14] respectively. State agencies and self-regulatory organizations (SRO)[15] are also involved in supervising broker-dealers and FCMs. Life insurance companies are regulated and overseen by state regulatory agencies. No formal/statutory holding company regulatory oversight currently exists for securities firms, futures firms, or insurance companies in the United States at the federal level.

Authority of the Financial Regulatory Agencies Varies in Scope

Many of the largest financial legal entities are part of a holding company structure that generally has affiliates conducting business activities in the formerly more separate sectors of banking, life insurance, securities trading, and futures trading sectors. In this report, we often refer to these holding company structures as large, diversified firms.

The dominant form of banking structure in the United States is the holding company. A number of the larger bank holding companies have

[12]This report focuses on regulation of capital requirements and thus does not provide a comprehensive description of the authority or activities of these regulators.

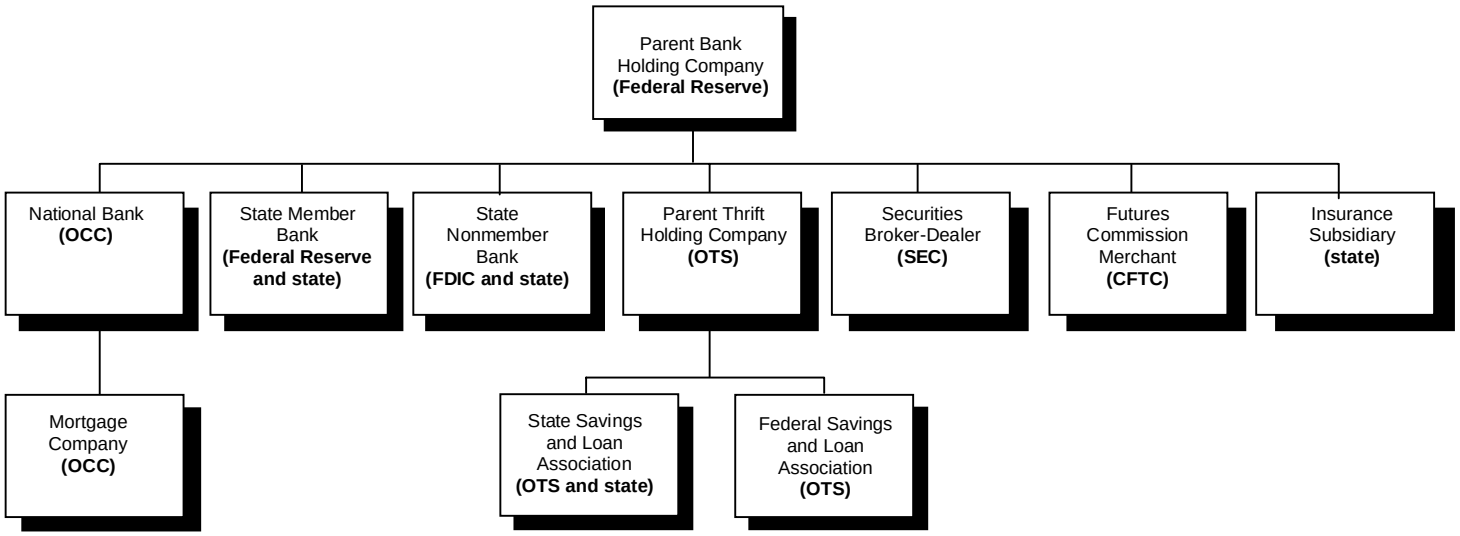
[13]The definition of a security subject to SEC regulation includes instruments, such as stocks, corporate and treasury bonds, notes, mutual funds, and securities options. SEC's mission is to administer federal securities laws and issue rules and regulations to provide protection for investors and to help assure that the securities markets are fair and honest. This is accomplished primarily by promoting adequate and effective disclosure of information to the investing public. SEC also regulates firms engaged in the purchase or sale of securities, people who provide investment advice, and investment companies.

[14]The Commodity Exchange Act gives CFTC exclusive jurisdiction, with certain exceptions, over the regulation of the nation's futures and options markets, including on- and off-exchange transactions in futures and options. Futures are contracts that obligate the holder to buy or sell a specific amount or value of an underlying asset, reference rate, or index at a specified price on a specified future date. Options are contracts that grant the purchaser the right, but not the obligation, to buy or sell a specific amount of the underlying at a particular price within a specified period. Listed options are exchange-traded. CFTC is responsible for ensuring the economic utility of these markets by guarding the integrity of the markets; protecting market users from fraud and other trading abuses; monitoring the markets to detect and prevent price distortions and manipulation; and fostering open, competitive, efficient, and financially sound markets.

[15]SROs play an extensive role in the regulation of the U.S. securities and futures industries. They assist SEC and CFTC in implementing and enforcing federal securities and commodities laws. SROs include all of the U.S. securities and commodities exchanges, the National Association of Securities Dealers, the National Futures Association, and the Municipal Securities Rulemaking Board.

established nonbank subsidiaries that engage in securities underwriting and brokerage services, insurance sales, and futures trading, as well as other nonbanking activities permitted because they are deemed to be closely related to the business of banking and to produce a public benefit.[16] Figure 1.1 is a simplified illustration of a hypothetical holding company with wholly owned banking and nonbanking subsidiaries and the regulators that oversee the various entities.

Figure 1.1: Simplified Structure of a Hypothetical Bank Holding Company



Bolding denotes regulator

Source: GAO.

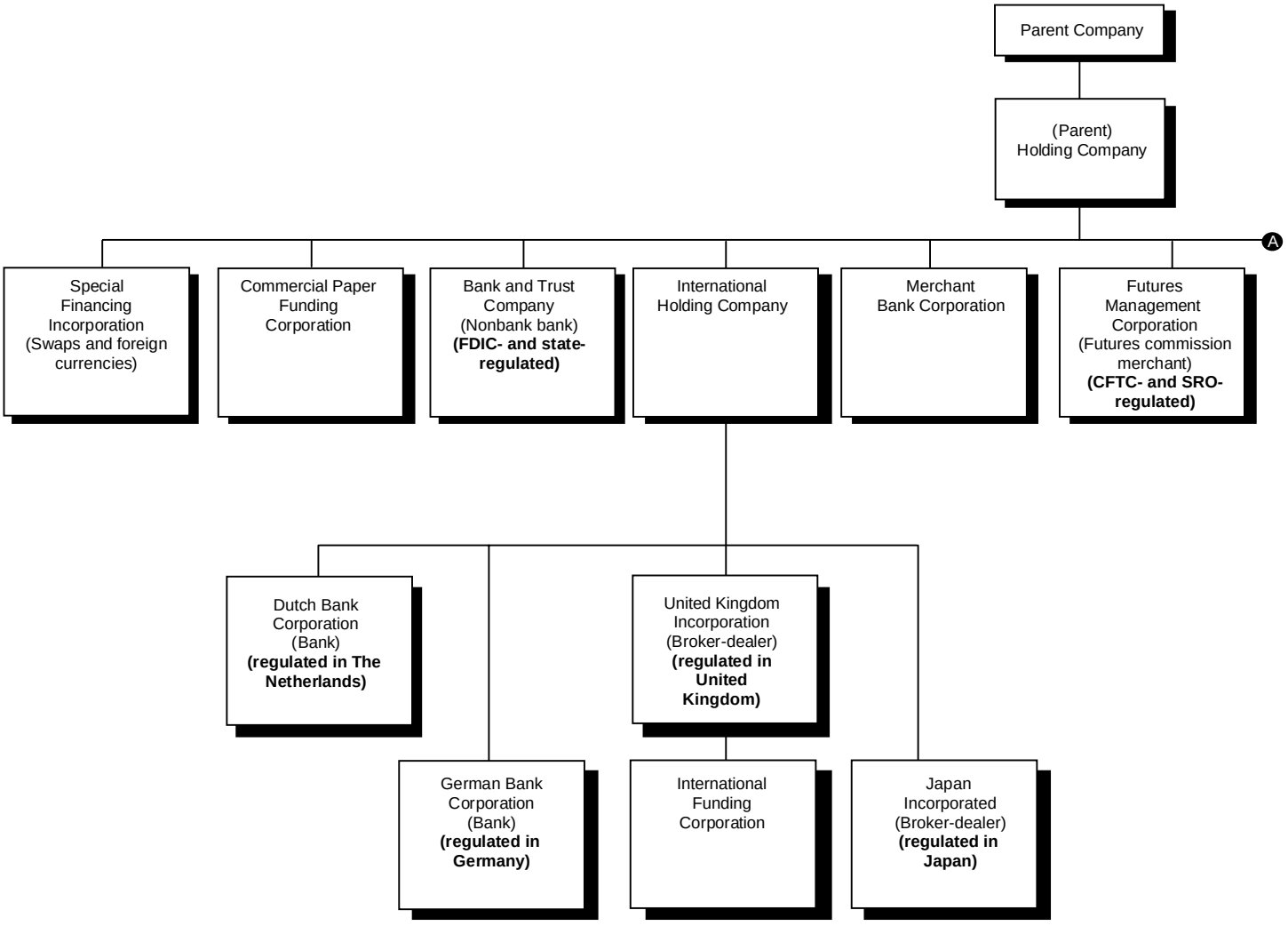
[16]Section 4 of the Bank Holding Company Act of 1956 generally prohibits bank holding companies from owning or controlling any company that is not a bank. The law, however, lists several exemptions to this rule. The most important of these authorizes the Federal Reserve Board to approve the acquisition or formation of a nonbank affiliate where the board determines that the activities of the affiliate are "so closely related to banking. . . as to be a proper incident thereto" and would produce a public benefit. 12 U.S.C. S 1843. Section 16 of the Glass-Steagall Act limits the securities activities of national banks essentially to brokerage services. Section 20 prohibits member banks from affiliating with organizations engaged principally in securities activities, although with approval of the Federal Reserve, a bank holding company may engage in limited securities activities through a subsidiary which is called a section 20 subsidiary.

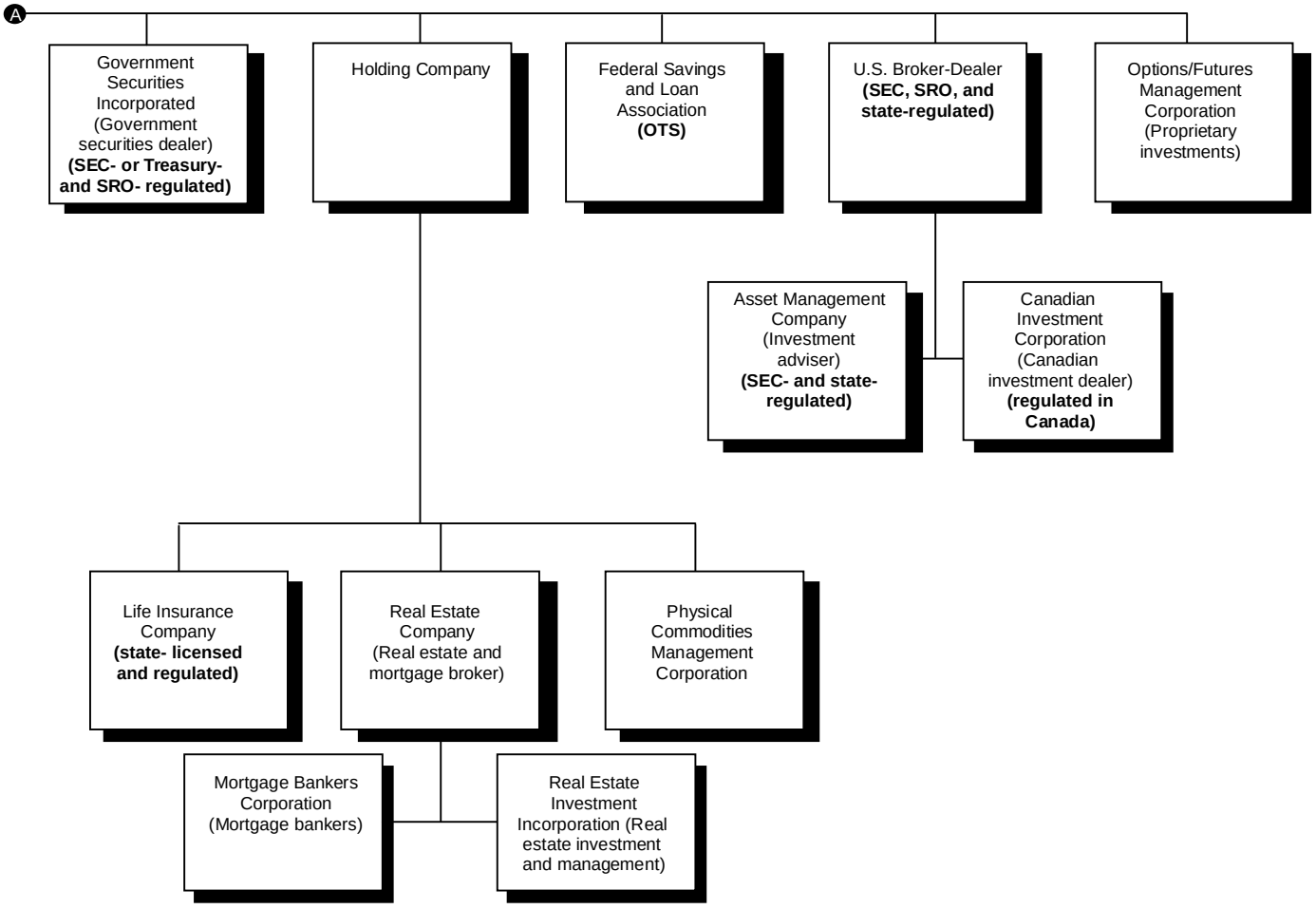
Many large U.S. securities broker-dealers, life insurers, and FCMs have also expanded their range of activities by establishing holding companies at the top of their corporate structures. When creating or acquiring affiliates, these other types of financial firms are not limited to creating or acquiring those that engage in activities related to their own. Banks are allowed to affiliate only with companies engaging in activities closely related to banking and must demonstrate some public benefit in creating or acquiring an affiliate, but other types of financial firms have no such limitations. Figure 1.2 shows a simplified structure of a hypothetical nonbank[17] financial holding company with affiliates engaged in banking activities (through a thrift institution),[18] securities and futures trading, and life insurance sales, among many other types of activities.

[17]A nonbank is a financial firm that does not have a bank charter.

[18]U.S. unitary thrift holding companies, unlike bank holding companies, may be owned by, or own, any type of financial services or other business. Thrifts also have broader powers than banks in areas such as insurance and real estate development and are regulated by the Office of Thrift Supervision.

Figure 1.2: Simplified Structure of a Hypothetical Nonbank Financial Holding Company





Bolding denotes regulator
( ) Denotes type of business

Source: GAO.

Bank Holding Companies Are Regulated on a Consolidated Basis; and Other Types of Regulated Entities on an Individual Basis

As summarized in table 1.1, the regulatory and oversight authorities of financial regulatory agencies differ. The Bank Holding Company Act of 1956 authorized the Federal Reserve Board to regulate bank holding companies on a consolidated basis. This gives the Federal Reserve Board regulatory and examination authority over all activities of the bank holding company. Affiliates that are banks are supervised by one or more of the federal banking agencies listed in table 1.1. Among other things, this means that capital standards apply at the holding company level and bank level. In addition, FDIC insures bank depositors and has authority to terminate deposit insurance for any FDIC-insured institution.

In contrast to the regulatory authority of the Federal Reserve Board, SEC and CFTC are authorized to regulate only those entities that themselves engage in activities involving securities and futures, respectively, and not the affiliates of those entities.[19] Unlike banks, Congress has not passed legislation authorizing SEC or CFTC to supervise holding companies of securities broker-dealers or FCMs, respectively. However, SEC and CFTC risk assessment rules promulgated pursuant to the Market Reform Act of 1990 and The Futures Trading Practices Act of 1992, respectively, enable those agencies to collect from the regulated entity information about the activities and financial condition of its affiliates and parent firms to assess the risks they pose to the regulated entity's financial and operational condition, including net capital, liquidity, and the ability to finance operations.[20] These rules do not provide either agency with the legal regulatory authority to examine or set regulatory capital requirements over the parent or affiliates of the SEC-registered broker-dealer or the CFTC-registered FCM, although they do give both agencies a supervisory role with respect to those affiliates.

State insurance departments are authorized to regulate insurance activities and those firms that sell insurance products. They are not authorized to regulate or examine parents or affiliates of the regulated entities.

[19]For example, the Securities Exchange Act of 1934 requires that any persons or firms who engage in the business of buying and selling securities for their own account and/or for customers must register with SEC as broker-dealers. Similarly, the Commodity Exchange Act requires that any persons or firms who engage in the business of buying or selling contracts for the purchase or sale of any commodity for future delivery (including commodity options and other risk-shifting instruments), for their own account and/or for customers, must register with CFTC as an FCM or Introducing Broker. Introducing brokers are firms that solicit and accept commodity futures and options orders but do not accept customer funds.

[20]Rules 17h-1T and 17h-2T for SEC and Rules 1.14 and 1.15 for CFTC.

Table 1.1: a Comparison of the Regulatory and Oversight Authority Concerning Capital of Federal Regulators of Commercial Banks, Securities Broker-Dealers, and FCMs and State Regulators of Life Insurers

Regulator	Financial entity subject to regulatory authority	Scope of supervisory/oversight authority
Office of the Comptroller of the Currency (OCC)	National banks and federal branches and federally licensed agencies of foreign banks with U.S. operations.	National banks; also, under delegated authority of the Federal Reserve, may participate in examining all activities of nonbank affiliates of OCC-regulated banks and their bank holding companies.
Federal Reserve System (FRS)	State-chartered banks that are FRS members[a] and bank holding companies and their nonbank subsidiaries; also, the combined U.S. operations of foreign banking organizations.	All activities of regulated state-chartered banks that are FRS members, bank holding companies, and their non-bank affiliates.
Federal Deposit Insurance Corporation (FDIC)[b]	Federally insured state-chartered banks that are not members of FRS.[a]	Backup examination authority for all federally insured banks. Under delegated authority of the Federal Reserve, may participate in examining all activities of nonbank affiliates of FDIC-regulated banks and their bank holding companies.
Securities and Exchange Commission (SEC)	SEC-registered broker-dealers.[c]	Only registered broker-dealers—not affiliates or parent holding companies.
Commodity Futures Trading Commission (CFTC)	CFTC-registered futures commission merchants (FCM).[d]	Only registered FCMs—not affiliates or parent holding companies.
State insurance departments	Insurance companies domiciled and licensed to operate in the state.	Only regulated insurance companies—not affiliates or parent holding companies.

Note: State regulators also oversee state-chartered banks and securities broker-dealers. The Office of Thrift Supervision oversees thrifts; however, we do not focus on thrifts in this report, so they are not included in this table.

[a]These banks are also overseen by state-level banking authorities.

[b]FDIC administers the Bank Insurance Fund and the Savings Association Insurance Fund.

[c]Broker-dealers must also comply with requirements of the various exchanges and industry associations, such as the New York Stock Exchange and the National Association of Securities Dealers, which are self-regulatory organizations under the Securities Exchange Act of 1934.

[d]FCMs must also comply with rules imposed by the various exchanges, such as the Chicago Mercantile Exchange and the Chicago Board of Trade, as well as the National Futures Association—all self-regulatory organizations under the Commodity Exchange Act.

Source: GAO analysis of applicable regulations.

Capital Regulation Is One of Many Tools Financial Regulators Use to Ensure Stability of the Financial System and Markets

Through capital standards and other regulations, regulators of banks, securities broker-dealers, FCMs, and life insurers seek to help ensure public confidence in financial institutions and markets by protecting customers' funds and limiting losses to various deposit and guarantee funds that further protect customers' funds. As for securities broker-dealers and FCMs, regulators seek to ensure that registered entities will have a pool of liquid assets available on a daily basis to meet their obligations to customers and other market participants. Capital regulation—requirements that firms hold minimum amounts of capital—is one tool in a kit of many that financial regulators use to help ensure stability and public confidence in the financial system and markets. It is supported by supervision—the monitoring, inspecting, and examining of regulated entities—and enforcement. In some cases, it is also supported by segregation of customer funds or by insurance protection of those funds.

The oversight activities of financial regulators are similar in some respects and different in others. Each regulator is to promulgate rules (including regulatory capital requirements), monitor firms' financial condition, perform examinations, and take appropriate actions to enforce relevant regulations and statutes. The oversight activities of SEC and CFTC differ most significantly from those of bank regulators and state insurance regulators because of differing purposes of the regulation. SEC and CFTC, with the assistance of SROs, protect investors and ensure the integrity of the securities and futures markets; bank regulators and state insurance regulators ensure the safety and soundness of entities they regulate.

Supervision of regulated entities in the banking, securities, futures, and life insurance sectors includes off-site monitoring of financial reports and on-site examination visits. In banking, supervisors are to track the financial condition of their banks on a continuing basis and between on-site examinations. A principal off-site technique banking supervisors use for monitoring the activities and financial condition of their banks is the review of detailed financial statements (Call Reports) that the banks submit quarterly. In addition, the banking regulators use computerized monitoring systems that use Call Report data to compute, for example, financial ratios, growth trends, and peer group comparisons. Banking supervisors also meet with bank senior management from time to time to discuss the current condition of the bank and plans the bank has for the future. Monitoring is a complement to on-site examinations, which lie at the heart of the supervisory process. The purpose of bank on-site examinations is for examiners to evaluate the bank's overall risk exposure with particular emphasis on what is known as its CAMELS—the adequacy

of its capital, and asset quality, the quality of its management and internal control procedures, the strength of its earnings, the adequacy of its liquidity, and its sensitivity to market risk. Banks are usually examined at least once during each 12-month period and more frequently if they have serious problems. In addition, well-capitalized banks with total assets of less than $250 million can be examined on an 18-month cycle.

In contrast to regulation of banks, regulation of the securities and futures markets is a combination of direct regulation and oversight by federal agencies and indirect regulation and oversight by SROs (e.g., the New York Stock Exchange, the National Association of Securities Dealers). Securities broker-dealers and FCMs are required to become members of an SRO and, as SRO members, must comply with SRO rules and regulations. SRO rules and regulations are promulgated under the SEC or CFTC standards and requirements. Securities SRO rules and regulations are often more stringent than SEC rules and require SEC's approval. SROs must register with SEC or CFTC and are subject to SEC or CFTC oversight. SROs establish rules to govern member conduct and trading, set qualifications for certain market participants, monitor daily trading activity, examine their members' financial health and compliance with rules, and investigate alleged violations of those rules and securities and futures laws. SEC oversees the regulatory and supervisory activities of the securities industry's SROs. CFTC oversees the compliance activities of the futures industry's SROs, which include the U.S. commodity exchanges and the National Futures Association. Both SEC and CFTC also develop, implement, interpret, and enforce statutes and regulations to protect customer funds, prevent trading and sales practice abuses, and ensure the financial integrity of firms holding customer funds. Additionally, SEC and CFTC conduct direct audits of clearing organizations and firms handling customer money to ensure compliance with the capital and segregation rules.

In contrast to banking, securities, and futures regulation, regulation of the insurance industry is primarily a state, not federal, responsibility. In general, state legislatures set the rules under which insurance companies are to operate, including capital standards; and state insurance regulators are to monitor the health and solvency of the regulated insurance companies. To help coordinate their activities, state insurance regulators have established a central structure—the National Association of Insurance Commissioners (NAIC), an organization whose members are the heads of the insurance departments of 50 states, the District of Columbia, and 4 U.S. territories and possessions. NAIC's basic purpose is to encourage consistency and cooperation among the various states and territories as

they individually regulate the insurance industry. To that end, NAIC promulgates model insurance laws and regulations for state consideration and provides a framework for multistate examinations of insurance companies.

State regulators use a number of basic methods to assess the financial strength of insurance companies, including reviewing and analyzing annual financial statements, doing periodic on-site financial examinations, and monitoring key financial ratios. Supervision of life insurers is the responsibility of insurance departments in each state, with the primary responsibility residing with the "domiciliary" regulator, that is, the regulator in the state where the company is domiciled.[21] The domiciliary regulator is responsible for conducting periodic on-site examinations and for reviewing the required annual and quarterly financial reports. Examiners monitor the financial health of the insurer, along with compliance with rules and regulations, and look for evidence of any unsafe business practices. Regulators in states where the company is licensed and operating, other than the domiciliary state, may participate in on-site examinations with the domiciliary state if they choose. These examinations are called zone examinations. In most states, the typical interval between on-site examinations is 3 to 5 years unless regulators have reason to believe problems exist that could affect the company's viability.

Financial regulators may take both informal supervisory and/or formal enforcement actions to ensure that regulated entities undertake corrective steps for identified problems. In banking, such informal actions may include a request that a bank adopt a board resolution or agree to the provisions of a memorandum of understanding to address the problems. If necessary, financial regulators may take formal enforcement actions to compel the management and directors of troubled entities to address problems. Formal enforcement actions in banking include written agreements, cease and desist orders, prompt corrective action directives, termination of deposit insurance, revocation of a bank charter, and closing of the bank. Other actions include assessing fines, such as civil money penalties; and removing an officer or director from office and permanently barring him or her from the banking industry.

SEC and CFTC have the authority to take supervisory and enforcement actions against the entities they regulate. Their enforcement tools include

[21]The insurer may or may not be headquartered or even operating in the state in which it is domiciled for regulatory purposes, although it usually is.

court injunctions; temporary restraining orders; and various administrative proceedings and sanctions, such as assessment of civil monetary penalties, disgorgement orders, censure, suspension and revocation of registration, and cease and desist orders.

Additionally, SEC staff provide informal regulation of broker-dealers through no-action letters. In the no-action process, a broker-dealer requests interpretive relief from SEC staff regarding certain transactions or activities. In a typical no-action letter, the staff states that it will not recommend that SEC take enforcement action if the requesting party executes transactions or engages in activities in the limited context stated by the staff. In SEC's view, limitations in no-action letters related to risk-management issues balance regulatory flexibility with the need to avoid undue risk. The letters are made available to the public and informally address regulatory concerns that by necessity are not detailed in securities statutes.

As with other financial regulators, insurance regulators have an array of informal and formal actions that can be employed to correct problems identified through the supervisory process. These actions often begin with informal discussions of regulatory concerns with company officials. If problems are not resolved promptly, regulators have a number of more formal tools available, including administrative actions; court orders and injunctions; and culminating with the power to take regulatory control of a company, remove the officers, and either sell or liquidate it. Many of the authorities held by state insurance regulators are enhanced when the Risk-Based Capital Insurers Model Act has been adopted in a particular state. When adopted, this act gives the state's chief insurance regulator the explicit authority to take regulatory action based on an insurer's risk-based capital level.

The Financial Services Industry Is Changing in Response to a Variety of Developments

Since the late 1970s, significant changes have been occurring in the financial services industry due to a number of market shocks, combined with advances in financial theory and information technology. The interaction of these factors has led to significant expansion of such financial products as derivatives and asset-backed securities,[22] improved methods to measure and manage risks, increased competition in financial services, and mergers of financial firms within and across financial

[22]Derivatives are financial contracts whose market value is determined by the value of an underlying asset, reference rate, or index. Asset-backed securities are created from securitized assets, such as auto loans, credit card receivables, mortgages, equipment leases, and corporate bonds. Asset securitization is the process by which loans and other receivables are pooled, reconstituted into one or more classes or positions, and then sold.

sectors. In addition, these factors have encouraged some firms to offer risk management services to other financial and nonfinancial firms. This risk management has often been based on the use of derivatives and asset-backed securities to repackage risks and returns.

The creation and growth in derivatives, huge increases in trading activities, and the development of new secondary markets, along with the creation of asset-backed securities, have fundamentally changed the financial landscape. Derivatives and asset-backed securities have permitted financial market participants to better manage market risk by transferring the risk from entities less willing to bear it to those more willing to do so. Derivatives have stimulated trading generally because they gave financial market participants a lower cost way to hedge investments or to take speculative positions.[23] In addition, derivatives products markets have grown rapidly. For example, the International Swaps and Derivatives Association estimates that as of December 31, 1996, the combined notional amount of globally outstanding interest rate swaps and other over-the-counter (OTC) derivatives had grown to $25.45 trillion from $3.45 trillion on December 31, 1990.[24]

Advances in information technology and financial theory have helped reduce various barriers to competition. The increased speed and lower costs in communicating and transmitting data over large geographical distances eliminated such distance as an obstacle to competition. Moreover, new financial theories and faster computers helped financial firms handle large amounts of data at low cost and analyze the risks and returns created by new financial products. Swaps and other derivatives, which have been growing rapidly, are an example of such technology- and theory-dependent products. Since the tools and skills underlying them were not unique to any one sector of the financial services industry, no one sector has a monopoly on their use; thus, the list of major derivatives dealers includes banks, securities firms, and insurance companies.[25]

Regulators also have acted in ways to promote greater competition in the financial services industry. For example, the Federal Reserve Board has approved a number of additional activities for banks to offer, including providing investment advice, underwriting insurance related to the

[23]To hedge is to reduce risk by taking a position that offsets existing or anticipated exposure to a change in market prices. Position refers to an investor's stake (buying or selling) in a market or a particular security. To speculate is to take risk by taking a position in hope of realizing a profit.

[24]OTC derivatives are customized contracts that are not traded on exchanges.

[25]See GAO/GGD/AIMD-97-8, Nov. 1, 1996, for a list of major derivatives dealers.

extension of credit, tax planning and preparation, data processing, and operating a credit bureau or collection agency. The Federal Reserve Board also approved bond and stock underwriting powers for Section 20 subsidiaries of bank holding companies. Effective in March 1997, the Federal Reserve Board enhanced these powers when it increased from 10 to 25 percent the share of total revenues a bank holding company's Section 20 subsidiary may derive from corporate equity and debt underwriting. On the basis of these decisions, banks have increasingly acquired or created securities broker-dealer affiliates or subsidiaries.[26] OCC has amended its regulations to permit subsidiaries of national banks to engage in activities that OCC determines—on a case-by-case application basis—to be "part of or incidental to the business of banking."

In addition to banks entering underwriting, an area associated with securities firms, a number of large securities firms have entered a traditional province of banks: commercial loans to corporate borrowers. Recently, securities firms have made and traded such loans, which are commonly linked with securities underwriting. Such services enable the firm to provide a customer with a full range of its financing needs. In a number of instances, banks and securities firms have joined together to provide such loan and security facilities for customers.

Increasing competition also affects insurance companies and insurance products. During the past several years, life insurance companies increasingly have moved away from traditional whole life and term insurance products and have focused instead on asset growth or investment products such as variable annuities. These products compete with stocks and bonds, retirement vehicles offered by banks, and stock mutual funds and are often sold by financial planners and securities brokers.

As part of this competition, large, diversified financial firms are increasingly operating in what once were separate banking, insurance, and securities sectors, as discussed earlier. Banks have acquired investment banks; and many types of firms have acquired thrifts, which are similar to banks but can be owned by anyone. For example, a number of insurance companies have applied for thrift licenses. Securities firms have acquired firms that have enabled them to engage in banking activities. For example, in 1997, Merrill Lynch & Company, Inc., and the Travelers Group, Inc., which includes insurance companies and securities firms, both received

[26]For example, in 1997, the Bankers Trust New York Corporation bought Alex Brown & Sons, Inc. (a stock brokerage firm), and NationsBank Corporation affiliated with Montgomery Securities.

federal thrift charters. In addition, insurance companies have acquired securities firms. For example, the Travelers Group acquired Salomon Brothers, Inc. (primarily a securities trading firm) in November 1997, and it already owned Smith Barney and Company (primarily a retail brokerage firm). In addition, in April 1998, the Travelers Group and Citicorp announced their intention to merge and create a new entity that is to be called Citigroup. This would be the biggest corporate merger in history; however, there are questions about the implications of current banking laws for the merger. If the laws are not changed, it is possible the new entity would have to divest itself of certain operations, either in insurance or banking.

Objectives, Scope, and Methodology

To help Congress and others better understand current regulatory capital requirements, developments in those requirements, and regulatory issues these developments raise, the objectives of this report are to describe, for the banking, securities, futures, and life insurance sectors of the financial services industry, (1) regulatory views of the purpose of capital and current regulatory requirements; (2) the approaches of some large, diversified financial firms to risk measurement and capital allocation; and (3) issues in capital regulation and initiatives being considered for changes to regulatory capital requirements.

To achieve these objectives, we interviewed

- officials from financial regulators, including OCC, the Federal Reserve Board, the Federal Reserve Bank of New York, FDIC, SEC, CFTC, and the Office of Thrift Supervision; and the Departments of Insurance for New York and Illinois;
- academics and consultants who are considered experts in the financial services field;
- rating agencies' analysts, including A.M. Best, Standard and Poor's, and Moody's Investors Service;
- officials of SROs, including the Chicago Board of Trade, the Chicago Board of Trade Clearing Corporation, the Chicago Mercantile Exchange, the National Futures Association, the New York Stock Exchange, and the National Association of Securities Dealers;
- officials of trade and industry associations, including the American Academy of Actuaries, the American Bankers Association, the American Council on Life Insurance, the Independent Bankers Association of America, the Institute of International Finance, NAIC, the New York Clearing House Association, and the Securities Industry Association; and

- officials of 16 large, diversified firms in the commercial banking, securities, futures, and insurance industries (see app. V for a listing of these firms).

In addition, we reviewed U.S. government, international organization, trade association, academic, industry, and private firm documents, including regulations, annual and other published reports, papers and articles, industry journals, and information available at various sites on the world wide web.

To determine the development of risk measurement and capital allocation systems in firms, we interviewed and obtained information from a number of large, diversified firms in the commercial banking, securities, futures, and insurance sectors (see app. V for a listing of these firms). We did not test the adequacy of any of the risk measurement and capital allocation systems discussed in this report. In selecting firms for this review, on recommendations from SEC, we chose securities firms that were part of the Derivatives Policy Group (DPG).[27] We chose commercial banks that appeared likely to be required to meet the market risk capital requirements that took effect on January 1, 1998,[28] and life insurance companies that have been involved in the development of risk-based capital standards for that industry. The securities firms we visited are large holding companies and include both SEC-registered broker-dealers and CFTC-registered FCMs.[29] We interviewed officials who could speak about risk management and capital allocation systems for the consolidated financial firm.

We developed and used a set of common questions in our discussions with these firms. In these interviews, we obtained information about the following:

- the most important risks faced by these firms,
- their risk measurement and capital allocation systems and methodologies,

[27]DPG was organized in 1994 to address the public policy issues raised by the OTC derivatives activities of unregistered affiliates of SEC-registered broker-dealers and CFTC-registered FCMs. It comprises the six U.S. securities firms with the highest volume of over-the-counter derivatives activities (CS First Boston, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley, and Salomon Brothers).

[28]The 5 U.S. bank holding companies we interviewed are among the top 10 largest bank holding companies in the United States. As of December 31, 1997, the total assets of the 5 bank holding companies comprised 57 percent of the total assets of the 10 largest bank holding companies.

[29]As part of DPG, the securities firms we visited represent five of the six largest derivatives dealers in the United States.

- their internal risk management structures and uses of internal risk measurement information,
- the impact of current capital requirements on their operations, and
- possible future directions in capital regulation.

We did our work in Washington, D.C.; New York; and Chicago between November 1996 and April 1998 in accordance with generally accepted government auditing standards.

We obtained written comments on a draft of this report from OCC, the Federal Reserve Board, FDIC, SEC, and CFTC. These comments are reprinted in appendixes VI, VII, VIII, IX, and X. The agencies generally believed the report was comprehensive and balanced. In their comments, OCC, FDIC, and SEC expand on a number of points made in the report pertaining to their industries. On June 2, 1998, the Washington Counsel of NAIC provided us with oral comments in which he characterized the report as reasonable. These organizations also provided technical comments, which have been incorporated where appropriate.

Regulatory Capital Requirements Differ by Type of Regulated Entity

Just as the financial regulators serve differing statutory purposes, they differ in their views on the purpose of regulatory capital. Bank capital standards are focused on maintaining the safety and soundness of banks, and capital is calculated on a going-concern basis. Capital standards for securities broker-dealers and FCMs are focused on protecting customers in the event of a broker-dealer or FCM failure and are calculated on a liquidation basis. Capital standards for life insurers are to help limit failures and protect claimants, and capital is calculated on a going-concern basis.[1]

In addition to reflecting differences in the regulators' views on the purpose of capital, regulatory capital requirements also reflect differences in what have been historically the dominant risks associated with the regulated entities. The bank capital requirements that apply to all banks have emphasized credit risk, because credit risk has long been the most important and predominant risk for banks, which traditionally invested the largest part of their funds in bank loans. Recently, regulators added a market risk capital requirement for banks engaged in trading activities that create market risks. Capital requirements for securities broker-dealers and FCMs traditionally focused on liquidity and market risks and the effect of changing market prices on the value of their assets, in keeping with the dominant risk in their activities. Capital requirements for life insurers focus on traditional risks, such as actuarial risk which is unique to the insurance industry, as well as other risks related to their assets and liabilities.

Current capital requirements reflect a variety of efforts to relate capital requirements to risks inherent in firms' activities. These include efforts to modify current rules to better reflect actual risks in firm activities as well as efforts to take advantage of new risk measurement techniques that are more sensitive to correlation among prices of assets and can more precisely measure risks. Industry representatives with whom we spoke, who generally favor changing regulatory capital requirements to more precisely account for risks in their activities, see progress in recent changes made to regulatory capital requirements. However, they also have concerns and see needs for additional improvement.

[1]Going-concern value is the value of a company as an operating business to another company or individual. The liquidating value of a company is the value of its assets. The difference between going-concern and liquidating value is often termed goodwill. Goodwill is generally understood to represent the value of a well-respected business name or other such factors expected to translate into greater than normal earning power.

The Purpose of Regulatory Capital Differs by Type of Regulated Entity

Although the agencies that oversee banks, securities broker-dealers, FCMs, and life insurance companies all seek to protect customers and ensure the smooth functioning of the markets they regulate, their statutory purposes differ in various ways. The differences in regulatory purpose are reflected in the regulators' views of the purpose of regulatory capital.

Bank Capital Standards Focus on Safety and Soundness of Banks, and Capital Is Calculated on a Going-Concern Basis

As shown in table 2.1, the regulatory purpose of agencies that oversee banks is to help ensure the safety and soundness of the banking and payments systems and minimize losses to the deposit insurance fund; and the Federal Reserve Board also has responsibility to help ensure the stability of the U.S. financial system. In this regard, regulators view capital as performing several important functions. It is there to absorb losses, thereby allowing banks to continue to operate as going concerns during periods when operating losses or other adverse financial results are being experienced. Capital also helps to promote public confidence, restrict excessive asset growth, and provide protection to depositors and the Bank Insurance Fund administered by FDIC. Depositors who are protected by deposit insurance may be less careful in their choice of banks. This behavior may, in turn, permit insured banks to operate less conservatively than they would without deposit insurance to shield them from depositors' concerns about the banks' safety and soundness. The consequences of both the banks' and depositors' behavior is called "moral hazard." Regulators use capital requirements to mitigate the moral hazard that arises from deposit insurance protection.

In addition, bank regulatory capital requirements are a measure regulators can use as a starting point in regularly assessing the financial condition of banks. A reduction in capital that causes the institution to approach the minimum required ratio is seen as a symptom warning regulators that an institution's financial health is threatened and that regulatory intervention may be needed to protect depositors and other parties. Under the Prompt Corrective Action guidelines enacted as part of the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991, banking supervisors are required to increase intervention as a bank's capital ratio falls through various predetermined ratios before the bank runs out of capital. This intervention is meant to reduce the likelihood of bank

failures, reduce the cost of failures that occur, and thus deter or minimize systemic risk.[2]

Minimum capital requirements also help protect the Bank Insurance Fund, which guarantees depositors will receive par value up to $100,000 per depositor per insured institution[3] if regulators close a bank and FDIC must liquidate it.[4] For deposits exceeding the $100,000 limit, FDIC is to provide reimbursements based on the value of the assets sold when the bank is closed and liquidated. Bank compliance with capital requirements protects the Bank Insurance Fund because higher capital requirements reduce the likelihood of bank failure and thus reduce the losses that FDIC is likely to incur in covering guaranteed deposits from failed banks. FDICIA imposed a requirement that a bank whose tangible equity[5] falls to 2 percent (or less) of assets is deemed to be "critically undercapitalized" and generally is to be placed in conservatorship or receivership within 90 days of becoming critically undercapitalized. Although bank regulation, including capital standards, attempts to reduce the likelihood of failures, it is not meant to forestall all failures.

Bank capital standards are focused on safety and soundness, and regulatory capital is calculated on a going-concern basis—that is, with the assumption that the bank will continue operating. In this way, bank capital regulation is focused on the continued operation of the banking system and is meant to ensure that payment services and the provision of loans to all customers, both large and small, will not be disrupted.

[2]Systemic risk could occur if the failure of a financial institution led to the failure of other financial institutions. In a worst-case scenario, these subsequent failures could result in a cascade of failures and impairment of the operations of the financial system and, ultimately, the overall economy. Direct regulatory oversight of bank holding companies is designed to help deter the failure of a financially weakened large banking institution that could create systemic problems.

[3]All accounts owned by an individual in a single banking institution are aggregated for deposit insurance purposes and covered up to $100,000 per depositor per insured institution. If a depositor has both checking and savings accounts in the same institution, both accounts taken together would be insured up to $100,000. However, if an individual has a joint account with another person in the same bank, this joint account would be separately insured up to $100,000. There is no limit to the number of insured accounts an individual may have in different banking institutions. See Deposit Insurance: A Strategy for Reform (GAO/GGD-91-26, Mar. 4, 1991).

[4]The Federal Deposit Insurance Act, as amended by the Federal Deposit Insurance Corporation Improvement Act of 1991, requires federal regulators to take specific action against banks and thrifts that have capital levels below minimum standards. In an earlier report, we discuss these requirements and their implementation. See app. I of this report and Bank and Thrift Regulation: Implementation of FDICIA's Prompt Regulatory Action Provisions (GAO/GGD-97-18, Nov. 21, 1996).

[5]Tangible equity is the sum of common stock, surplus, and retained earnings, net of Treasury stock and currency translation adjustments, with intangible assets subtracted.

Capital Standards for Broker-Dealers and FCMs Focus on Protecting Customers and Their Markets and Are Calculated on a Liquidation Basis

As shown in table 2.1, the primary regulatory purposes of the SEC and CFTC capital standards are to ensure that broker-dealers and FCMs will have a pool of liquid assets available on a daily basis to meet their obligations to customers and other market participants. This protection of customers does not shield customers from investment losses if the market value of the investment is less than the purchase price, and the protection is consistent with SEC's and CFTC's overall concern with ensuring the integrity of the securities and futures markets, respectively. These agencies' regulatory capital requirements are designed to provide assurance that broker-dealers and FCMs can fulfill their obligations to customers and other market participants in the event a broker-dealer or FCM is closed. The amounts owed to customers are based on credit balances (or cash) in customer accounts and the market value of customers' securities and futures positions at the broker-dealer or FCM.

Minimum capital requirements also help protect the Securities Investor Protection Corporation (SIPC), a nonprofit membership corporation created by Congress under the Securities Investor Protection Act of 1970. Within certain limits, SIPC will return to customers cash and securities held at liquidated SIPC member broker-dealers. SIPC protects each customer up to $500,000 for claims for cash and securities, although claims for cash are limited to $100,000 per customer. The cash limit historically has tracked the bank-insured deposits amount. SIPC does not protect investors from declines in the market value of their securities. Successful functioning of the net capital rule results in the orderly liquidation of a failing firm; prevents the need for federal court intervention; and reduces strains on SIPC's resources, including the SIPC membership assessment fund from which customers are paid.

Capital Standards for Life Insurers Are to Help Limit Failures and Protect Claimants

Generally speaking, state insurance regulators are to monitor the health and solvency of regulated life insurers in order to protect claimants. For state insurance regulators, the purposes of capital are similar to the purposes of capital for bank regulators. State insurance regulators impose capital requirements to try to limit life insurance company failures and thus help ensure the long-run viability of these insurance companies so that they can meet policyholders' claims in the future. However, state regulators regulate only insurance companies and not the insurance groups or the often large, diversified financial firms that own insurance companies. Generally, however, insurance regulators do have the responsibility of approving mergers or acquisitions of insurance companies.

Table 2.1: Primary Purposes of Regulatory Capital

Entity type	Primary purposes of regulatory capital
Banks and bank holding companies	• To help ensure the safety and soundness of the banking and payments systems • To minimize losses to the deposit insurance funds
Broker-dealers	• To protect customers and other market participants from losses due to broker-dealer failure • To ensure the integrity of the securities markets
FCMs	• To protect customers and other market participants from losses due to the failure of the FCM • To ensure the integrity of the commodities markets
Insurance companies	• To monitor the health and solvency of regulated insurers to protect claimants

Source: GAO analysis of applicable regulations.

Regulatory Capital Requirements Differ by Industry Sector, Reflecting Differences in Regulatory Purposes and Dominant Activities Within Sectors

Current regulatory capital requirements for the banking, securities, futures, and life insurance sectors vary in how they take into account the risks of regulated entities in determining minimum capital standards. The capital requirements differ, although the rules for securities broker-dealers and FCMs are similar. These differences reflect differing regulatory purposes, as discussed earlier, or differences in the types of activities and risks that are, or have been, dominant for the various types of regulated entities. To one degree or another, all of the regulators have adopted some form of "risk-based" capital regulation. However, due to differences in their purposes or in the historic risks faced by the regulated entities, the actual methods for assessing risks and determining capital levels continue to differ across regulators.

Bank Regulatory Capital Requirements Emphasize Credit Risk and Certain Market Risks

Initial bank risk-based capital requirements primarily emphasized credit risk, reflecting the predominance of lending activities by banks. In 1988, regulators in the United States and other countries who were part of the Basle Committee on Banking Supervision[6] agreed to the Basle Accord, an internationally developed capital standards framework for internationally active banks. The accord's requirements were initiated in the United States in March 1990, with a 2-year phase-in period ending in full implementation

[6]The Bank for International Settlements was established in 1930 in Basle, Switzerland. Its objectives are to promote cooperation of central banks, to provide additional facilities for international operations, and to act as trustee for international financial settlements. The Basle Committee on Banking Supervision meets under the auspices of the Bank for International Settlements. It is made up of the heads of supervision from the central banks and supervisory authorities of Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

in 1992. These requirements pertained primarily to credit risk; however, they were amended in 1996 to incorporate market risk requirements for specific types of assets that are often traded in internationally active banks. In addition to the risk-based requirements, U.S. banking regulators also have minimum leverage capital requirements. These leverage capital standards were established prior to—and have been retained even after the implementation of—the risk-based capital standards. Also, in 1991, FDICIA created a capital-based framework for bank oversight and enforcement based on the use of increasingly stringent forms of prompt corrective action as an institution's leverage and risk-based capital ratios decline. (See app. I for a more detailed discussion of bank risk-based capital requirements.)

Credit Risk Standards Under the Basle Accord

The 1988 accord's standards, which bank regulators and others describe as "risk-based," require banks to hold capital to cushion against potential losses arising primarily from credit risk.[7] Although the accord pertains to internationally active banks, U.S. banking regulators have required all U.S. banks and bank holding companies, since 1992, to hold capital equal to at least 8 percent of the total value of their on-balance sheet assets and off-balance sheet items,[8] after adjusting this value by a measure of the relative risk (known as risk-weighting).[9]

According to regulatory guidelines on capital adequacy, the final supervisory judgment of a bank's capital adequacy may differ from the conclusions that might be drawn solely from the risk-based capital ratio. This is because the ratio does not incorporate other factors that can affect a bank's financial condition, such as interest rate exposure, liquidity risks, the quality of loans and investments, and management's overall ability to

[7]Recently adopted regulatory capital requirements for both banks and life insurers are often referred to as "risk-based" capital requirements, a term that is not generally used to describe capital requirements for securities broker-dealers and FCMs. However, current capital requirements for all types of regulated financial entities variously take account of risks in the entities' business.

[8]An off-balance sheet item is a financial contract that can create credit losses for the bank but is not reported on the balance sheet under standard accounting practices. An example of such an off-balance sheet position is a letter of credit or an unused line of credit, which commits the bank to making a loan in the future that would be on the balance sheet and thus create a credit risk.

[9]The risk-based capital guidelines apply on a consolidated basis to banks and bank holding companies with consolidated assets of $150 million or more. For bank holding companies with less than $150 million in consolidated assets, the guidelines are to be applied on a bank-only basis, unless the parent bank holding company is engaged in nonbanking activity involving significant leverage, or the parent company has a significant amount of outstanding debt that is held by the general public.

monitor and control financial and operating risks.[10] The guidelines establish minimum ratios of capital to risk-weighted assets; banks are generally expected to operate well above these minimum ratios.

Banks are required to meet a total risk-based capital requirement equal to 8 percent of risk-weighted assets. At a minimum, a bank's capital must consist of core capital, also called tier 1 capital, of at least 4 percent of risk-weighted assets. Core capital includes common stockholders' equity, noncumulative perpetual preferred stock, and minority equity investments in consolidated subsidiaries.[11] The remainder of a bank's total capital can also consist of supplementary capital, known as tier 2 capital. This can include items such as general loan and lease loss allowances, cumulative preferred stock, certain hybrid (debt/equity) instruments, and subordinated debt with a maturity of 5 years or more. The regulation limits the amount of various items included in tier 1 and tier 2 capital. For example, the amount of supplementary (tier 2) capital that is recognized for purposes of the risk-based capital calculation cannot exceed 100 percent of tier 1 capital.

These capital standards were developed because regulators in the United States and in other countries wanted to address more adequately the credit risks posed by certain bank activities. By working with various countries to develop an international standard, regulators also attempted to encourage banks to strengthen their capital positions while minimizing any competitive inequality that might arise if requirements differed across countries. According to the original 1987 consultative paper issued by the Basle Committee, the target ratio of 8 percent capital to risk-adjusted assets represented a higher level of capital than banks in various countries were generally holding at the time.[12] Recognizing this, the 1988 Basle Accord allowed 4 years for banks to come into full compliance with the required amount.

[10]Capital Adequacy Guidelines, Reg. H (12 C.F.R. pt. 208) App. A, Board of Governors of the Federal Reserve System as amended Dec. 31, 1993. OCC's regulation is at 12 C.F.R. pt. 3.10 and 3.11. FDIC's regulation is at 12 C.F.R. pt. 325.

[11]Perpetual preferred stock means preferred stock that does not have a maturity date and cannot be redeemed at the option of the holder. Cumulative perpetual preferred stock requires all dividends to be paid on it before payment of any common stock dividends. Dividends are not cumulative for noncumulative perpetual preferred stock. Banks are allowed to include in their core capital only noncumulative perpetual preferred stock. For bank holding company calculations, both cumulative and noncumulative perpetual preferred stock qualify for inclusion in tier 1. However, the aggregate amount may not exceed 25 percent of the sum of all core capital elements, including cumulative perpetual preferred stock.

[12]Consultative Paper: Proposals for International Convergence of Capital Measurement and Capital Standards, Committee on Banking Regulations and Supervisory Practices, BIS (Basle, Switzerland: Dec. 1987).

The risk-weights for credit risk attempt to account for the relative riskiness of a transaction on the basis of its broad characteristics, such as a type of obligor (e.g., government vs. bank vs. a private sector borrower) and whether the transaction is on- or off-balance sheet. Assets with a relatively low likelihood of default are assigned lower risk-weights than assets thought to have a higher likelihood of default. Although the amount at risk is often associated with changing asset prices, the credit risk calculation does not use market price information to evaluate risks, except in the case of derivatives contracts. Because bank loans, which dominate credit risks, generally are not traded, market price information cannot be regularly observed and thus used to evaluate risk. Instead, the risk-weights for credit risk are broad categories arrived at through consensus among members of the Basle Committee.

Under the credit risk rules, the adjustments of asset values to account for the relative riskiness of a counterparty involve multiplying the asset values by certain risk weights, which are percentages ranging from 0 to 100 percent. A zero risk-weight reflects little or no credit risk. For example, if a bank holds a claim on the U.S. Treasury, a Federal Reserve Bank, or the central government or central bank of another qualifying[13] Organization for Economic Cooperation and Development (OECD) country,[14] this asset is multiplied by a factor of 0 percent, which results in no capital being required against the credit risk from this transaction.

For an obligation owed by another commercial bank in an OECD country, a bank must multiply the amount of this obligation by 20 percent, which has the effect of requiring the bank to hold capital equal to 1.6 percent of the value of the claim on the other bank. Loans fully secured by a mortgage on a 1-4 family residential property carry a risk weight of 50 percent, thus requiring the bank to hold capital equal to 4 percent of the value of the mortgage. For an unsecured obligation owed by a private corporation or individual, such as a loan without collateral, a bank must multiply the amount of the unsecured obligation by 100 percent, which requires the bank to hold capital equal to a full 8 percent of the value of the unsecured obligation.

The U.S. regulations place all credit risks into one of four broad categories and treat each product in a given category as if it carries equal levels of

[13]In July 1994, the Basle Committee amended the accord concerning the qualification for OECD risk-weighting. See appendix I for a further explanation.

[14]OECD includes members from 29 countries. Its goals are to achieve high economic growth, contribute to sound economic expansion, and contribute to the expansion of world trade.

credit risk—that is, the capital requirement for each asset in the category is based on the same percentage risk-weight. Although these risk-weightings are based primarily on the type of obligor, qualifying collateral (such as cash and government securities) and qualifying guarantees (including bank and government guarantees) are also recognized.

To adjust for credit risks created by financial positions not reported on the balance sheet, the regulations provide conversion factors to express off-balance sheet items as an equivalent on-balance sheet item, as well as rules for incorporating the credit risk of interest-rate, exchange-rate, and other off-balance sheet derivatives. These positions are converted into a credit equivalent amount, and then the standard loan risk-weight for the type of customer is applied. The risk-weight is applied according to the type of obligor, except that in the case of derivatives the maximum risk-weight is 50 percent.

Final Rule to Address Market Risk Adopted for Dealer Banks

In September 1996, U.S. bank regulators issued a final rule based on the Basle Committee's January 1996 amendment to the Basle Accord designed to incorporate market risks into the risk-based capital standards.[15] As applied by U.S. bank regulators, the purpose of the amendment was to ensure that banks with significant exposure to market risk maintain adequate capital to support that exposure. Because the market risk rule applies to assets that are commonly traded in public markets and marked to market,[16] the risk calculations are based, in part, on measuring expected movements in prices and the risks in the current financial position of the institution.

U.S. rules apply to any bank or bank holding company whose trading activity equals 10 percent or more of its total assets or whose trading activity equals $1 billion or more. In addition, a bank regulator can include an institution that does not meet the criteria if deemed necessary for safety and soundness purposes or can exclude institutions that meet the applicability criteria. At the end of 1996, 17 banks and 17 bank holding

[15]Amendment to the Capital Accord to Incorporate Market Risk, Basle Committee on Banking Supervision, Jan. 1996.

[16]Marking to market means that the value of a financial product on the books of an institution is regularly expressed in terms of its fair value. Some assets, such as stocks and bonds, which are regularly traded on exchanges, can be marked to market easily on the basis of current market prices. Other assets, such as commercial loans provided by banks, are more difficult to mark to market because each loan is unique and there is no active secondary market generating fair prices or values for such loans.

companies met these criteria.[17] The new rules became mandatory January 1, 1998, but banks could have begun implementing them as of January 1, 1997.

The final market risk rule requires that institutions adjust their risk-based capital ratio to take into account both the general market[18] and specific risk of all "covered positions" both on- and off-balance sheet.[19] The rule does not cover all market risks faced by banks. For example, interest rate risk on nontrading assets such as commercial loans and mortgages is not included.

The rule requires that banks use their own internal models to measure their daily "value-at-risk" (VAR) for covered positions.[20] VAR reflects changes in prices; price volatility or variability; and correlation among the prices of financial assets (that is, the extent to which asset prices move together). A bank's internal model may use any generally accepted VAR measurement technique, but the regulation requires the level of sophistication and accuracy of the model to be commensurate with the nature and size of the bank's covered positions.[21]

To adapt banks' internal models for regulatory purposes, bank regulators developed minimum qualitative and quantitative requirements that all banks subject to the market risk standard are to use in calculating their VAR estimate for determining their risk-based capital ratio. The qualitative requirements reiterate the basic elements of sound risk management. For example, banks subject to the market risk capital requirements are

[17]The Federal Reserve notes that the 17 banks that met the market risk criteria held 98 percent of the trading positions (assets plus liabilities) held by all U.S. commercial banks at the end of 1996. Fourteen of the 17 holding companies that met the criteria were associated with banks that met the criteria.

[18]General market risk means changes in the market value of covered positions resulting from broad market movements, such as changes in the general level of interest rates, equity prices, foreign exchange rates, or commodity prices. Specific risk means changes in the market value of specific positions due to factors other than broad market movements and includes such risks as the credit risk of an instrument's issuer.

[19]Covered positions means all positions (both debt and equity) in a bank's trading account and all foreign exchange and commodity positions, whether or not in the trading account.

[20]Value-at-risk represents an estimate of the maximum amount by which the value of an institution's positions could decline due to general market movements during a fixed holding period, measured with a specified confidence interval.

[21]The U.S. market risk approach was based on internal models produced by each bank. The Basle Accord permitted two alternative approaches—a bank could develop its own internal model or apply a standardized approach written into the accord. The standardized approach assigned risk to assets on the basis of their characteristics, such as interest rates or terms to maturity. U.S. banks are to use only the internal models approach.

required to have a risk control unit that reports directly to senior management and is independent of business trading units.

According to the final rule, the quantitative requirements are designed to ensure that an institution has adequate levels of capital and that capital charges[22] are sufficiently consistent across institutions with similar exposures. These requirements call for each bank to use common parameters when using its internal model for generating its estimate of VAR. These common parameters include, among others: daily calculation; an assumed holding period of 10 days; a 99 percent confidence level; the use of empirically verified correlation between risk types; and the use of at least 1 year of historical data, with the data updated at least once every 3 months.

The total market risk charge is the sum of the general market and specific risk charges. The market risk charge starts from the estimate of VAR. Because the VAR models may not capture unusual market events, the general market risk charge is then the higher of the previous day's VAR, or the average daily VAR over the last 60 business days multiplied by at least 3. The specific risk charge can be determined by a bank's internal model if the model is approved by the regulator, or by calculations specified in the regulation if the model is not approved. The charge for specific risk is added to the general market risk amount to obtain the total market risk capital charge.

For banks subject to the market risk charge, the market risk regulation includes an additional tier of qualifying capital—tier 3. Tier 3 capital is unsecured subordinated debt that is fully paid up, has an original maturity of at least 2 years, and is redeemable before maturity only with approval by the regulator.[23]

The final rule also requires banks to conduct periodic backtesting beginning in January 1999. More specifically, banks will be required to compare daily VAR estimates generated by internal models against actual daily trading results to determine how effectively the VAR measure identified the boundaries of losses, consistent with the predetermined statistical confidence level. The regulation will require bank regulators to

[22]In the market risk amendment, the calculated capital charge is a conservative estimate of possible losses due to market volatility.

[23]To be included in the definition of tier 3 capital, the subordinated debt is to include a lock-in clause precluding payment of either interest or principal (even at maturity) if the payment would cause the issuing bank's risk-based capital ratio to fall or remain below the minimum requirement.

use the backtesting results to adjust the multiplication factor (multiplier) used to determine the bank capital requirement.[24]

Capital Leverage Ratio Supplements Credit and Market Risk Measures

In addition to the risk-based capital requirements, U.S. banks are subject to a minimum leverage ratio, which is a requirement that tier 1 capital be equal to a certain percentage of total assets,[25] regardless of the type or riskiness of the assets. Leverage ratios have been part of bank regulatory requirements since the 1980s. They were continued after the introduction of risk-based capital requirements, as a cushion against risks not explicitly covered in the risk-based capital requirements, such as operational weaknesses in internal policies, systems, and controls. According to FDIC, leverage standards also help to restrict excessive asset growth and minimize potential moral hazards by ensuring that any asset growth is funded by a commensurate amount of owners' equity.

Since the early 1990s, banks have been specifically required to hold tier 1 capital equalling between 3 and 5 percent of their total assets, depending on a regulatory assessment of the strength of their management and controls. The amount of capital held by a bank is not to be less than this leverage ratio. However, if the risk-based capital calculation yields a higher capital requirement, the higher amount is the minimum level required.

Capital Levels of Regulated Banks Currently Tend to Exceed Required Minimum Requirements

In 1997, the risk-based capital ratios for the six large banks we spoke with all exceeded the minimum 8 percent total requirement, as shown in table 2.2. In addition, the ratios for tier 1 capital, which is considered the strongest form of capital, exceeded the 4 percent minimum requirement at all of the banks. According to regulatory officials, the risk-based capital ratios of almost all U.S. banks exceed the minimum required levels. According to FDIC, fewer than 10 percent of U.S. banks actually report risk-based capital figures by completing the Call Report Risk-Based Capital forms. When calculating their capital ratios, banks are permitted to perform a simple test that, once passed, negates the need to do the more complicated calculations. Over 90 percent of banks pass this de minimis test, and an algorithm approximates their risk-based capital level.

[24]For example, if a bank exceeds its VAR estimate 10 or more times in the previous 250 business days, its multiplier could be increased from 3 to 4.

[25]For purposes of the leverage ratio, the federal regulators define "total assets" for banks as the average of total assets reported in the Call Report, minus any assets that are deducted in determining tier 1 capital.

Bank regulators told us they believe prompt corrective action has been influential in keeping bank capital levels up.[26] In addition, several years of record-breaking earnings have facilitated financial firms' capital accumulation.

Table 2.2: Risk-Based Capital Ratios for Six Large Bank Holding Companies, as of December 31, 1997[a]

Dollars in billions

	Total risk-based capital		Tier 1 risk-based capital	
Bank holding company	Dollar amount	Percentage of total risk-weighted assets	Dollar amount	Percentage of total risk-weighted assets
BankAmerica Corporation	$26.6	11.6%	$17.3	7.5%
Bankers Trust New York Corp.	11.0	14.1	6.4	8.3
Canadian Imperial Bank of Commerce[a]	14.5	9.8	10.2	7.0
The Chase Manhattan Corp.	33.3	11.6	22.6	7.9
Citicorp	31.1	12.3	21.1	8.3
First Chicago NBD Corp.	12.7	11.7	8.5	7.9

Note: All figures rounded.

[a]The fiscal year for the Canadian Imperial Bank of Commerce ended on October 31, 1997. The capital ratios in the table above for the Canadian Imperial Bank of Commerce were calculated using regulatory guidelines for Canadian banks. Under U.S. rules, its ratios would have been 8.8 percent for total capital and 6.4 percent for tier 1 capital.

Source: 1997 Annual Reports of the bank holding companies in table.

Securities and Futures Regulatory Capital Requirements Emphasize Liquid Capital to Meet Customer Obligations in the Event of Firm Failure

As discussed earlier, regulators of securities broker-dealers and FCMs seek to protect customers of the firms they oversee as well as to protect the integrity of their markets. The regulatory foundation of customer protection efforts includes capital requirements in the form of net capital rules[27] and customer protection and funds segregation rules,[28] which are designed to protect the regulated entity's customers and thereby other market participants from monetary losses and delays that can occur when

[26]According to FDIC, its risk-based assessment rules provide an incentive for insured institutions to exceed the minimum required capital levels. Insured institutions that are "well capitalized" pay at a lower premium rate than institutions that are merely adequately capitalized (meet the minimum requirements), or are less than adequately capitalized. To be well capitalized, an institution must have a total risk-based capital ratio of 10 percent or more, a tier 1 ratio of 6 percent, and a leverage ratio of 5 percent.

[27]SEC Rule 15c3-1 and CFTC Rule 1.17.

[28]SEC Rule 15c3-3 and CFTC Rules 1.20-1.30.

the regulated entity fails.[29] The objective of protecting investors does not extend to the protection of the going concern of broker-dealers or FCMs, nor does it extend to the protection of investors' holdings against market losses. These rules, respectively, require SEC-registered broker-dealers and CFTC-registered FCMs—the regulated entities—to continually maintain sufficient liquid assets to protect the interest of customers and other market participants if the firm ceases doing business, and as applicable, to keep customer assets segregated from the regulated entity's assets. The rules focus specifically on the regulated entity's financial condition and activities. As noted above, SEC and CFTC do not have statutory authority to regulate holding companies of broker-dealers or FCMs. The financial condition of holding companies or other affiliates of the regulated entity are generally not included in computation of net capital or compliance with the customer segregation rule.[30]

SEC and CFTC Use Similar Methods to Calculate Capital

SEC and CFTC calculate broker-dealer and FCM liquid capital, respectively, in a similar manner. However, their capital requirements, which are based on either ratios of capital to assets or capital to liabilities of the firm, are calculated differently.

SEC's Net Capital Rule

Capital standards for brokers and dealers based upon liquidity have been in effect since 1934 when the Securities Exchange Act was adopted. According to SEC, it adopted the SEC Uniform Net Capital Rule[31] in 1975 in response to congressional concerns arising from the unprecedented financial and operational crisis in the securities industry from 1967 to 1970. It is a conservative liquidity-based capital standard that requires broker-dealers to maintain a minimum level of liquid capital sufficient to promptly satisfy all of its obligations to customers and other market participants, and to provide a cushion of liquid assets to cover potential market, credit, and other risks. The rule focuses generally on the registered broker-dealer; therefore, the assets and liabilities of a related entity (e.g., an affiliate or parent) of the broker-dealer are generally not taken into account in calculation of net capital.

Net Capital Requirements: With certain exceptions, the net capital rule requires a registered broker-dealer to maintain the greater of an absolute

[29]CFTC imposes capital requirements on both FCMs and Introducing Brokers. Because Introducing Brokers do not hold customer funds and do not pose a significant risk to the functions of the markets, their capital regulations are not considered further in this report.

[30]An exception to this principle is when the registered broker-dealer guarantees or assumes responsibility for the liabilities of the related unregistered entity. In such a situation, the broker-dealer is required to consolidate into a single computation the assets and liabilities of both itself and the guaranteed entity. See Rule 15c3-1(a)(1)(i) and Appendix C to the rule.

[31]SEC Rule 15c3-1 under the Securities Exchange Act of 1934.

minimum dollar amount of net capital depending on the nature of the broker-dealer's business,[32] or a specified minimum ratio of net capital to either its liabilities or its customer-related receivables.

Under the SEC regulations, a broker-dealer must satisfy a minimum net capital ratio based either on a calculated ratio of capital to indebtedness (liabilities) or capital to customer-related receivables. Under the basic (or aggregate indebtedness) method, the capital a broker-dealer is required to maintain must be the greater of $250,000 or 6-2/3 percent of aggregate indebtedness (generally all the liabilities and/or obligations of the broker-dealer). The basic method is generally used by smaller broker-dealers. Under the alternative method, a broker-dealer is required to maintain capital equal to the greater of $250,000 or 2 percent of the total amount of customer-related receivables (money owed by customers and certain other market participants to the broker-dealer). If the broker-dealer is also registered as an FCM with CFTC under the Commodity Exchange Act (CEA) (i.e., dually-registered), it must maintain capital equal to the greater of SEC's minimum requirements, as described above; or 4 percent of the customer funds (money owed to the customers by the FCM) that the broker-dealer is required to segregate pursuant to the act and regulations thereunder. The alternative method tends to be used by larger broker-dealers.

The basic and alternative methods are intended to allow a firm to increase its customer business only to the extent that the firm's net capital can support such an increase.

Computing Net Capital: The process of computing a broker-dealer's regulatory net capital involves separating its liquid and illiquid assets. Liquid assets are assets that can be converted easily into cash with relatively little loss of value. Assets that are considered illiquid are given no value when net capital is computed (a 100 percent capital charge). Only liquid assets count in the calculation of net capital, because a broker-dealer must have sufficient capital to close its business within a short time frame and have sufficient liquid assets to meet its liabilities, including those of customers.

[32]For example, firms that hold customer funds or securities (i.e., carrying firms) have a minimum capital requirement of $250,000, whereas firms that serve as agents for customers and generally do not hold customer funds and securities (i.e., introducing firms) have a minimum capital requirement of $5,000. These levels of minimum dollar amounts were designed to protect customers against the riskiness of a particular business conducted by a broker-dealer. See appendix II.

To begin computing net capital, U.S. Generally Accepted Accounting Principles (GAAP)[33] equity must be determined by subtracting the broker-dealer's GAAP liabilities from its GAAP assets.[34] Certain subordinated liabilities are added back to GAAP equity because the net capital rule allows them to count toward capital, subject to certain conditions.[35] Deductions are taken from GAAP equity for illiquid assets, such as the value of exchange seats and fixed assets. Unsecured receivables are also deducted from GAAP equity. The net capital rule further requires prescribed percentage deductions from GAAP equity, called "haircuts."[36] Haircuts provide a capital cushion to reflect an expectation about possible losses on proprietary securities and financial instruments held by a broker-dealer resulting from adverse events. The amount of the haircut on a position is a function of, among other things, the position's market risk liquidity. A haircut is taken on a broker-dealer's proprietary position because the proceeds received from selling assets during a liquidation depend on the liquidity and market risk of the assets. Less liquid assets and assets with greater price volatility are more likely to take longer to sell and to be sold at a loss. Thus, the less liquid the position, the greater the haircut on the position. Haircuts generally recognize limited correlation among prices

[33]GAAP are accounting rules and conventions defining acceptable practices in preparing financial statements. GAAP's aim is to provide uniformity in financial statements reporting.

[34]Broker-dealer assets include cash; money owed by customers and other broker-dealers; securities held in proprietary trading and investment accounts; and fixed assets like buildings, furniture, and equipment. Broker-dealer liabilities include money owed to customers and other broker-dealers, bank loans, debt securities issued by the broker-dealer, or funds loaned to it by the parent company.

[35]The rule permits certain subordinated liabilities to be included as part of the regulatory net capital of a broker-dealer. In order to count toward net capital, among other things, these subordinated liabilities (1) must be subordinated to the claims of all present and future creditors, including customers; (2) must be approved for inclusion as net capital by the broker-dealer's self-regulatory organization; (3) may not be repaid if the repayment would reduce net capital below certain required amounts; and (4) must have an initial term of 1 year or more.

[36]Haircuts are intended to reflect the inherent risks within a broker-dealer's trading and investment positions and provide a margin of safety against losses incurred by a broker-dealer. Through the issuance of no-action position letters, SEC officials in the Division of Market Regulation can reduce the capital charge for a particular type of transaction. An approved no-action position can be used by any market participant for the participant's benefit. SEC issues no-action letters in response to requests by broker-dealers, industry groups, and SROs for its staff members' views on whether they would recommend enforcement action if the particular set of facts and circumstances as outlined in the request letter were to occur. No-action letters do not make rulings on whether the particular circumstances are legal or illegal—the letters only state whether the Division of Market Regulation staff would or would not recommend an enforcement action to the Commission under those specific circumstances. Examination staff use these no-action letters when calculating a particular broker-dealer's compliance with net capital requirements. CFTC also issues no-action positions regarding capital requirements for FCMs.

that can affect the actual values received when assets are liquidated.[37] The final figure, after all adjustments are made, is referred to as net (or liquid) capital. This figure is then compared to the minimum requirement to determine capital compliance. See appendix II for greater discussion of the SEC net capital rule.

CFTC's Net Capital Rule

Liquid capital for FCMs is generally calculated in the same way that SEC calculates a broker-dealer's liquid capital. That is, CFTC generally makes similar liquidity (illiquid assets deductions) and risk (haircuts for trading and investment positions)[38] adjustments to GAAP net worth as does SEC in determining the amount of liquid capital. (See app. II for more detail on the calculation.)

CFTC's capital requirements, like SEC's, are based on the firms' business activities and apply only to the registered FCMs. However, unlike SEC's, CFTC's requirement is based on the amount of required segregated customer funds,[39] (subject to certain adjustments),[40] rather than aggregate indebtedness or customer-related receivables. The amount of required segregated funds is based primarily on margin requirements for the commodity contracts held by the FCM's customers. Margin requirements are set by each exchange for each commodity contract traded on the exchange and represent the customers' guarantee of performance. The amount of margin per commodity varies depending on the market value of the contract and volatility of the price of the underlying commodity. The amount of segregated funds on deposit is determined primarily by the Standard Portfolio Analysis of Risk (SPAN) margining system, a VAR based statistical model designed to evaluate the total risk in a portfolio of related futures and options positions. Therefore, the CFTC's capital requirements are, in large measure, risk-based. In addition, the deductions or haircuts for proprietary positions in futures or commodity option positions are applied to the margin requirement calculated under SPAN. All funds held by

[37]SEC has adopted a risk-based methodology using theoretical option pricing models to calculate haircuts for listed options and related hedge positions. See appendix II.

[38]CFTC's capital rule defers to SEC's haircuts on proprietary securities positions to reflect the market risk in such positions. SEC's capital rule defers to CFTC's haircuts on proprietary futures and options positions. CFTC's capital charges for proprietary futures and options positions are based on futures exchanges' margin requirements and are portfolio risk-based.

[39]Segregated customer funds typically include cash, securities held for customers or representing investments of customer funds deposited in segregated funds, bank accounts, margin on deposit with clearing organizations of contract markets, unrealized gains on futures contracts, and the market value of long options.

[40]See intra note 41.

FCMs but owed to customers are required to be segregated from the firm's funds and treated as belonging to customers.

Under CFTC's net capital rule (Rule 1.17), FCMs must maintain adjusted net capital in an amount that is no less than the greater of (a) a prescribed minimum fixed-dollar amount of $250,000; (b) a variable minimum amount of 4 percent of customer funds required to be segregated, subject to certain adjustments;[41] (c) the amount of adjusted net capital required by a registered futures association of which it is a member; or (d) if the FCM is also a registered broker-dealer, which is known as being "dually-registered," the amount required under SEC's net capital rule.

Under CFTC's capital rule, an FCM calculates adjusted net capital as the amount by which current assets (cash and other assets that are reasonably expected to be realized as cash in a year) exceed its adjusted liabilities (the FCM's total liabilities minus certain subordinated liabilities) and various regulatory charges or adjustments—such as percentage reductions in the market value of certain proprietary positions and undermargined customer accounts.[42]

Adjusted net capital is intended to provide a cushion for market and credit risks and to give a firm with customer accounts time to transfer accounts and liquidate the accounts of the defaulting customers in an orderly manner.

Capital Levels of Regulated Firms Currently Tend to Exceed the Regulatory Minimum Requirement

Some regulators and firm representatives told us that because a broker-dealer must cease conducting a securities business if its net capital falls below the minimum requirement, broker-dealers generally maintain capital greater than the minimum requirement (a.k.a. excess capital). As shown in table 2.3, the amount of excess net capital held by the five large securities firms in our study, which are all dually-registered as FCMs, ranged from $974 million to $1.845 billion. Some of the firm representatives we interviewed stated that one reason they held such large amounts of excess capital is that their counterparties required them to do so in order to be willing to conduct business with them.

[41]Pursuant to Rule 1.17(a)(1)(i)(B), this factor is 4 percent of the customer funds required to be segregated pursuant to CEA and the rules thereunder, plus the "foreign futures or foreign options secured amounts" (see Rule 1.3(rr)), less the market value of commodity options purchased by customers on or subject to the rules of a contract market or a foreign board of trade.

[42]An undermargined customer account is a margin account in which the customer's equity is below its required amount.

Table 2.3: Capital Information for Five Large U.S. Broker-Dealers and Their Holding Companies

Dollars in millions

Date of data	Parent company	Total consolidated capital[a]	Principal U.S. broker-dealer[b]	Net capital[c]	Excess net capital[d]
12/26/97	Merrill Lynch & Co., Inc.	$51,419	Merrill Lynch Pierce Fenner & Smith, Inc.	$2,249	$1,845
11/30/97	Lehman Brothers Holdings, Inc.	24,784	Lehman Brothers Inc.	1,484	1,359
11/30/97	Morgan Stanley, Dean Witter, Discover & Co.	38,748	Morgan Stanley & Co. Inc.	2,186	1,753
11/28/97	The Goldman Sachs Group, L.P.	21,774	Goldman, Sachs & Co.	1,770	1,370
12/31/97	Salomon Smith Barney Holdings, Inc.[e]	27,592	Salomon Brothers Inc.	1,047	974

[a]Total consolidated capital represents the sum of the parent company's GAAP ownership equity and long-term borrowings. For the Goldman Sachs Group, L.P. (a partnership), it represents the sum of the parent company's GAAP partners' capital and long-term borrowings.

[b]In terms of total assets. All of the principal U.S. registered broker-dealers are also registered with CFTC as FCMs (i.e., dually-registered).

[c]Net capital represents the amount of capital maintained by a U.S. registered broker-dealer pursuant to Rule 15c3-1 under the Securities Exchange Act of 1934 (the Exchange Act).

[d]Excess net capital represents the amount of capital held by a U.S. registered broker-dealer that is greater than the amount of capital that is required to be maintained by a U.S. registered broker-dealer pursuant to Rule 15c3-1 under the Exchange Act as of the date indicated.

[e]Salomon Smith Barney Holdings, Inc. is a wholly owned subsidiary of the Travelers Group, Inc.

Source: The Goldman Sachs Group L.P. 1997 Annual Review, 1997; the 1997 Annual Reports for the other parent companies; and the 1997 U.S. broker-dealers' annual statements of financial condition (audited).

Early Warning Capital Triggers

In addition to the minimum base requirements, the regulatory net capital rules and the rules of the various SROs establish early warning capital levels that exceed the minimum requirement. These capital triggers allow regulators and SROs to identify at early stages broker-dealers and FCMs that are experiencing financial difficulties and to take corrective actions to protect customers and the marketplace. Broker-dealers and FCMs are required to promptly notify their regulators when early warning violations occur. SROs are required to notify SEC and CFTC and place restrictions on the activities of regulated entities whose net capital falls to the early warning levels.[43] For example, under the SEC net capital rule, a

[43]SEC Rule 17a-11 and Rule 15c3-1(e) under the Securities Exchange Act of 1934.

broker-dealer that uses the alternative method of calculating net capital may not withdraw equity capital in any form to pay shareholders if its net capital is less than 5 percent of its customer-related receivables.

When an FCM's adjusted net capital falls below its early warning level, which is generally 150 percent of the minimum net capital amount, it must promptly notify CFTC.[44] In addition, CFTC requires FCMs to report to CFTC when a series of events, on a net basis, causes a 20 percent or greater reduction in their net capital.

As soon as a broker-dealer's or FCM's net capital amount falls below the minimum net capital level, the firm must immediately cease conducting business and it must either demonstrate that it has come back into compliance with net capital requirements or liquidate its operations. Closing a broker-dealer or FCM before insolvency makes the firm a viable merger candidate because of its residual value and generally allows the regulated entity's customers and other market participants to be fully compensated when the firm is liquidated.

The SEC Net Capital Rule Amendment Relates Capital Charges More Closely to Risks in Listed Options

After a 2-year test period using the Options Clearing Corporation's Theoretical Intermarket Margining System (TIMS),[45] SEC amended its net capital rule in early 1997 to allow broker-dealers to use theoretical option pricing models[46] (i.e., statistical models) to calculate required capital charges for exchange-traded (i.e., listed) equity, index, and currency options and their related hedged positions.[47] At this time, the only approved vendor and options pricing model is the Options Clearing Corporation and its TIMS. According to SEC, this methodology will relate capital charges (haircuts) on these instruments more closely to the market risk inherent in these broker-dealer options positions. This methodology permits the risk calculations for listed options to reflect market prices, price volatility, and correlation among asset prices.

[44]CFTC Rule 1.12. For dually-registered firms, the CFTC early warning capital trigger is the greater of (1) 150 percent of the greatest of the amounts calculated pursuant to CFTC Rule 1.17(a)(1)(i)(A-C) or (2) the amount specified in SEC Rule 17a-11(b).

[45]TIMS is used to measure the market risk associated with participants' positions and to establish clearing house margin requirements.

[46]A broker-dealer may use the Options Clearing Corporation's TIMS or any other model maintained and operated by any third-party source and approved by a designated examination authority to determine theoretical options prices and related haircuts. See appendix II for additional discussion.

[47]See SEC Release No. 34-38248 (Feb. 6, 1997).

According to the regulations, this methodology is a two-step process. In the first step, third-party source models and vendors approved by a designated examining authority (i.e., an SRO) are to be used to estimate the potential gain and loss on the individual portfolios of the broker-dealers. In the second step, such approved vendors are to provide, for a fee, a service by which the broker-dealer may download the results generated by the option pricing models to allow the broker-dealers to then compute the required haircut for their individual portfolios. (See app. II for greater discussion of the salient features of the methodology.) Adoption of this methodology is the first time SEC has formally permitted the use of statistical models, which reflect price volatility and correlation, for setting regulatory capital requirements. The effective date of the amendment was September 1, 1997.

SEC, CFTC, and some SROs are exploring other possible approaches to more closely relate regulatory capital charges to the actual risks inherent in a firm's operations. These initiatives are discussed in chapter 4.

SEC and CFTC Both Have Customer Segregation Rules to Protect Customer Assets

Both SEC and CFTC have rules that require the segregation of customer funds from firm funds. The SEC rule complements its net capital rule and is designed to prevent the misallocation or misuse of customer funds and securities. The CFTC rule also complements its net capital rule and provides for the safeguard of customer funds by requiring that they are segregated from the FCM's own funds.

SEC's Rule Is Designed to Safeguard Customer Assets

The SEC customer protection rule[48] attempts to prevent the misallocation or misuse of customer funds and customer securities by broker-dealers. The rule applies to carrying firms because they hold customer assets. The rule, working in conjunction with SEC's net capital rule, is designed to protect the regulated entity's customers from monetary losses and delays that can occur when the regulated entity fails.

[48]Rule 15c3-3 under the Securities Exchange Act of 1934.

The customer protection rule has two parts: (1) possession or control[49] of all customers' fully paid and excess margin securities,[50] and (2) special reserve bank account. The first part is to prevent broker-dealers from using customer securities to finance the firm's proprietary activities, because all customers' fully paid and excess margin securities must be in possession or control of the broker-dealer. The rule also requires the broker-dealer to maintain a system capable of tracking fully paid and excess margin securities daily. The broker-dealer is required to keep all customer fully-paid and excess margin securities segregated from the broker-dealer's assets and maintained free of all claims or liens.

The second part of the customer protection rule involves customer cash kept at broker-dealers. When customer cash—the amount the firm owes customers (credits)—exceeds the amount customers owe the firm (debits), the broker-dealer must keep the difference in a special reserve bank account. The broker-dealer is to calculate the amount of the difference weekly using the reserve formula specified in the rule. If debits exceed credits, then no deposit is required. Broker-dealers may not use customer margin securities and cash to finance their operations or proprietary trading activities, except to finance other customers' transactions. Also, creditors of a failed securities broker-dealer cannot claim assets from the broker-dealer's customer property account.

CFTC's Rule Is Designed to Safeguard Customer Funds

Section 4d(2) of the CEA and CFTC rules 1.20-1.30 provide for the safeguarding of customer funds[51] by requiring such funds to be segregated

[49]"Possession" of securities means the securities are physically located at the broker-dealer. "Control" of securities means the securities are located at one of the approved "control" locations.

Rule 15c3-3 specifies the locations in which a security will be considered in possession or control of the broker-dealer. This includes those securities that are held at a clearing corporation or depository, free of any lien; carried in a Special Omnibus Account under the Federal Reserve Board Regulation T with instructions for segregation; a bona fide item of transfer of up to 40 days; in the custody of foreign banks or depositories approved by SEC; in a custodian bank; in transit between offices of the broker-dealer; or held by certain subsidiaries of the broker-dealer.

[50]Fully paid securities are securities that are purchased in transactions for which the customer has made full payment. Excess margin securities in a customer account are margin securities with a market value in excess of 140 percent of the account debit balance (the amount the customer owes the firm for the purchase of the securities). For example, a customer buys $80,000 worth of securities on 50-percent margin, and the broker-dealer loans the customer $40,000 (debit balance). The amount of the customer margin securities that can be pledged as collateral for a bank loan is $56,000 (140 percent times $40,000). Because only $56,000 of the $80,000 of customer securities can be pledged to the bank as collateral, the remaining $24,000 of securities are excess-margin securities that must be segregated and held in safekeeping by the broker-dealer.

[51]CFTC Rule 1.3(gg) defines "customer funds" to mean all money, securities, or property received by an FCM on behalf or owed to customers used (1) to margin, guarantee, or secure futures contracts; or (2) as the premium on CFTC-regulated exchange traded options, and money accruing to customers as a result of such futures and options contracts.

from funds belonging to the FCM. Similar to the SEC rule, the CFTC segregation rule complements its net capital rule and exists to ensure that FCMs do not mix customer funds with theirs. In the event of a firm's insolvency, under the rule, customer funds would be clearly identified as belonging to customers and would not be available to creditors of the firm.

The rule requires that funds belonging to an FCM's customers be separately accounted for; segregated as belonging to commodity futures or option customers; and, when deposited with any bank, trust company, clearing organization, or another FCM, deposited under an account name that clearly identifies them as such and shows that they are segregated as required by the act and regulations. Also, each FCM is required to obtain and retain an acknowledgment from such bank, trust company, clearing organization, or FCM that it was informed that the customer funds deposited therein are those of commodity or option customers and are being held in accordance with the provisions of the act and regulations.

On a daily basis, FCMs are to compute the customer funds they are required to segregate on the basis of funds received from customers and the daily mark to market of customer positions. CFTC's segregation rule requires that 100 percent of each customer's funds be segregated from FCM's funds. Unlike securities broker-dealers, FCMs generally cannot use one customer's funds to finance another customer's transactions. Thus, CFTC's segregation requirements serve to provide protection through the deposit of all customer funds in segregated accounts.[52]

Under SEC requirements, generally the net amount owed to customers is deposited in a bank account with the assumption that money receivable from the broker-dealer's customers will be collected and paid to the customers having credit balances in their accounts, and any shortfall will be covered by the amount deposited in the bank account set up for customers. In addition, SIPC provides insurance protection for securities customers of broker-dealers in the event there are not enough funds on deposit in the bank account. The commodities industry does not have a customer account government-sponsored insurance program that protects against losses due to FCM insolvency.

[52]According to the Chicago Mercantile Exchange (CME), the customer segregation requirements are designed to protect customers from the consequences of an FCM's failure, but they do not always provide sufficient protection should the default be caused by another customer of that firm. In CME's view, protection against customer-caused defaults rests with the FCM's management and the importance placed on its internal risk management controls.

Together, these customer protection rules are designed to protect (1) customers and other market participants of broker-dealers and FCMs from monetary losses and delays that can occur when the regulated broker-dealer or FCM fails by facilitating the orderly unwinding of a failed firm through liquidation; and (2) the integrity of the securities and futures markets.

Insurance Regulatory Requirements Are to Ensure the Long-Run Viability of Insurers So Policyholders' Claims Can Be Honored

According to NAIC, capital requirements have been used as an important tool in limiting insolvency costs throughout the history of insurance regulation. Initially, states enacted statutes that required a specified minimum amount of capital and surplus for an insurance company to enter the business or to remain in the business.[53] In some states, a single dollar amount of minimum capital and surplus was applicable to all insurers, regardless of the lines of insurance they wrote. This requirement was, in effect, an entrance requirement and generally did not vary with the size of the insurer or the risks that a company accepted. Thus, the minimum amount of required regulatory capital was unlikely to bear any relationship to the amount of risk on the books of any particular insurer.

In the latter half of the 20th century, according to NAIC, changes within the insurance industry itself and the economic environment in which it operated raised questions about the long-term viability of traditional insurance products and led insurers to offer new products. These products included variable annuities, variable life insurance, universal life insurance, single-premium deferred annuities, and guaranteed investment contracts.[54] In NAIC's view, competition among sellers of these products led life insurers to seek higher returns on their investment portfolios, and some of them sought such returns without sufficient consideration of the accompanying higher investment risks.

[53]The life insurance industry designates its capital as capital stock, which represents funds paid into the company by shareholders; and as surplus, which is the remaining excess of assets over liabilities.

[54]An annuity is a contract written by an insurance company to provide income benefits for a specified number of years, or for life. In a deferred annuity, the premiums are paid currently but benefits are scheduled to begin at a later date. A variable annuity is a contract in which annual units are purchased, often through a retirement plan account. The number of units varies with unit cost, and the benefits vary directly with the experience of assets that back the contract. A single-premium deferred annuity is a deferred annuity contract purchased with a single premium. Whole life insurance is a plan that combines protection and a growing cash value. Variable life insurance is a form of whole life insurance in which the cash value varies, depending on the investment performance in a separate account. Universal life is a form of life insurance that combines accumulating cash value with a varying rate of return. A guaranteed investment contract is one in which the insurance company accepts a specified amount of money from a qualified retirement plan and agrees to refund the money at a fixed date in the future.

According to NAIC, an increase in the number and size of life insurer insolvencies from the 1960s through the 1980s led insurance regulators to believe they needed new tools to deal with changes in the industry resulting from new products and investment strategies. Because most states required a fixed minimum amount of capital regardless of the risks undertaken in a company's insurance and investment operations, regulators believed that the traditional statutory insurance capital requirements that were in place were not sufficiently flexible.

By 1990, according to NAIC, a number of states were experimenting with risk-based capital formulas for regulatory purposes. NAIC became interested in risk-based capital in 1989. Its working group and advisory committee developed and tested the life risk-based capital formula, which was approved by NAIC in December 1992, to be used for the first time with the 1993 annual statement filed in March 1994.

Application of the Risk-Based Capital Requirement to Life Insurance Companies

According to NAIC, the risk-based capital formula is intended to determine the minimum amount of capital an insurer needs to avoid triggering regulatory action. The amount of capital required varies with the risk an insurer is assuming in its insurance and investment operations, as well as the normal risks to which all businesses are subject. The formula requires companies to hold minimum percentages of various assets and liabilities as capital, with these percentages based on the historical variability of the value of those assets and liabilities. Companies are free to make their own capitalization decisions commensurate with their own level of risk tolerance as long as the level is above the regulatory minimum risk-based capital thresholds. In NAIC's view, its formula, in effect, imposes a minimum and uniform degree of risk aversion on all companies, but the formula also allows companies to operate freely at any given level above the minimum threshold.

The NAIC life insurance risk-based formula classifies all of the risks into four major categories: asset risk, insurance risk, interest rate risk, and all other business risk.[55] The formula consists of a series of risk factors that are to be applied, usually as multipliers, to selected assets, liabilities, or other specific company financial data to establish the minimum capital needed to bear the risk arising from that item (similar to risk-weights in banking).

[55]These risk categories are given the designations of C-0 to C-4, which are used by the insurance industry. Asset risk is divided into risk of default from affiliated investments and all other asset risks. These two categories are given the designation C-0 and C-1. The other three categories of risk are denoted by C-2, C-3, and C-4, respectively.

- The asset risks are the risks of asset defaults and decreases in market value. For example, the risk factor for cash in the formula is 0.003, which indicates that an insurer must maintain capital equal to three-tenths of 1 percent of its cash holdings to absorb the risk of loss in cash in a bank failure. At the other end of the range, the multiplier for publicly traded common stocks is 0.300, which indicates a requirement for capital equal to 30 percent of the value of the stocks to protect against downturns in the market. The formula also includes charges for risks arising from the ownership of subsidiaries and affiliates, which vary with the nature of these entities. According to NAIC data, asset risks represent by far the largest proportion of risk among the four categories faced by the life insurance industry as a whole.
- The insurance risks, which are unique to the insurance industry, are the risk of underpricing or unfavorable developments in mortality or morbidity. NAIC developed a series of risk factors to determine the capital necessary to absorb those risks that are to be applied to the net amount at risk (face amount less reserves) for life insurance. According to NAIC data, insurance risks are second in magnitude among the four categories of risks for the life insurance industry as a whole. However, for a large number of relatively small companies, this component is the dominant risk-based capital risk.
- NAIC defines interest rate risk as the chance that a change in interest rates will result in an insurer not earning enough return on its investments to meet its interest obligations under its various insurance and annuity contracts. There is also a risk that changes in interest rates will spur disintermediation.[56] The interest rate risk depends on how closely the assets and liabilities are matched in time. The formula is concerned with the risks related to annuity and pension business. Interest rate risk is third in magnitude among the four categories of risk for the life insurance industry as a whole.
- The all-other-business-risk category encompasses risks not included elsewhere in the formula. In developing the risk-based capital formula, the working group recognized that all companies are subject to some risks, such as litigation, that are not contemplated in the parts of the formula used for other categories. However, the group concluded that the derivation of appropriate risk factors for most of these risks was not possible. Also, these risks vary from one company to another. Initially, NAIC decided that the only risk factor to be included in the risk-based capital formula would be a charge for the risk of guaranty fund assessments.

[56]Disintermediation is the movement of funds from a financial intermediary (i.e., an insurance company) to a higher yielding investment in the general market.

In addition, the risk-based capital formula also requires the performance of sensitivity tests to indicate how sensitive the formula is to changes in certain risk factors. These tests require the company to recalculate its risk-based capital using revised risk factors for certain specified risks and to report the difference between the basic calculations and the sensitivity tests. The purpose of the tests is to provide additional information for company management and regulators.

In NAIC's view, the true impact of the risk-based capital system is in the Risk-Based Capital for Insurers Model Act (the Model Act), which NAIC developed and recommended that the states adopt. When adopted by a state, this act gives the state's chief insurance regulator the authority to act on the results generated by the risk-based capital formula.[57]

The act requires each insurer to file a report with NAIC; the commissioner of the insurer's domiciliary state; and the commissioner of any state in which the insurer is licensed, if that state's insurance commissioner requests it in writing. In their annual reports, insurers are also required to report their Authorized Control Level Risk-Based Capital, which is the total risk-based capital an insurer needs to hold to avoid being taken into conservatorship. (See app. III for additional information on life risk-based capital regulations.)

Industry Representatives See Progress in Recent Revisions to Capital Standards but Cite Problems With These and Other Capital Rules

The interviews we conducted with representatives of large, diversified firms; industry and rating agency officials; and regulators indicated generally positive views regarding revisions made to capital rules in banking and life insurance in the past several years to more precisely account for their actual risks ("risk-based" capital requirements). Representatives of banks and life insurers said that the changes were a step in the right direction. However, some of these representatives also said that further improvements were needed. Representatives of many of the large financial firms we interviewed generally said that the current requirements of the net capital rule did not correlate well with actual risks. Several of these representatives said that the net capital rule affected their decisions about where to conduct certain activities, such as derivatives.

[57]According to NAIC, as of March 1998, of the 51 insurance jurisdictions, which includes the District of Columbia but excludes the 4 U.S. territories, 50 have adopted laws, regulations, or bulletins that are considered to be substantially similar to the Model Act. The remaining jurisdiction, New York, has adopted a similar law that applies to life insurers.

Bank "Risk-Based" Capital Requirements Are Seen as a Regulatory Improvement but Also Raise Concerns About Accuracy of Risk Measurement

Bankers, regulators, and industry and rating agency officials we spoke with generally believe the current risk-based capital standards for banks are an improvement over the former requirements, but they still have limitations. For example, one regulator and one rating agency commented that although the current credit risk standards are crude, they are much better than the previous leverage ratio requirement, which did not vary with any differences in risk levels. In the view of the Chairman of the Federal Reserve Board, the risk-based capital accord of 1988 had shortcomings, but it was a genuine step forward at the time it was developed. In the view of the Comptroller of the Currency, the accord highlighted and ultimately helped reverse the slippage in bank capital levels worldwide. It focused attention on the whole concept of risk as a tool for both bank managers and bank supervisors and advanced the effectiveness of bank supervision worldwide. It gave official recognition to the growing importance of off-balance sheet activities in bank operations.

Some bank officials we spoke with commented that the current credit risk standards are nonetheless crude and imprecise. The primary reason for this is because the risk-weights are not adjusted for asset quality within each broad class of assets. Institute of International Finance officials said that the credit risk rules offered perverse incentives to banks to take on riskier loans in that they encourage banks to go up the yield curve in pursuit of a return on capital. This means that the bank is making more long-term loans, which tend to have higher interest rates than do short-term loans, thus simultaneously increasing interest rate risk and potential returns. The Federal Reserve Board Chairman noted a number of weaknesses in the risk-based capital structure for credit risk, including its inability to adjust weights for hedging, portfolio diversification, and management controls. Such adjustments are based on changing price volatility and correlation among prices. Another weakness noted by regulators is that the current risk-based structure does not consider all types of risk. Also, it is not flexible enough to respond to new market developments and products.

Officials of one bank told us that they do not manage to regulatory capital levels, because the credit risk-based capital requirements provide the wrong incentives by not distinguishing among the quality of products in the same asset class. Officials of two banks commented that they are not constrained by regulatory capital requirements, because assets can always be securitized so capital will not have to be held against them, or they can move to riskier assets in each credit risk category to obtain higher returns.

An official of another bank felt that the credit risk standards needed to be realigned to match current credit management practices in the industry.

Many bankers we spoke with generally felt the new market risk requirements, which are based on price volatility and correlation, were a step in the right direction and represented a recognition of standard risk management practices and principles. However, one bank told us that even this new requirement will require it to hold unrealistic levels of capital due to the multipliers imposed on the bank's internal model.

One regulator commented that a limitation of the new market risk requirement is that it covers market risk in a bank's trading book, but not in its banking book, which is where a lot of banks have exposure to market risk. Others commented that in practice, managers adjust their books daily, but the regulatory use of VAR is calculated with a 10-day holding period; thus, they believe it ignores this day-by-day adjustment process. Two rating agencies commented that even after the inclusion of market risk, other important risks to banks, such as operational and liquidity risks, are not quantified.

Regulatory Capital Requirements for Securities Firms Raise Concerns About Inefficiencies in These Entities

SEC believes the current haircut[58] approach of the net capital rule has several advantages. First, it requires an amount of capital that will be sufficient as a provision against losses, even for unusual events. Second, it is an objective, although conservative, measurement of risk in positions that allows the regulator to compare firms to one another. Third, the current methodology enables examiners to readily determine whether a firm is properly calculating haircuts.

SEC believes there are also weaknesses associated with determining capital charges on the basis of fixed percentage haircuts. For example, the current method of calculating net capital by deducting fixed percentages from the market value of securities can allow only limited types of hedges without becoming unreasonably complicated. In this way, the rule does not account for historical price correlation between foreign securities and U.S. securities or between equity securities and debt securities. By failing to recognize offsets from these correlations between and within asset classes, the fixed percentage haircut method may cause firms with large, diverse portfolios to reserve capital that actually overcompensates for market risk.

[58]See footnote 36 for an explanation of haircuts.

Representatives of the securities firms, rating agencies, and industry association officials we spoke with generally felt that the current net capital rule's requirements do not correlate well with the actual risks in the activities of firms. Industry officials told us that the current net capital rule does not deal well with hedging or other risk-reducing strategies, which are based on price volatility and correlation. Representatives of two firms commented that regulatory capital rules constrain their business decisions, because they require the firms to hold what they view as excessive capital for certain activities. Three firms told us that the net capital rule has an impact on where they do certain business activities, such as derivatives transactions, foreign exchange, and bridge financing. Some industry officials said they are forced to conduct these business activities in unregulated entities due to the high haircuts imposed by the net capital rule if a broker-dealer were to conduct these activities.[59] Representatives of another firm said the regulatory structure drives the holding company structure, which they consider to be an inefficient and expensive business structure. Firm representatives told us they have businesses in many countries, and they are required to provide information to each country regulator. No authority regulates all of the activities of these firms; therefore, even though firms provide a lot of information to regulators, no regulator knows the condition of the entire firm. One rating agency commented that broker-dealers have shifted risks to other parts of the firm in response to net capital requirements.

Representatives of three futures SROs commented that the strengths of CFTC's net capital rule are that it is easily understood, easily calculated, and easily verified by regulatory auditors. Weaknesses they saw in the rule were that (1) it applies only to funds of domestic customers on deposit with FCMs, so it misses noncustomers and foreign customers; (2) it misses coverage of some risks found in affiliates and internationally; (3) it creates incentives for FCMs to return excess margin funds to customers because such funds can increase an FCM's segregation requirement and therefore its capital requirement; and (4) it does not deal well with the complexities of exotic instruments.

Life Insurance Risk-Based Capital Requirements Are Seen as a Step Forward, but Concerns Remain

Life insurance companies, rating agencies, insurance regulators, and insurance association officials we spoke with generally felt risk-based capital requirements were a step forward, but improvements were needed. Insurance regulators commented that the main strength of the

[59]See chapter 4 for a discussion of a recent SEC proposal to create "limited purpose" broker-dealers that is to address this issue.

requirements is that they permit regulators to close a failing company. Similarly, representatives of two firms said that an advantage of these requirements is that they provided regulators a tool they could use before a firm had to be closed by allowing for graduated regulatory action. Representatives of one firm said that the effect of the requirements was to get weaker companies to increase their capital levels. Representatives of another firm commented that the most important aspects of risk-based capital requirements are their objectivity (auditability) and completeness. Representatives of one rating agency commented that the insurance risk-based capital requirements have raised awareness of risk in the industry. Representatives of two rating agencies said they saw a favorable trend in capitalization after the insurance risk-based capital requirements were adopted. One regulator commented that the risk-based capital requirements act as a floor, and firms tend to hold more capital.

Life insurance industry officials whom we spoke with generally said that the current requirements do not cover all risks equally well and that some changes are needed. (See ch. 4 for initiatives under consideration.) These officials saw other limitations in the risk-based capital standards, including that the model is static, it is a lagging indicator, it does not address parent/affiliated company relationships, it has difficulty quantifying risks in new products, it does not deal well with diversification or with derivatives-based risks, it is not strong on interest rate risk, and it concentrates too much on credit risk. One regulator commented that because the risk-based capital formula does not address risks evenly, firms have an incentive to alter their business.

Capital Rules for Large, Diversified Firms Underscore Importance of These Firms' Risk Measurement Practices

As discussed earlier in this chapter, regulators are increasingly using the results of risk measurement systems of large, diversified firms in calculations that determine regulatory capital requirements, thus attempting to better link capital with firms' actual risk. Specifically, bank regulators use the market risk measures of large banks in setting the market risk component of risk-based capital. Also, SEC has recently allowed firms to use option pricing models to calculate some capital charges. Along with other options, SEC and CFTC are exploring possible further reliance upon the results of firms' risk measurement systems in capital regulation. These explorations are described in chapter 4.

Current and possible future use of firms' estimates of risk in regulatory determination of capital requirements makes the firms' risk measurement practices an important element of capital regulation for legislative and

regulatory policymakers to understand. Chapter 3 describes the approaches being used by some large, diversified firms to measure and manage risk.

Some Large, Diversified Financial Firms Are Measuring Risks With Mathematical Models

Unlike regulators, whose focus on the capital levels of firms is driven by regulatory public purposes, firms analyze their use of capital to help ensure that they can achieve their business objective—maximizing the value of the capital provided by stockholders. To do this they must measure and manage risks, returns, and capital.

A number of large, diversified financial firms are measuring some risks and returns on a firmwide basis. Among other things, these measurements are designed to enable them to determine the trade-offs among risks and returns that would best enable them to maximize the value of equity capital. Individual risks are often measured by means of a variety of complex quantitative and statistical models that use computer programs to analyze financial data and determine risks. Although different firms use similar overall financial approaches when considering the risks they face, the actual statistical models that the firms use are firm-specific—that is, each firm bases its model on its own data and financial activities. The extent to which large, diversified firms measure and model each risk varies according to the risks inherent in their business activities and their ability to quantify those risks. Market and insurance/actuarial risks tend to be most amenable to the use of statistical models. Credit and liquidity risks also have quantifiable elements. Operational and business/event risks are very difficult to quantify and are not as readily measured; however, some firms are developing measurements of these risks.

Regulators and firms alike recognize that models have limitations; however, they believe that using such models can improve a firm's ability to understand, measure, and manage risks, thereby decreasing the likelihood of some unanticipated risks and losses. Under widely circulated general risk management principles, which were developed in conjunction with financial regulators, firmwide measurement of risk is an integral part of a unified, firmwide risk management system. Such principles include setting limits on trading or other activities and determining capital requirements for business lines on the basis of the measured risks, whenever possible.

Financial Firms Use Capital to Help Manage the Trade-Off Between Return and Risk

Modern finance theory suggests that capital provided by investors enables financial firms to fund operations, earn profits, and grow. It also provides firms with a cushion to absorb unexpected losses. Firms need to attract capital from investors by offering a mix of returns and risks that is competitive with the mix available in other investments.

Both equity investors (stockholders) and bondholders consider return and risk in their decisions to invest in firms. To attract and keep equity capital investors, a firm tries to manage the trade-off between increasing returns and decreasing risks. The trade-off exists because increasing returns, at a given level of risk, generally increases stock values; increasing risks at a given level of return generally is viewed as lowering stock value.

Equity stockholders' returns are based on the firm's dividends and capital gains on the stock. A firm using a risky but successful strategy can increase stockholder returns as long as the costs of borrowed funds are less than the return to equity. In contrast, bondholders' returns are based on interest paid by the firm and capital gains on its bonds. The returns to bondholders are limited, and a successful risky strategy does not increase bondholders' returns.

Equity stockholders' risks are the volatility of returns and, in the extreme case, losses in bankruptcy or liquidation when assets are sold to satisfy the claims of the firm's bond and other debt holders. Generally, bondholders' risk is the chance that a firm's risky strategies will fail and it will not be able to repay interest and principal. In the event of a bankruptcy or liquidation, the value of the assets may not cover the outstanding principal. Because stockholders can obtain larger returns from risky and successful strategies and bondholders cannot obtain added returns from such strategies, bondholders are less likely to encourage or accept increased risk-taking by a firm. Furthermore, if the firm undertakes risky strategies, bondholders may require a higher interest rate as compensation for the increased risk. The higher interest rate decreases the funding advantage of debt financing and lowers profits for stockholders.

Bondholders depend on, among other things, credit rating agencies for evaluations of the creditworthiness of bonds based, in part, on a firm's leverage.[1] When a firm receives high ratings, such as an investment grade rating from credit rating agencies, the market then allows the firm to pay a lower interest rate on its debt, which lowers costs. Consequently, firms often manage their operations to receive investment grade credit ratings. Several firms that we spoke with told us that they manage their firms to a

[1]Leverage is the relationship of a firm's debt to equity, as expressed in the debt-to-equity ratio.

AA investment rating, which is the second highest investment grade rating.[2]

While maximizing stock values, firm management also needs to address the concerns of regulators and others. Regulators' concerns are important, because regulators can limit firms' operating freedom by forcing them to allocate capital according to the regulators' concerns over risk and can require firms to cease doing business, if capital levels fall below the minimum capital requirement. Managers also need to take into consideration the interests of many other parties concerned with the performance of the firm. Employee interests are important, because changing compensation packages can create incentives for excessive risk taking. In addition, financial firms undertake many transactions with each other. It is in each party's interest to consider the capital levels (relative to risks) in its trading partner or counterparty, because a poorly capitalized entity might fail to complete its financial obligations under a financial contract.

Firms Are Using Models to Measure and Limit Risk-Taking and Determine Their Capital Allocations

Advances in financial theory and information technology have enabled large financial firms to track and evaluate some risks on a more quantitative basis than they could before. Some firms are measuring certain risks on a firmwide basis. According to the financial literature we reviewed and several of the firm representatives we spoke with, large, diversified firms are increasingly doing this because of heightened competition among firms and increased scrutiny of risk management practices by regulators.

Firms can use such tracking and measuring to set limits on risk-taking, evaluate the return and risks of specific activities, and allocate capital accordingly—that is, to ensure that the estimated returns are large enough given the estimated risks. As discussed later in this chapter, these activities are embedded in general risk management principles that lay out a management approach and in tools that are designed to ensure that a firm is appropriately addressing its risks. These principles form the basis of a firm's risk management system that can, among other things, provide timely information on trading positions, risks, and risk-adjusted

[2]According to major credit rating agencies, Standard & Poor's and Moody's, AAA/Aaa through BBB/Baa ratings are investment grade. AAA/Aaa are the highest ratings and indicate that the capacity to repay debt is extremely strong. AA/Aa ratings indicate a very strong capacity to repay and differ from AAA only in a small degree. "A" ratings indicate a strong capacity to repay, although with somewhat more susceptibility to adverse effects of changes in circumstances and economic conditions than in the higher rated categories. BBB/Baa ratings indicate an adequate capacity to repay but with somewhat more susceptibility to adverse effects of changes in circumstances and economic conditions than in higher rated categories.

performance measures.[3] Such principles also encourage firms to develop risk-adjusted performance measures to track the risk-return trade-off. For example, these general principles are embedded in SEC oversight under the DPG and in bank regulators' capital regulations.

A general framework for risk-adjusted performance measures that is used by a number of the larger firms is called the risk-adjusted return on capital (RAROC) system.[4] RAROC is the risk-adjusted profitability of a particular business activity per dollar of equity capital allocated to an activity. This means that at any given level of profit and risk, if managers increase capital allocated to an activity, the RAROC for that activity will tend to decrease. Consequently, RAROC directly measures and takes into account the risk, return, and capital trade-off.

Some Firms Measure Market Risk With Statistical and Other Financial Models

As markets become more competitive, as new financial instruments create new mixes of risks and return, and as markets remain volatile and uncertain, managers need improved tools to consider risks and manage them. Therefore, the ability to set limits on trading activity or manage risks is especially important to large financial firms. Generally, models can help managers limit risks and are used to set limits on traders and trading activities. In addition, models can be used to determine needed capital levels on the basis of the measured risks.

In the banking, securities, futures, and life insurance sectors, some large firms measure market risk with statistical financial models supplemented by, or in combination with, other types of models. Statistical models apply past data on price changes to determine losses that might occur in the future; they are often used to measure market risks, such as trading in securities, derivatives, and foreign currencies. Such risks are not equally important for all types of financial firms. For example, market risks are important for large securities firms and banks undertaking trading of financial assets. Life insurance companies must often consider interest rate risk (a type of market risk) when underwriting annuities and other investment products that they sell. In contrast, many banks and insurance companies consider credit risks to be more important. Basically, the

[3]A risk-adjusted performance measure permits a manager to quantitatively relate the return to the risk associated with a product or business decision. One common risk-adjusted performance measure is the ratio of expected profits over the risk, measured as volatility of profits. The measure can improve for one of two reasons; returns can increase at a given risk level or risk can decrease for a given return.

[4]RAROC is discussed in more detail in appendix IV.

relative importance of different risks for a firm depends on the products it offers, the business strategies it uses, and the markets it serves.

Models have important limitations; nonetheless, in the views of the firm representatives and industry experts we spoke with, they improve a manager's ability to measure and manage risks, thus decreasing the likelihood of losses due to measured risks that could deplete the capital cushion provided by management to cover losses.

Value-At-Risk (VAR) Models Are Used to Measure and Manage Market Risks

A firm's "value-at-risk" (VAR) is an estimate of the maximum amount that a firm can lose on a particular portfolio a certain percent of the time over a particular period of time. Empirically, this loss can be measured by statistical models as a confidence interval, that is, the percent of the time a certain loss is not likely to be exceeded. This confidence interval implies a corresponding probability that the certain loss is likely to be exceeded a certain percentage of the time. The amount of capital needed to cover this confidence interval is often called economic capital-at-risk.

Using the confidence interval approach, a firm might specify a 1-day time horizon with a 99 percent confidence interval—the percent of the time that a specified loss is not likely to be exceeded. This calculation might yield a $1 million loss that on average would not be exceeded more than 1 out of every 100 trading days. To ensure that this 1-in-100 chance of a $1 million loss would not create a financial problem, the firm could assign a $1 million capital buffer. If the firm wants to lessen the chance that the allocated level of capital will be exhausted, it could increase the confidence interval, increase the capital set aside, or change its trading strategy to create less risk. In contrast, if the firm wanted to increase the expected profits, it could decrease the confidence interval, lower the capital set aside to cover possible losses, or change its trading strategy to create greater expected profits while accepting the added risks.

According to the modeling literature,[5] the four main approaches to VAR modeling are the correlation or parametric method, the historical method, the historic simulation method, and Monte Carlo simulation. VAR models can be based predominantly on the correlations among asset prices and the effects of such correlations on the risk in the firm. In addition, VAR estimates can be based on historic simulation or Monte Carlo simulations that show how changes in several fundamental economic variables or factors would affect the financial condition of the firm.

[5]"Value at Risk—New Approaches to Risk Management," Katerina Simons, New England Economic Review, Sept./Oct. 1996.

VAR Estimates Can Be Based on Correlation Among Asset Prices and Returns

Most VAR models depend on statistical analyses of past price movements that determine returns on the assets. The VAR approach evaluates how prices and price volatility behaved in the past to determine the range of price movements or risks that might occur in the future. This VAR approach is based on price variances and, in some cases, covariances among the prices that create market risks.[6] This approach uses statistical estimates of the variances of asset prices and the covariances among asset prices to summarize the overall market risk faced by the firm.

The correlation method assumes that the statistical distribution of asset returns is normally distributed and that the variance-covariance matrix completely describes the distribution. Assuming a normal statistical distribution simplifies the analysis and the computation of the VAR estimates, because it assumes that returns are symmetrically distributed around the mean and the dispersion of returns above and below the mean are similar.[7]

VAR Estimates Based on the Historical Method Use Actual Historic Returns to Determine Losses

The historical method rejects the use of the normal distribution, because much empirical research on the statistical properties of asset returns suggests that returns are not normally distributed. The evidence suggests that high and low returns are more likely to occur than would be predicted if a normal curve assumption were used. Evidence also suggests that in many cases, the actual returns are more likely to be negative than would be predicted if a normal curve assumption were used. In the historic method, the VAR is calculated by finding the lowest returns in the historic data. Using historic data tends to produce higher VAR estimates. This occurs because, empirically, the normal curve assumption underestimates the likelihood of larger losses. Implementing the historical approach requires added historic data that can be expensive to obtain or even nonexistent.

[6]Variances and covariances are statistical measures of how prices vary over time. The variance refers to the variability or volatility of the price of a specific asset, and the covariance refers to the variability or volatility of the relative prices of two assets at the same time.

[7]In financial theory, the standard deviation is used as a measure of risk because the theory often assumes that risks are distributed along a normal probability distribution—often called a bell-shaped curve. The standard deviation is a statistical measure of the degree to which an individual value in a probability distribution varies from the mean or expected value of the distribution. In normal distributions, knowing the standard deviation permits an analyst to directly determine the confidence interval. In practice, many financial risks are not distributed normally. As a result, the standard deviation of the distribution does not directly suggest the probability that a certain loss will be exceeded.

VAR Estimates Based on the Historic Simulation Approach Use Information on Returns and Risk Factors to Calculate the VAR

The returns on particular instruments often cannot be used to determine the VAR estimate. If an institution is large and complex, it may be impractical to maintain historic data on all of its instruments. Furthermore, historic data may not be available on new or innovative instruments that the institution is introducing. In such cases, VAR models must include information about the historic distribution of economic risk factors that will determine the risk created by new instruments. Such risk factors are the fundamental economic creators of risk. For example, for a bond denominated in a foreign currency, the risk factors are foreign exchange rates and interest rates. For a Standard & Poor's 500 option, the relevant risk factors are its volatility, the dividend yield on the index, and the risk-free interest rates. In the case of banks, when new instruments are present, the bank can develop a VAR model based on the statistical distribution of risk factors and the current composition of the bank's portfolio of activities both on and off the balance sheet. However, the use of historic simulation is limited by the bank's inability to change assumptions about fundamental risk factors.

VAR Estimates Based on Monte Carlo Simulations Can Evaluate the Effects of Changing Numerous Fundamental Risk Factors

Firms often are subject to several risks at one time. To address the simultaneous effects of several risks, firms tend to develop Monte Carlo simulations. VAR models based on Monte Carlo simulations start with management identifying a series of changes in several fundamental risk factors that can simultaneously affect the firm. The analysis of the effects of these factors is determined in a mathematical model in which equations show how changes in the fundamental risk factors affect the firm's cash flows, financial condition, and remaining capital.

On the basis of statistical analyses of how market prices have varied in the past, the Monte Carlo approach to VAR estimation is designed to show how the firm will perform in the future by letting managers evaluate how the firm would perform under thousands of different economic conditions. Monte Carlo approaches to VAR estimation also display the effects of nonlinear risks—risks that grow more than proportionately with movements in the underlying risk factor. Such risks are found in derivatives contracts and in the options embedded in financial products.[8]

[8]Market risks can vary linearly or nonlinearly with prices. Examples of linear or direct risks are losses that can occur if the price of foreign currencies, a bond, or a stock decreases. Linear losses are directly proportional to price movements. Nonlinear risks are not proportional in that for some price movements in one direction, no losses are incurred by the firm; but for larger price movements in the same direction, large losses can occur. Nonlinear risks are generally associated with options contracts or financial products with options built in. Mortgages are an example of a financial product with embedded options. When interest rates decline a small amount, mortgage prepayments may not accelerate. But when interest rates drop by a large amount, prepayments can accelerate quite quickly and create financial losses for firms holding mortgages at rates well above current market rates.

Identifying such risks can help the firm to identify the mix of conditions and strategies that would cause the greatest harm. On the basis of the Monte Carlo estimates of VAR, the firm can adjust trading limits to avoid excessive risks or create a better risk-return trade-off.

Backtesting Is Used to Determine the Accuracy of VAR Models

VAR models are commonly backtested to evaluate the accuracy of assumptions by comparing predictions with actual trading results. Backtests determine whether and how well the models' results compare to a firm's historic daily trading results. Backtests provide information retrospectively about the past accuracy of an internal model by comparing a firm's daily VAR measures with its corresponding daily trading profits and losses. Any VAR-set limit that is exceeded by trading losses at a greater frequency than indicated by the chosen confidence level indicates that the model is not measuring expected losses well enough.

VAR-Based Models Have Limitations

According to the financial literature and our interviews, the limitations of the VAR model include a dependence on past data to estimate possible future losses and possible errors caused by simplifying statistical assumptions.

The VAR calculation and estimated losses from VAR models are based on the past behavior of prices and price volatility. If price patterns are changing now or will change in the future, estimates of potential losses based on past price changes will be incorrect. As a result, the risk managers at the firms told us they must continually update their statistical estimates and monitor for changing price patterns that affect losses predicted by VAR models.

Some VAR calculations are simplified by assuming returns are distributed normally. Such simplifications ease data needs, lower computational costs, and are easier for those less familiar with advanced statistical modeling techniques to understand. However, such assumptions can result in the model underestimating the probability and extent of large losses. To avoid this problem, several of the firm representatives we interviewed said that they use Monte Carlo simulations when necessary because such simulations take returns that are not normally distributed into consideration.

Simplifying assumptions also limits the ability of some VAR models to measure risks that do not vary directly or linearly with price changes. For example, gains or losses on stocks held in portfolios vary directly or linearly with market prices. As the market prices of stocks increase, the

value of the stock or foreign currencies held by a firm increases in direct proportion. Such direct, linear relationships also exist in foreign currency trading, a common activity of many large, diversified financial firms.

In contrast, losses on options and financial contracts with embedded options can be nonlinear and need not move proportionately or linearly with interest rates or other prices. Options have risks that are nonlinear; for small price movements there may be no losses for the firm, but for larger price movements the firm can suffer large losses. Similarly, interest rate risks in certain financial products can be nonlinear. For example, for small declines in interest rates, mortgage prepayments will not accelerate. However, for large declines in interest rates, prepayments can accelerate quickly and create large and nonlinear losses for a firm holding mortgages. Representatives of several firms told us that nonlinear effects in certain other types of financial options affect the accuracy of VAR modeling.

Stress Tests and Scenario Analysis Are Used to Determine How Large Changes in Economic Conditions Could Lead to a Firm Failure

Firms use stress tests and scenario analyses to help validate or cross-check the reliability of VAR models. Stress tests measure the potential impact of various large market movements on the value of a firm's portfolio. Such tests are a useful tool for identifying exposures that appear to be relatively small in the current environment but that grow more than proportionally with changes in risk factors. Scenario analysis generates forward-looking "what-if" simulations for specified changes in market factors that quantify revenue implications of such scenarios for the firm.

Stress tests are based on a series of mathematical equations that show how changes in fundamental economic factors would affect the financial statements of the firm over time. Stress tests determine whether large changes in underlying key factors would lead to losses that could put the financial firm at risk of failing. The level of key economic factors used in the stress test can be based on (1) past economic situations in which key economic variables have affected a firm's financial condition or (2) management's judgment. When using past economic situations to determine the level of key economic variables, risk managers may use the results of statistical analyses to help decide what factors to use in the test and how large the stress should be. The values or the risk factors used in the stress tests can be based on management's judgments and statistical analyses of the variability of the risk factors in the past. Some stress tests apply Monte Carlo simulations to determine how often and how quickly a firm will fail when subject to stressful economic environments.

All Market Risk Models Have Limits and Benefits

The financial literature and our interviews with risk managers told us that all models are limited to the extent that they rely on historic data and pricing patterns that may not reflect future economic conditions and risks. In addition, all models are limited by the quality of the data available, the computation power available, and the ability of analysts to develop mathematical models to accurately reflect financial risks and returns as economic conditions change. Several of the risk managers we met with stressed the importance of the risk factors used in a firm's internal modeling. Because a firm's internal system cannot effectively track all of the risks the firm is exposed to, risk managers choose those they believe are the most significant, such as equity and foreign exchange positions and the yield curve slope.[9]

Models also offer benefits. Managers using models are able to take a more disciplined approach to the overall operations of the firm. Models encourage and permit risk managers to simultaneously consider the risks and returns in individual assets or portfolios and their interactions, which, in combination determine the overall risks and returns of the firm from market risks.

Our interviews with industry association officials who tend to represent smaller financial firms suggest that small companies may be more likely to hold assets until maturity and less likely to realize the market losses in their portfolios when the market value of assets decreases. According to these officials, these companies may not find it necessary to undertake such market risk modeling, because their risks and long-run profits are not driven by changes in market prices and returns. Instead, their risks may be concentrated in credit risk, insurance risk, and operational risks, which have not been quantified or modeled as extensively as market risks.

Firms Measure Credit Risk in a Variety of Ways

Traditional credit risk management at banks, securities firms, and insurance companies has most often been based on analysis of standardized information reports and judgments by experienced credit officers of the creditworthiness of borrowers and any collateral against the loan or bond. On the basis of such judgments, firm managers have set limits on financial positions and developed plans to manage credit risks. Increasingly at large, diversified firms, traditional credit risk management approaches have been augmented by credit-scoring models for certain

[9]The yield curve is a graph showing the structure of interest rates by plotting the yields of all bonds of the same quality with maturities ranging from the shortest to the longest available. The resulting curve shows if short-term interest rates are higher or lower than long-term rates. Analysts study the yield curve carefully in order to make judgments about the direction of interest rates.

classes of homogeneous loans, such as credit card, automobile, and residential mortgages. In even fewer firms, models have also been applied to evaluating the credit of companies with publicly traded stock.

Traditional Credit Analysis

Traditional credit analysis is based on standardized reports and credit officer judgments. In most firms, the credit quality of a particular loan is to be judged by a reviewing officer and placed into one of several credit categories. Categories range from risk-free or low risk to potential or full loss. In rating creditworthiness, credit risk is exclusively the risk of a loss on a loan due to a default and is not the risk due to price volatility.

A particular loan can be reassessed on the basis of either the changing condition of the borrower or changes in the economy that may affect the likelihood that the loan will be repaid on a timely basis. When considering the risks from a particular loan or financial position with a firm, lenders generally consider all the positions with that firm, because a credit problem in one position with a firm will usually be associated with credit risks for all positions of the entire firm. For example, in a situation where a firm has several financial interactions with a bank, such as a commercial loan, a mortgage, and a foreign exchange transaction, if one of these interactions appears uncreditworthy, it can affect the others.

Commercial banks, securities firms, and life insurance companies that we interviewed told us they used the traditional approach to credit analysis. Each firm said it applied a consistent evaluation and rating scheme to all credit decisions. The firm produced aggregated results on the overall credit portfolio. A typical bank might use a rating system with up to 10 rating categories that are defined from low to high risk. Consistent application and updating of the ratings are part of the process. In some firms, both the borrower and the instrument are rated separately. Part of the rating addresses covenants or limitations in the contract and collateral used to secure the contract.

Given consistent application of the ratings by its credit officers, a bank can produce a report of the credit risk in its loan portfolio at any time. The report changes as loans enter and exit the system and as ratings of particular loans change over time. According to one source, this credit quality report is most meaningful when credits are monitored and periodically reviewed by a risk management group or function.

Insurance companies tend to be very focused on credit risk. Because insurance companies' credit risk often appears in bonds and other traded instruments, rating the instruments is one way to address credit risk. Credit ratings needed by the insurance companies are often performed by the Securities Valuation Office of NAIC.[10]

In many financial firms, credit analysis traditionally was done on a loan-by-loan basis. Such an approach ignored the fact that all loans in the same region or industry tended to become less creditworthy at the same time. However, given sectoral losses of the 1980s in real estate and the petroleum industry, firms are increasingly concerned that many loans concentrated in the same region or industry may create losses at nearly the same time. To address these concerns, some firms are undertaking concentration reports by industry, and work is under way to improve the industry classification codes needed to produce concentration reports.

Some Firms Are Using Credit Scoring Models to Determine Credit Risk

Credit scoring applies formal statistical procedures to the credit decision process. Credit scoring models, based on statistical analyses, use data on the borrower found in credit reports and loan application information to determine whether or not a loan is likely to be repaid. In addition, credit scoring can be used to adjust terms on the loan such as downpayments and interest rates. Such models are often used in underwriting credit cards and mortgages. Credit scoring is most applicable to classes of loans in which there are numerous loans that are frequently underwritten with similar terms. Within each class, the loans are relatively small compared to the total holdings in the class, made frequently, and easily statistically analyzed because the loans have relatively homogeneous characteristics. This homogeneity occurs because the loans are not custom-tailored to the borrower or to the collateral asset.

Some Firms Are Using Stock Prices and Portfolio Credit Models to Measure Credit Risk

Some banks and consulting firms that we spoke to have developed a portfolio approach that rates the creditworthiness of loans to larger corporations whose bonds and stocks are traded regularly in the financial markets.[11] This approach addresses the correlations among the creditworthiness ratings of individual assets in the portfolio.

[10]The Securities Valuation Office was established in 1951 to assign risk ratings to bonds held in investment portfolios of insurance companies. At that time, most of the bonds held by insurers were private placements that were not rated by private rating agencies. Currently, however, the Securities Valuation Office uses the private ratings unless there is a split rating, i.e., conflicting ratings for the same issue from different private raters. In these cases, as well as in the increasingly infrequent cases of private placements without a public credit rating, the Securities Valuation Office is to conduct its own analysis and assign a rating.

[11]Both consultants and large banks have developed credit ratings that are based on stock prices, and some large banks either directly develop such ratings or use consultants to undertake such ratings.

In the first step, the portfolio approach uses the traditional approach of rating each loan or financial instrument on a case-by-case basis to generate its inputs by determining the credit risk from each obligor (borrower from the bank). In the next step, the portfolio approach accounts for the credit risk across the portfolio based on the correlation of credit quality across obligors. In this way, this approach takes into account and quantifies the benefits of portfolio diversification. It is similar to the portfolio approach already used in market risk modeling such as VAR.

The portfolio approach to credit risk may depend on stock and bond price information and ratings by credit rating agencies, such as Standard and Poor's. Using statistical methods, the portfolio approach estimates the probability of default on an instrument and the probable loss from that instrument if a default occurs. The approach uses the credit rating from a credit rating agency or the internal credit rating by a bank evaluating its own loans. Credit rating agency ratings and bank loan evaluations are based on reviews of the financial books and other pertinent information gathered during the rating or loan application process when a firm is issuing bonds or applying for a loan. Such ratings are not driven by market prices or by the volatility of market prices.

The portfolio approach also uses market information on stock prices to estimate the total probability of default on the basis of the correlations of defaults among the component loans in the portfolio. By taking these market prices into account, the portfolio credit rating can directly take into account the correlation among credit risks because it can address the correlation among stock prices. Such correlation information permits risk managers to develop more economically efficient portfolios by improving expected profits or lowering the risk of losses from the total loan portfolio. As with market risk modeling, assumptions about the probability distributions and the correlation among the risks affect the estimated potential losses due to credit risk embedded in any particular portfolio.

The portfolio approach to credit risk enables a risk manager to

- quantify and control credit concentration risk;
- consider concentrations on the basis of industry rating category, type of instrument, or other factors;
- interpret credit risk in terms of needed capital as is done in market risk calculations; and
- evaluate investment decisions more precisely in terms of risks, returns, and capital.

Many Firms Use Worst-Case Cash Flow Simulations to Measure Liquidity Risk

Liquidity risk analyses are most concerned with the effect of a sudden crisis that arises when lines of credit may be closed, assets can be sold only at a loss, and other new funding sources cannot be found. In a liquidity crisis, a firm must be able to sustain itself and obtain cash as needed when the markets, in general, appear much less willing to buy assets from the institution or make loans to the firm experiencing the crisis.

Many firms develop worst-case simulations (i.e., stress tests) or models to investigate the implications of a severe loss, which affects credit ratings, or a systemwide crisis that would affect all sources of liquidity due to a flight to quality[12] throughout the economy. The worst-case "scenarios" are based on simulations of firm cash flows.

In each worst-case cash flow analysis, a firm would attempt to estimate the immediate funding shortfall associated with a severe loss and a crisis that is systemwide. In a worst-case analysis, a firm attempts to measure the speed with which it can acquire needed liquidity during a crisis. Such liquidity might be based on liquidating assets—that is, shrinking its balance sheet—or estimating sources of funds that would still be available during a crisis. The results of such worst-case analyses or simulated crises are often reported in estimated days of exposure or days of a funding crisis. On the basis of the liquidity problems that arise in worst-case simulations, managers can alter current operations to forestall liquidity problems in a crisis, adjust the liquidity of current asset holdings, or create more secure lines of credit.

Such simulations are not used to forecast future problems but rather as a planning tool to understand what a liquidity crisis might entail. In the view of a number of firm representatives we spoke with, such simulations or worst-case studies are imprecise but essential to a firm in the event of a substantial change or deterioration of its financial condition. Some firms we spoke with used such simulations to determine what backup lines of credit, which cannot be cancelled, are needed to ensure liquidity or funding during a crisis.

One large securities firm suggested that financial firms can fail in a crisis when liquidity is lost even though other fundamental risks might not be present. Another large firm emphasized that broker-dealers depend on

[12]Flight to quality occurs in financial markets when investors rearrange their asset holdings to include only the most creditworthy or least risky assets. During such situations, financially weaker firms may find that they have lost access to credit lines—liquid funds from creditors or banks—and thus be unable to fund operations. Such closing of credit lines can force a firm to fail.

liquidity when managing market or trading risk because, without liquidity—the ability to buy and sell financial assets without large losses—hedging and other risk-reducing strategies do not work. Firms' representatives told us their firms often maintain an equity cushion above regulatory capital levels to ensure the constant availability of sufficient cash to deal with liquidity problems or to undertake a large and potentially profitable deal. Another large, diversified firm emphasized that during crises, investor flights to quality occur and firms without strong credit ratings may not be able to refinance short-term debt or fund operations. Firms that maintain high levels of capital are generally considered to be more creditworthy.

Other firms told us that liquidity is an amorphous term and cannot be addressed by VAR or other mathematical models. A representative of a large industry group said that liquidity risk is somewhat quantifiable but not to the same extent as credit and market risk.

According to several insurance industry analysts, liquidity is not as big a concern with many life insurance companies as it is with other financial institutions because life insurance policy liabilities are less liquid than life insurers' assets. Life insurance companies issue policies that have high surrender charges that tend to limit redemptions. A decade ago, when interest rate movements created options that encouraged early redemptions, illiquidity was more of a problem for life insurance companies. New policies are now written that are designed to bring returns on products into accord with market rates. In addition, policy loans are often charged variable rates that track the market instead of fixed rates in order to prevent losses.[13]

Life Insurers Use Statistical Models to Measure Insurance/Actuarial Risk

In the past, life insurance companies generally used conservative static assumptions regarding loss distributions and interest rates. This approach was ill equipped to deal with the interest rate volatility of the late 1970s, according to several insurance company representatives we spoke with. Life insurance policies are full of options—settlement options, policy loan options, over-deposit privileges and surrender or renewal on the part of the insured, and discretionary dividend options on the part of the insurer.

[13]Many insurance companies use financial consultants specializing in insurance company risk analysis for their analyses and stress testing. The scenario testing includes about 50 to 100 scenarios that either increase or decrease all interest rates by the same amount or change short- and long-term interest rates by different amounts. Such changes in the interest rates test for interest rate risk. A worst-case scenario cash flow test is also undertaken.

When interest rates are volatile, these options increase in value and thus are more likely to be exercised.

Traditional actuarial valuation methods that assume interest rate stability incorrectly value these options when interest rates are volatile because the companies do not consider or calculate the economic value of the options. By assuming stable interest rates, insurance companies tended to underprice their policies. Today, the standard valuation techniques deal explicitly with the interest rate risk options embedded in policies. These standard valuation techniques use statistical modeling approaches such as VAR based on correlations and Monte Carlo simulations discussed earlier in connection with market risks.

Most Firms Said They Did Not or Could Not Measure Business/Event and Operational Risk

Although the firms we interviewed emphasized that business risk and operational risk were crucial concerns, most acknowledged that they did not or could not effectively measure these risks. Several firms described how they were measuring market, credit, and liquidity risks and explained that their firms did not measure other risks, such as operational or business risks. Several suggested that they were not convinced that operational and business risks could ever be measured to the same degree that market, credit, and liquidity risks were measured. In almost all the interviews we conducted, including all those with regulators, we were told that because measurement of business/event and operational risk is difficult, managers' judgments are crucial to managing these risks.

A securities-based firm said that most failures in this industry were not created by market risks; rather, operational problems led to the failures. One bank's risk manager suggested that business risk was an amorphous term and thus could not be measured or placed in a mathematical or statistical model. This bank does, however, include business risk in its Risk-Adjusted-Return on Capital (RAROC) system. A manager of a large and complex insurance-based financial firm said he was not yet comfortable with how his firm measured such risks. Another bank, which said it is vigorously trying to model its risks, told us that it has not yet quantified operational risk. A major consultant to the financial services industry concluded that operational risks are hard to quantify because the risks are embedded in (1) the operating and accounting systems, (2) the models, (3) staff behavior, (4) the compensation systems that create incentives to undertake various activities that affect both firm and employee risks and returns, and (5) the managers' abilities to foresee the consequences of the interactions among these factors. Officials of one bank we interviewed

told us they were quantifying business/operational risk by using revenue volatility as a proxy for impact of risk on business results.

Measuring and Managing All Risks on a Firmwide Basis

In practice, risk measurement approaches differ across the risks faced by firms, and not all risks are quantified to the same extent. For example, under widely circulated general risk management principles, firms are to monitor and manage all risks but are expected to explicitly measure and manage only market, credit, and liquidity risks, as discussed above. Firms monitor and measure other risks using a more qualitative approach because, to date, quantification of these other risks has not progressed enough to be commonly used even at large, diversified firms.

Because financial firms are as yet unable to quantify and model all risks, a fully quantified approach to determine needed capital has not yet been developed. Nonetheless, the general framework called RAROC has been developed for such firmwide risk assessments across all risks and products (see app. IV for a discussion of this framework). However, as long as no common basis exists for measuring all risks, firms cannot fully integrate their risk measurement and management systems in a firmwide, cross-risk, and cross-product analysis. Thus, given the different approaches and levels of sophistication currently available for measuring and managing risks, managers' judgment and effective risk management approaches remain a crucial determinant of risks, returns, and needed capital levels in each financial firm.

General Principles of Firmwide Risk Management

As mentioned earlier, firmwide risk measurement is an integral part of a unified, firmwide risk management system under widely circulated general risk management principles. Our discussions with regulators and representatives of large, diversified financial firms indicated that these firms accept the approach of the general risk management principles and are applying these principles in the design of their internal risk control function. However, to date, not all firms we spoke with have fully implemented the risk and capital measurement systems laid out by the principles.[14]

[14]Such general risk management principles have been adopted by bank regulators in the risk-based capital market risk component discussed in chapter 2 and appendix I.

General Risk Management Principles Are Designed to Ensure That a Firm Is Appropriately Addressing Its Risks

General risk management principles lay out a management approach and tools that are designed to ensure that a firm is appropriately addressing its risks. There is a common set of five broad risk management principles:[15]

1. A structured framework is to be established to link a firm's business strategy and operations to its risk management objectives.

2. Centralization of the risk management function in one dedicated staff office is needed.

3. Risk measurement, risk reporting, and risk controls are needed to permit managers and others to evaluate the implications of the risks, returns, and capital levels in the firm.

4. Operations systems are needed to support the risk management function.

5. Risk management systems are needed to provide needed data on a timely basis.

Under these principles, the firm's risk management strategy is to be based on a framework of responsibilities and functions driven by the board down to operating levels, which covers all aspects of risk. The basis for this principle is the view that unless the board is fully integrated in the risk management approach, the firm's managers and employees will not be fully committed to risk management. To emphasize the importance of risk management, the principles state that a risk management group composed of senior managers is to be created.

In accordance with the principles, the risk management function is to be fully integrated into a firm's operations. The day-to-day responsibility for risk monitoring and risk evaluation is to rest with the risk management function, which is to report to a risk management group—a special committee of senior managers. The role of the risk management function is to implement policies associated with specific risks, such as market risk, credit risk, liquidity risk, operational risk, and business/event risk. Its purpose is also to ensure that trading is within approved limits and that

[15]Principles of risk management have been developed by various industry and regulatory bodies, including the Bank for International Settlements, the International Organization of Securities Commissions, DPG, U.S. bank regulators, and a group assembled by Coopers & Lybrand. All of these are broadly similar. The list here is from Coopers & Lybrand, termed Generally Accepted Risk Principles.

risk limits and policies are properly understood and evaluated before transactions are undertaken.

The principles lay out a framework for risk measurement, reporting, and control of risks; quantification of market, credit, and liquidity risks; and development of the capability to aggregate and monitor exposures on a firmwide basis. The principles require a firm to set a comprehensive set of limits to ensure that risk exposures remain within agreed-upon boundaries set by the board or risk management group. In addition, the firm needs a mechanism for evaluating firm performance on a risk-adjusted basis to address the trade-off between return and risk. That is, the firm must develop a method to simultaneously measure and manage the trade-offs that can exist between return and risk on a firmwide, business-unit, and product-specific basis.

The principles call for a risk management system to generate, on a timely basis, information on the firm's trading positions, risks, and risk-adjusted performance measures. Such information is to be available to the risk management group; risk management function; and other end users of the information, such as traders, credit risk departments, or managers of trading units.

Under the principles, firms are to develop a comprehensive set of operational controls, because firms engaged in trading activities often encounter difficulties as a result of operational control problems rather than measurement problems. Such operational controls are meant to ensure that risk limits are set by the board and, once set, are not violated. To guard against operational problems, it is important for firms to rigorously establish controls that limit risk-taking and unauthorized activities throughout the firm, according to the principles.

Firm officials we met with consistently mentioned these principles and provided firm-specific examples to illustrate their importance. For example, many firms and analysts emphasized that although their approach to risk management is constantly evolving, it is of paramount importance that senior management determines the level of risk that the firm will accept and communicates this information firmwide. Representatives of several firms commented that a central committee, which reports to the chief executive officer, monitors their risks. Firm representatives stressed that numbers are important, but good communication, internal controls, and management judgment are what really matter.

Issues and Initiatives in Capital Regulation

Through our interviews with industry representatives, regulators, and others as well as our review of pertinent literature and other documents, we sought to identify significant issues in capital regulation. We group the issues we identified into the following three categories:

- differences among financial regulators in terms of the risks each focuses on and the purposes of its capital rules;
- differences between regulators' and firms' estimates of risks and needed capital, and in their views of risk and how it should be managed, and
- concern about how regulatory capital rules are administered.

The principal issue in the first category is that as firms that have traditionally been in different sectors of the financial services industry increasingly offer similar products and take on similar risks, differences in capital regulation among their regulators may have unintended competitive implications for these firms.

Issues in the second category include a concern that current regulatory capital requirements that are not adequately sensitive to the risks inherent in a firm's particular products or activities may create inappropriate risk management incentives for firms and, in extreme cases, could even lead to increased risk-taking. A related issue concerns the possible increased use by regulators of a firm's internal estimates of risk in setting regulatory capital requirements, because financial firms and regulators have somewhat different purposes for capital and tolerances for risk.

The third category, administrative issues, includes questions about whether it makes sense to apply the same approach to capital regulation for firms of all sizes and degrees of complexity. It also includes questions, such as how can the regulators properly oversee the validity of the internal statistical models that firms use to meet regulatory capital requirements.

As competition within and among different financial sectors has increased and as large, diversified firms have improved their ability to measure and manage risks and capital, financial regulators are responding by exploring possible changes to capital requirements. Many initiatives aim to make capital requirements more sensitive to the risks firms face in their activities; other initiatives represent fundamentally different approaches to capital regulation.

Differences in Regulatory Objectives and Approaches May Have Unintended Competitive Implications

In an environment of increasing competition across financial sectors and national borders, large, diversified financial firms increasingly offer similar products that pose similar risks. At the same time, individual firms and their affiliates are regulated by a variety of domestic and foreign regulators, and some are unregulated. Differences in corporate legal systems and markets also contribute to international differences. Concern about differing capital requirements for firms with similar products posing similar risks is one part of an ongoing "level playing field" debate in financial modernization. On a level playing field, firms and markets compete without advantages that result from government backing (such as government-backed deposit insurance) or disadvantages that result from burdensome regulation.

At the same time, regulators acknowledge that differences in regulatory purposes have implications for capital requirements that could limit achievement of a level playing field. As discussed in chapter 2, the specific objectives of the various financial regulators and their approaches to regulation differ. For example, bank regulators are concerned with maintaining the safety and soundness of the banking and payments system and protecting the deposit insurance funds; and securities and futures regulators are concerned with investor protection and ensuring the integrity of the securities and futures markets, respectively.

Financial regulators and other experts we interviewed discussed the appropriateness of having similar capital requirements for banks, which are covered by government-backed insurance funds, and other firms that are not; or whether it is appropriate for capital requirements of banks, which are part of the payments system, to be similar to capital requirements for firms that are not. Traditionally, bank regulation has been more concerned with systemic risk than has regulation of other financial entities. Some experts have argued that capital regulation must be stricter on entities that pose greater systemic risk than on those that do not.

Also, financial regulators were concerned that different domestic and foreign capital standards for the various types of financial firms create incentives for firms to change operations in ways that change their regulator, such as moving business overseas, to avoid or offset capital requirements they believe are costly and excessive. Different regulators may have different capital standards for the same product. In some situations, a firm facing the higher capital standard has an incentive to move its activities in that product line into an affiliate that has a different

regulator or one that is unregulated. However, in banking, all affiliates within the holding company fall under the holding company capital standards. If a bank believes the standards are too high for a certain product, it may choose to abandon that product line; or it may restructure its transactions to provide a similar service that carries a lower capital requirement.

Differences Exist Between Regulators' and Firms' Estimates of Risk and Needed Capital

An important issue for regulators is how to establish capital requirements that meet their purposes without requiring either excessive or insufficient capital for the risks involved. To a large degree, to increase the value of the shareholders' equity in competitive markets, large, diversified financial firms have increasingly used statistical and mathematical models to measure and manage economic risks and to determine their optimum capital levels. As firms have been able to apply more sophisticated risk measurement tools, some said they have become increasingly aware of a discrepancy between their internal estimates of risk and the capital needed to support certain activities and the regulatory capital requirements for those activities. Even though firms may hold more total capital than regulatory minimums call for, regulatory capital requirements may impose higher capital levels for some activities than the firms believe to be appropriate.

The difference between amounts of capital allocated by some financial firms and regulatory capital requirements reflect, in part, differences between the firms' primary objectives and the purpose of regulators. As discussed in chapters 2 and 3, financial firms and regulators agree that capital serves as a buffer against unexpected losses. However, the primary use of capital for firms is to maximize the value of their shares for stockholders by choosing the best mix of risk and returns. Regulators, on the other hand, impose minimum capital requirements to serve the public interest.

Currently, financial regulators use a "building block" approach in setting capital requirements—that is, capital requirements are determined largely on the basis of broad classes of risk, and the total capital requirement is the sum of requirements for each risk. Many firms and regulators have argued that this building block approach is inappropriate, because the total risk in the firm is based on the interactions of all risks in the firm's portfolio, and risks need not be additive. We did not identify any firms that were yet able to hedge across different risks—for example, hedging credit exposures and market exposures against each other. However, some firms

said they have developed hedging strategies that allow them to decrease risks by hedging the same risk within and across portfolios—for example, hedging interest rate or foreign exchange risk in different portfolios within the firm. These risk-reducing strategies are often not recognized in existing building block regulatory approaches to setting minimum capital requirements. Thus, because these approaches do not recognize the possibility that total risk may be less than the sum of individual risks if risks offset each other, they could lead to excessive capital requirements.

In both the banking and securities/futures sectors, capital regulations contain formulas that apply single risk-weightings to a broad range of riskiness within a single category. For example, in banking, the same 8 percent capital requirement is imposed on all unsecured loans to private commercial borrowers regardless of individual creditworthiness, with the result that a high-risk/high-return loan carries no more regulatory capital than a low-risk/low-return loan. As a result, the regulation might give firms an incentive to seek the highest returns within a broad class regardless of underlying risk; or to adjust activities (e.g, develop new products and/or change operations or corporate structures) in a way that reduces or escapes capital requirements. In other words, firms may adjust business to achieve the lowest regulatory capital cost rather than an optimal balance of risk and capital. Also, the securities net capital rule requires registered broker-dealers to apply a 100-percent haircut to any portion of the trading profits, to the extent the profits are unsecured, reflecting SEC's emphasis on liquidity in its net capital rule.

Moreover, if capital requirements are not adequately sensitive to risk, they may require either too much or too little regulatory capital for the activities being covered. For example, capital requirements that require firms to hold more capital than they believe to be warranted by the risk can cause them to reorganize their structures, resulting in less regulated financial markets as firms move operations outside of regulated entities. Because securities firms consider the 100-percent haircut for OTC derivatives transactions excessive, for example, they book much of their OTC derivatives business in unregulated affiliates to escape capital requirements and other regulatory oversight for these derivatives activities. Some regulators and we have expressed concern about the lack of regulatory oversight in OTC derivatives activities.[1]

[1]See Financial Derivatives: Actions Needed to Protect the Financial System (GAO/GGD-94-133, May 18, 1994); and Financial Derivatives: Actions Taken or Proposed Since May 1994 (GAO/GGD/AIMD-97-8 Nov. 1, 1996).

On the other hand, capital requirements that are too low to protect against risk may result in firms holding only the required amount of capital. As a result, they may not be sufficiently cushioned against potential losses. At the same time, a relatively low capital requirement may induce some institutions to hold excessive amounts of the asset, thus increasing their exposure to the risk. For example, the calculation of bank capital ratios does not explicitly include the interest rate risk inherent in mortgages and other interest-sensitive assets; this may cause banks to hold more of these assets and fewer assets for which the capital requirement more fully captures all the risks.

Increased Regulatory Use of Firm Estimates of Risk Raises Issues Regarding the Appropriateness of These Estimates for Regulatory Capital Purposes

Although financial regulators are already using firms' estimates of risk in limited ways, concerns about regulatory insensitivity to risk are leading some regulators to consider increased use of firms' own estimates of risk for setting regulatory capital requirements. Through our interviews and our review of the literature on risk measurement, we identified a number of concerns with regard to increased regulatory capital requirements that are based on each firm's own risk estimates. First, the current risk measures used by firms are limited in that they do not measure all risks the firms face. Second, some risk measurement systems may measure some risks incompletely. Third, models used by specific firms are tailored to what each firm sees as its risk measurement needs, so they are not necessarily comparable. Fourth, increasing regulatory use of firm risk estimates could cause firms to modify their models to reduce their regulatory capital requirements.

Firm Risk Measurements Are Limited in Various Ways

Both the literature and representatives of all of the firms we interviewed agreed that a firm's risk measurement systems are limited in that they do not accurately measure all of the firm's risks. Many of the representatives said that because their firms' risk measures and models address some categories of risks (for example, market and credit risks) and not others (for example, operational and business/event risks), their firms continue to use judgments to determine the overall capital levels they need.

In addition to limitations resulting from firms not measuring the same types of risk, some models may not correlate the same type of risk (such as credit or market risk) across the entire firm. In this way, such models may not fully measure all risks within a risk type included in the model. However, as discussed earlier, some firms said they do measure some

risks on a consolidated basis—taking into account correlations of the same type of risk wherever it exists in the consolidated firm.

Moreover, models may fail to capture major unique market events of low probability that could pose considerable risk, such as currency devaluations in emerging markets. According to some of the firms' representatives we interviewed, the firms' risk estimates address expected losses, but they cannot accurately account for the unexpected losses the firm may face. VAR modeling is often based on day-to-day risks and historical experience and assumes that managers regularly readjust their portfolios as risks change. However, the representatives noted that such models can easily miss low-probability events that could result in large losses, which could pose considerable risk. For this reason, the capital levels indicated by the models may not cover losses during a major market event, such as a financial crisis in an emerging market. Moreover, even if the models were capable of totally accurate risk measurement, regulators, who, for example, are likely to be concerned with the systemic risk posed by a low-probability, high-loss event, may require more capital for certain risks than the firms would set aside for that risk.[2]

Use of Firms' Internal Models Raises Questions of Consistency and Dependability

The financial regulators we spoke with are concerned with the consistency of capital requirements across the firms they regulate. When regulators depend on firm-specific models or measures to set capital levels, however, capital requirements may not be consistent across firms with similar risk levels. Each firm that uses internal models may well reflect in its own model the firm's unique characteristics, such as the particular risk factors it faces. Thus, even when regulators specify the use of common procedures for developing internal models, such as those in the market risk capital requirement for banks, the internal models firms produce differ because each firm designs its model to measure what it sees as its own risk profile. Because a firm's model was designed for use with a specific risk profile, another firm's model applied to the same profile might produce a different risk estimate. In addition, both the consistency and the accuracy of these models depend on the quality of the raw data used.

The financial regulators are concerned about the dependability of the results of firms' risk measurement systems, in terms of the accuracy of the results and the transparency in the firms' use of internal models. To help

[2]This discrepancy between firm-set capital levels and regulatory minimums need not be unique to firms that use statistical models to set capital levels.

ensure that the capital set aside for various risks accurately reflects the firm's risks of possible losses, it is important for risk measures and models to truly reflect management's own best judgment about the design and use of the models and for the model inputs to be complete and accurate.

With regard to transparency in the use of firm-specific internal models, regulators and other experts are concerned that their use of firm-specific risk measures to set minimum capital requirements could give firms an incentive to adjust the internal models they use to determine their minimum regulatory capital in such a way as to reduce their regulatory capital requirements. Such behavior by firms would raise questions about the dependability of the risk and capital measures used by the firms. Firms might undertake such model alterations if the regulatory minimums for certain risks exceeded the capital level managers wished to put aside for such risks, either because their estimates of risk were lower or their risk tolerances were greater than those set by the regulators. The regulators said that if they could ensure that only one model existed within a firm for a particular risk, they could be more confident that the firm's own true risk estimates were being used to set minimum capital requirements.

Increasing Complexity of Large Firms' Activities Raises Issues Regarding Administration of Capital Requirements

Our interviews with industry representatives, regulators, and others and review of the literature on capital requirements identified issues in the administration of capital requirements. One issue concerns the reasonableness of using the same approach to capital regulation for firms of a similar type (e.g., banks) but with varying sizes and degrees of complexity. That is, as the activities of large firms diverge from those of small firms, a single standard for all firms may become increasingly inappropriate.

As the activities of large firms become more complex, regulators and firms are concerned about proper regulatory oversight of the use of statistical models for regulatory purposes. Regulatory confidence in the effectiveness of capital standards in accomplishing the regulatory purpose depends in part on those standards being auditable and understandable, which is significantly complicated by the use of sophisticated measures and firm proprietary models. In the views of both regulators and other experts, many auditors and regulators may not yet have the expertise needed to verify the accuracy of the measures calculated in the models used in determining minimum capital standards.[3] In addition, depending

[3]A firm's management is responsible for meeting capital standards. Internal and external auditors, self-regulatory organizations, and regulatory agency staff are responsible for reviewing firms' compliance with capital standards.

on their business mix, smaller firms are less likely to have the resources or the need to develop sophisticated models.

Part of this issue concerns the costs to the regulators if they adopt sophisticated approaches to setting minimum capital requirements. Financial regulators understand that their adoption of more sophisticated regulatory capital requirements (e.g, increased use of firms' internal models) would mean increased regulatory costs related to hiring and training regulatory staff.

Complexities associated with the increasing use of sophisticated measures and firms' proprietary models in determining capital requirements could also pose challenges for regulators and industry representatives in promptly analyzing and addressing policy or administrative issues in capital standards. For example, representatives from a number of firms we spoke with said that as their internal modeling and capital allocation processes become more complex, it is more difficult for managers who do not necessarily have the technical expertise to judge the quality of the models, processes, and their results.

In the view of the Federal Reserve Chairman, no matter how complex capital requirements become, firms will develop new products to exploit the remaining inevitable distortions in the regulations to lower their capital requirements. As previously discussed, examples of such distortions are the current credit risk-based capital rules that treat all commercial loans as if they had equal degrees of riskiness. As discussed in the next section, some other experts argue that trying to address all of the firms' potential activities through increasingly sophisticated capital regulation is impossible. They suggest that the use of simplified regulations, such as an incentive-based approach or an approach based on strict supervisory oversight and increased disclosure, would be a better way to implement capital requirements.

The importance of these and other issues is apparent in the initiatives discussed in the next section. Some of the issues have more relevance for some of the initiatives than for others. Some of the initiatives are actual proposals, and others are still in the exploratory stage. Because they are all either proposals or ideas being explored, we did not evaluate them.

Most of the initiatives discussed below are attempts to make capital requirements more sensitive to risks in firm activities, and others represent new approaches to capital regulation. Banking regulators have

noted, however, that in consideration of new approaches to capital regulation, there are both statutory and international constraints on the changes they can make. With regard to statutory constraints, because FDICIA institutionalized regulatory capital using risk-weights plus leverage as a matter of law, regulatory capital with a risk-based component will be an integral part of the overall U.S. supervisory approach until it is changed by Congress. Internationally, U.S. bank regulators have agreed to coordinate their capital regulations with those of the other Basle Committee members, and U.S. regulators are actively involved in the committee's work. Although the Basle Committee is aware of and is studying many of the initiatives proposed in the United States, none of the U.S. regulators we spoke with expected any unilateral new approaches or any major changes to the Basle Accord or its approach in the near future.

Financial Regulators and SROs Are Exploring Ways to Make Capital Requirements More Sensitive to Risk

Regulatory agencies and SROs are exploring or have proposed a number of initiatives for modifying or changing current capital requirements in banking, securities, futures, and life insurance that would make the requirements more sensitive to the actual risks in firm activities. The banking initiatives range from a proposal that would allow banks to use credit ratings from rating agencies to determine risk-based capital requirements for certain products to taking an approach to measuring credit risk that is based on statistical modeling. SEC and CFTC are monitoring and evaluating the DPG's voluntary efforts to relate capital to risks. In addition, SEC issued (1) a concept release[4] on the extent to which a statistical modeling approach should be used by broker-dealers to better reflect market risks in their activities; (2) a proposal that would create a new class of broker-dealers, called OTC derivatives dealers, that would be subject to modified capital requirements in connection with conducting an OTC derivatives business; and (3) proposed amendments to the net capital rule regarding the method of computing haircuts applicable to interest rate products. CFTC is also exploring whether the regulatory structure should be changed for OTC derivatives dealers. Two futures industry exchanges have taken steps to make minimum capital requirements more risk-based to reflect the total risks to the FCM. Although life insurance industry regulators have no current plans to fundamentally change their formula-based approach to setting capital requirements, they are working to modify various components of the current risk-based capital requirements.

[4]A concept release is a paper issued by regulators to elicit discussion and comment from industry and others on a potential regulatory change.

Bank Regulators Are Exploring Risk-Based Capital Initiatives for Credit Risk

Bank regulators have recently proposed revisions to the risk-based capital standards that, if adopted, would affect the method used to measure the relative exposure to credit risk for certain products. This is in response to the concerns, discussed earlier, about the imprecise nature of the current credit risk-based capital standards, which have created conflicts between the regulators and banks. In addition, regulators are exploring other modifications to the standards that would more precisely measure the credit risks firms face in their activities.

Bank Regulators Have Proposed Use of Credit Ratings to Measure Relative Risk Exposure in Certain Products

In November 1997, the banking regulators asked for comments on a proposal that would revise the risk-based capital standards to allow the use of credit ratings from the nationally recognized statistical rating agencies (e.g., Moody's Investors Service) to measure relative exposure to credit risk and to determine the associated risk-based capital requirement for certain products. The regulators believe the use of credit ratings would provide a way for them to use market determinations of credit quality to identify different loss positions for capital purposes in an asset securitization structure.[5] Such a change might open the way for them to determine capital requirements more precisely across a wide variety of transactions and structures in administering the risk-based capital system.

Because credit ratings may not exist for some nontraded positions, the regulators are also considering some alternative approaches to the use of credit ratings—the ratings benchmark approach and the internal information approaches. Under the first alternative, the regulators would issue benchmark guidelines that banks would use in assessing the relative credit risk of nontraded positions in specified standardized securitization structures. The second alternative consists of two different internal information approaches under which banks would use credit information they have about the credit quality of assets underlying a position to set the capital requirement for that position. The first, the historical loss approach, would take into account unexpected losses over the life of the asset pool. The second, the bank model approach, would base capital requirements for certain positions on the internal risk assessments made by banks' "internal models" for measuring credit risk. Although regulators have permitted the use of credit ratings for other purposes, these revisions to the credit risk-based capital standards, if adopted, would be the first

[5]This proposal would cover "recourse" arrangements and "direct credit substitutes" and other securitized transactions that expose banks to credit risk. Recourse refers to any risk of credit loss that a bank retains in connection with the transfer of its assets. Direct credit substitutes, such as a standby letter of credit or guarantee, refers to arrangements in which a bank assumes all or part of the risk of loss on an asset or pool of assets owned by another party, even though the bank had not owned and sold the asset.

time banks have been permitted to use credit ratings, benchmarks, or their own internal risk assessments in determining credit risk-based capital requirements.

Bank Regulators Are Also Exploring Other Possible Modifications to Credit Risk Capital Requirements

According to a 1997 paper by two Federal Reserve officials, there is increasing discussion in the banking industry as well as the regulatory community about the possibility for further evolution of bank capital regulation.[6] This paper was intended to provide the equivalent of a briefing paper on some of the specific alternative proposals that have been put forward concerning the future of capital regulation. In the view of the authors, the paper was not intended to pass judgment—positive or negative—on any of these alternatives, but it sought to raise issues that are likely to be important as the discussion of the proposals continues.

In considering the possibility of such evolution, these officials believe it is helpful to keep in mind several recent changes that they believe will influence possible future changes. First, the overall approach to bank supervision is also undergoing continuing review. For example, the bank examination process has been increasingly focused on risk management and internal controls. Second, banks today, especially large internationally active banks, face a number of different types of risks. Some of these risks, such as the market risk of traded instruments, are easier to quantify than others, such as operational risk. In addition, the computer systems and analytical abilities of these banks to measure and manage these risks are evolving themselves.

One modification under consideration would be to continue to extend and revise existing risk-based standards with the goal of improving the extent to which the risk weights for credit risk reflect the true economic risk of the underlying positions. As discussed in chapter 2, many bankers have commented that some of the current risk-weights do not accurately reflect the risk inherent in particular assets, and some have argued that the current risk-based capital framework introduces distortions into the risk-return trade-offs that banks face. Such changes may help address the issue of inappropriate incentives being created for firms by the current risk-weighting scheme.

However, in the view of these Federal Reserve officials, it is not clear that it is possible to better correlate the regulatory risk calculation with true

[6]"Regulatory Minimum Capital Standards for Banks: Current Status and Future Prospects," Darryll Hendricks and Beverly Hirtle, in Technology: Policy Implications for the Future of Financial Services, Proceedings of the 33rd Annual Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago, May 1997.

economic risk. In order to eliminate inefficiencies in the risk weights, many believe it would be necessary to mark loan portfolios to market. However, there is no consensus that this is desirable or feasible because there is no readily available resale market for most loans and, therefore, no current market value for them.

Some in the industry are exploring the possibility of using portfolio-based models of credit risk for regulatory capital purposes, much as banks' internal models of market risk are now being used. According to these Federal Reserve officials, these credit risk models have yet to be empirically tested. Such testing appears to require long periods due to the time period required to observe changes in credit risks. One model, called CreditMetrics, was introduced in 1997 and was accompanied by statements that a primary goal was to encourage a change in regulatory credit risk capital calculations. One problem in the development of credit risk models noted in the paper is that data for such models are sparse. Also, it is not clear what the appropriate holding period is in the case of credit risk. Another issue, noted in the paper, is how far to take this modeling—is there value in attempting to include operational risk, for example, into such a framework?

SEC, CFTC, and Some SROs Are Exploring Approaches to Correlate Regulatory Capital Requirements More Closely to the Risks Inherent in a Firm's Operations

SEC, CFTC, and some SROs are continuing efforts to revise regulatory capital charges to (1) reflect the economic risks being undertaken by broker-dealers and FCMs more precisely and (2) reduce incentives for some broker-dealers and FCMs to conduct certain activities through their unregistered affiliates to avoid capital requirements that apply only to registered broker-dealers and FCMs. For example, the current SEC and CFTC capital requirements consider any net interest payments due a broker-dealer or FCM from interest rate swaps to be unsecured receivables. As such, they are deducted from the firm's GAAP equity (which is the equivalent of a 100 percent capital charge). Many broker-dealers and FCMs consider this charge to be an excessive capital requirement. However, if these same swaps were to be conducted in an unregistered affiliate, they would not be subject to capital requirements.

SEC and CFTC Are Exploring the Use of Value-At-Risk Models for Determining Capital Requirements for Market Risk

Value-at-Risk (VAR), a statistical modeling approach, is increasingly being used by a few large broker-dealers in varying ways to measure, control, and report the amount of market risk incurred in their trading activities. According to market participants, SEC's current net capital requirements do not accurately reflect the economic risks being taken by a broker-dealer's activities, because such requirements do not incorporate

modern finance and risk management techniques. Because the current net capital rule generally does not recognize portfolio diversification, correlation among asset prices, or the many hedging strategies firms employ to reduce their risk, these market participants argue that capital requirements and risk do not always move in the same direction; i.e., if risks increase, then capital requirements should increase and vice versa. Accordingly, certain broker-dealers and their industry associations have been urging SEC to allow broker-dealers to use their internal models for determining regulatory capital requirements for market risk (like banks). In response to such industry urging, SEC issued a concept release in December 1997 on the extent to which a firm's statistical models might be used in setting capital requirements for a broker-dealer's proprietary positions.

The statistical modeling approach is intended to more accurately reflect the risk-return trade-off and the relationship between risks and regulatory capital. In the same concept release, SEC discussed the possibility of adopting a "precommitment" feature similar to that being considered by banking regulators.[7]

The DPG Framework Suggested How to Estimate Capital-At-Risk but Did Not Establish Capital Standards

In 1995, DPG member firms, in coordination with SEC and CFTC, developed a self-regulatory framework to address public policy issues raised by the OTC derivatives activities of "unregulated affiliates of SEC-registered broker-dealers and CFTC-registered FCMs." DPG's voluntary self-regulatory framework[8] includes, among other things, a provision for evaluating risk in relation to capital. As noted in the framework, this initiative is considered part of a process, not a single event. As DPG member firms and SEC and CFTC gain insights, they anticipate further refinements to the framework.

The "risk in relation to capital" provision of the framework has two parts. First, it suggests a way to estimate market and credit exposures associated with OTC derivatives activities. The market risk approach is similar to the approach used by bank regulators in that it uses internal models; but the credit risk approach is different in that it is based on rating agency information, not on regulatory risk-weights. Second, it advocates an approach for evaluating those risks in relation to capital. According to the DPG framework, capital-at-risk estimates are imperfect measures of

[7]In the precommitment approach, a bank would commit to manage its trading portfolio to limit market risk losses over a subsequent interval to a specified amount; if the bank exceeded its limit, it would face penalties. We present more information on this approach later in this chapter.

[8]Framework For Voluntary Oversight, Derivatives Policy Group, Mar. 1995.

potential losses associated with market and credit risks.[9] However, it noted that managers and supervisors can use them to gauge capital adequacy, and the firms have agreed to report their estimates periodically to SEC and CFTC.[10]

Although DPG firms' estimates of capital-at-risk are not intended to be capital standards, the estimates incorporate elements similar to some of those used in the banks' risk-based capital regulations. The DPG capital-at-risk for market risk is to be generated by the DPG reporting firm's internal model using the same parameters (10-day price shock, 99 percent confidence interval) required by the bank regulators. DPG, however, rejected the use of a multiplier to link capital-at-risk to capital levels. Moreover, for credit risk, DPG adjusts for historical default ratios as published by the rating agencies. The DPG firms rejected the bank regulators' method of estimating potential future credit risk because the bank regulators' method is based on notional/contract amounts,[11] which the DPG firms do not consider to be meaningful measures of risk.

DPG firms consider this to be an interim approach for estimating current and potential credit risk. They noted in the framework that they anticipate cooperating with requests by SEC and CFTC to compute potential credit risk using other methodologies.

Because the potential for risk of loss beyond the capital-at-risk estimate exists, DPG firms agreed to supplement these estimates with other potential loss estimates resulting from defined stress scenarios. The framework also outlines a common approach to audit and verify technical and performance characteristics because it allows the DPG firms to use internal models that may be unique. DPG member firms developed minimum standards and audit and verification procedures to ensure that performance characteristics of all models used to estimate capital-at-risk for market risk are broadly similar and rigorous.

[9]"Capital-at-risk" as defined by DPG is conceptually the same as "value-at-risk" used elsewhere in this report.

[10]One of the DPG firms, CS First Boston, is not required to submit information to SEC or CFTC because it has an OTC derivatives affiliate that is regulated by the Bank of England. According to SEC, under its risk assessment rules, it receives copies of quarterly financial reports that the affiliate files with the Bank of England.

[11]The notional amount is the amount upon which payments between parties to certain types of derivatives contracts are based. In an earlier report we reported that the amount at risk in a derivatives transaction is generally about 3 percent of the notional amount. See OTC Derivatives: Additional Oversight Could Reduce Costly Sales Practice Disputes (GAO/GGD-98-5, Oct. 2, 1997).

SEC and CFTC have received annual reports from the DPG reporting firms that summarized external auditors' reviews of these models. However, because no generally accepted criteria for modeling yet exist that would allow an external auditor to give an opinion on the model's adequacy, the independent accountants filed reports regarding only limited agreed-upon procedures with respect to their reviews of these models.

In the second part of the framework's capital-at-risk component, the DPG firms advocate, for a transitional period, an approach for evaluating market- and credit-risk estimates in relation to capital levels. To evaluate the adequacy of existing capital levels at DPG-member affiliates, the framework advocates an oversight approach that encourages regulators and senior managers to take into account the following factors: the firm's structure, internal controls, and risk management systems; quality of management; risk profile and credit standing; actual daily loss experience; ability to manage risks as indicated by the firm's ability to perform and document stress testing; and overall compliance with the framework's policies and procedures. The DPG firms anticipate that as experience is gained with the overall DPG framework, and depending on the evolution of thinking and policies among regulators internationally, this approach may require further refinement or modification.

Concerns remain about using internal models for regulatory purposes (e.g., validating the accuracy of the results). However, SEC and CFTC have been collecting and examining data from broker-dealers' internal models, via DPG, to gain a better understanding of the manner in which the models operate and the adequacy of capital charges derived from them.

SEC Is Considering Creating OTC Derivatives Dealers

Current capital and margin requirements applicable to registered broker-dealers impose substantial costs on the operation of an OTC derivatives business and make it difficult for U.S. securities firms to compete effectively with banks and foreign dealers in the OTC derivatives markets. In December 1997, in order to allow broker-dealers to take better advantage of counterparty netting[12] and to adjust the capital rule to better reflect the risks of OTC derivatives, SEC proposed the creation of a new class of broker-dealers called OTC derivatives dealers. This limited regulatory structure would be available only to entities acting primarily as counterparties in privately negotiated over-the-counter derivatives transactions and would be subject to modified capital, margin, and other regulatory requirements tailored to the OTC derivatives business. For

[12]Netting is an agreed-upon offsetting of positions or obligations by trading partners that can reduce a large number of individual obligations or positions to a smaller number.

example, under the limited regulatory structure, OTC derivatives dealers would be required to maintain at least $100 million in tentative net capital (i.e., capital before haircuts and undue concentration charges are taken) and at least $20 million in regulatory net capital. Also, OTC derivatives dealers would be exempted from certain margin requirements.

SEC believes the proposed minimum of $100 million in tentative net capital is necessary to ensure against excessive leverage and risks other than credit or market risk, all of which are now factored into the current haircuts, and to provide for a cushion of capital against severe market disturbances. Under the proposal, OTC derivatives dealers would be given the option of either taking haircuts, as currently required under SEC's net capital rule, or using a rule proposed to calculate capital charges for credit risk and using a VAR model to determine capital charges for market risk. SEC's proposed rule would require that any VAR models meet certain minimum qualitative and quantitative requirements.

In calculating capital charges for market risk, OTC derivatives dealers could elect one of two methods. First, OTC derivatives dealers would be able to use the full VAR method to calculate capital charges for market risk exposure for transactions in eligible OTC derivatives instruments and other proprietary positions of the OTC derivatives dealer. Under the full VAR method, a market risk capital charge would be equal to the VAR of its positions multiplied by a factor specified in the proposed rule. Second, an OTC derivatives dealer could use an alternative method of computing the market risk capital charge for equity instruments and OTC options and use VAR for its other proprietary positions. Because OTC derivatives dealers would be required to obtain authorization from SEC before using VAR models, this alternative method would also be used by a firm that does not receive SEC authorization to use a VAR model for equity instruments.

In calculating capital charges for credit risk, OTC derivatives dealers electing to apply the proposed rule would compute a two-part charge on a counterparty basis. First, for each counterparty, OTC derivatives dealers would take a capital charge equal to the net replacement value in the account of the counterparty multiplied by 8 percent, and further multiplied by a counterparty factor ranging from 20 to 100 percent based on the counterparty's rating by at least two nationally recognized statistical rating agencies. The counterparty factors would link the size of the credit risk capital charge to the perceived risk that the counterparty may default.

The second part of the credit risk charge would consist of a concentration charge that would apply when the net replacement value in the account of any one counterparty exceeds 25 percent of the OTC derivatives dealer's tentative net capital and would also be based on the counterparty's rating by at least two rating agencies. The concentration charge would equal 5 percent of the amount of the net replacement value in excess of 25 percent of the OTC derivatives dealer's tentative net capital for counterparties that are highly rated and would increase in relation to the OTC derivatives dealer's exposure to lower rated counterparties.

SEC Proposed New Net Capital Rule Treatment for Interest Rate Products

In addition to the OTC derivatives dealers release, in December 1997, SEC proposed amendments to the net capital rule, Rule 15c3-1, regarding the method of computing haircuts applicable to interest rate products. The proposed amendments would treat most types of interest rate products as part of a single portfolio and would recognize various hedges among a portfolio of government securities, investment grade nonconvertible debt securities (or corporate debt securities), certain pass-through mortgage-backed securities, repurchase and reverse repurchase agreements, money market instruments, futures and forward contracts on these debt instruments, and other types of debt-related derivatives. The proposed amendments are intended to better match capital charges with actual market risk hedging practices employed by broker-dealers.

CFTC Is Exploring the Regulatory Structure Applicable to OTC Derivatives

As part of its comprehensive regulatory reform efforts to update its oversight of both exchange and off-exchange markets, CFTC published a concept release in May 1998, on issues relating to the OTC derivatives market. The concept release requests comments on whether the regulatory structure applicable to OTC derivatives under CFTC regulations should be changed in light of the growth in the derivatives marketplace since CFTC's last major regulatory actions involving OTC derivatives in 1993.

CME and CBOT Adopted Risk-Based Capital Requirements for Their Clearing Organizations

In 1995, two futures industry SROs, the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME), informally proposed to CFTC to base minimum capital requirements on "funds at risk" as opposed to the current "funds required to be segregated." In their view, the current CFTC net capital requirements (CFTC Rule 1.17) do not fully reflect all of the risks (e.g., foreign customers trading in foreign markets) faced by FCMs' trading activities and thus impose insufficient capital requirements on FCMs. Funds at risk are generally defined as the initial margin requirements, which are themselves risk-based, imposed by the various exchanges on all open positions held at those exchanges; segregated funds are generally balances that FCMs owe to customers.

The CBOT and the CME risk-based capital proposals were positively received by CFTC, which consulted with the SROs on the parameters of the risk model. The SROs' risk-based capital requirements for their clearing organizations became effective on January 1, 1998. Under the newly adopted risk-based capital requirements, all members of the two SROs are required to maintain adjusted net capital in excess of the greater of (1) the minimum dollar balances of the respective clearing organizations, or (2) 10 percent of domestic and foreign domiciled customer and 4 percent of noncustomer (excluding proprietary) risk maintenance margin/performance bond requirements for all domestic and foreign futures and options on futures contract, or (3) the CFTC/SEC minimum regulatory capital requirements. CME and CBOT believe that these new requirements will correlate FCMS' capital requirements more closely to the total risks they face in their business.

To aid in the adoption of an industrywide risk-based capital standard, CBOT and CME plan to collect and analyze data over several years to determine the effect of the new requirements on overall industry capital levels.

Life Insurance Regulators Are Exploring Changes to Their Risk-Based Capital Requirements

NAIC has asked the American Academy of Actuaries[13] to study the possibility of increasing the level of quantification in the interest rate risk component of the life insurance risk-based capital requirements. The reason for changing the interest rate risk component is due to the difficulty in managing interest rate risk for life insurance companies. This difficulty increases as financial products become more complex, and interest rate risk exists in both the assets and liabilities of life insurance companies. The current risk-based capital formula addresses interest rate risk only in the asset side.

Changes to the interest rate risk component of the risk-based capital requirements are seen by life insurance regulators and companies as a major change. Other changes that are being made to the risk-based capital formula are considered to be minor modifications. For example, since the initial formula was adopted, changes have been made to the mortgage loan factors, and the treatment of insurers' investments in certain mutual funds have been given different treatment depending upon what the mutual funds invest in. Regulators we spoke with expected further changes similar to these to continue in the future.

[13]The American Academy of Actuaries is the public policy, communications, and professional organization for all actuaries.

New Approaches to Capital Regulation Are Also Being Explored

In addition to initiatives that would make regulatory capital requirements more sensitive to risks in firms' activities, a number of other ideas are being explored, primarily in banking, that would take different approaches to simplifying capital regulation. Three of them would use various incentives rather than detailed requirements to deter excessive risk-taking by firms. The final idea in this section is motivated by a desire of some in the industry to keep capital requirements from becoming extremely complex and comes from the recognition that minimum regulatory capital standards and banks' own internal capital allocation models serve different purposes.

The Precommitment Approach Was Pilot Tested

In July 1995, the Federal Reserve Board requested public comment on the so-called precommitment approach to market risk capital requirements, which was introduced in a paper by two Federal Reserve officials.[14] It was developed in response to perceived difficulties with the internal models approach to market risk capital. For example, banks' internal models are not designed to measure risk exposure over the time horizons of regulatory concern and thus may not accurately translate to these intervals. In addition, model-based capital calculations cannot account for the fact that some banks will be in a position to reduce their exposure to losses through investment in superior information systems or other aspects of risk management.

Under the precommitment approach, the bank would specify an amount of capital it believed was adequate to cover its risk exposure over a fixed subsequent interval and would commit to manage its trading portfolio to limit losses over the interval to this amount. If the bank's losses exceeded the precommitment amount, it would face penalties that could range from public disclosure to additional capital requirements or monetary fines. Under this approach, both the commitment and the bank's risk management system would be subject to review by regulatory authorities. The penalties associated with a breach of the capital commitment are to provide the incentive for banks to commit honestly and to manage risk to stay within the commitment.

Some industry analysts considered such an approach to be a major improvement in capital regulation. However, others believe the approach raises a number of issues because of its departure from traditional capital

[14]A Precommitment Approach to Capital Requirements for Market Risk, Paul H. Kupiec and James M. O'Brien, FEDS 95-36, Federal Reserve Board, July 1995.

regulation—comparability, interaction with other supervisory policies, enforceability, and the role of penalties.

Regarding comparability, on the surface it would seem that precommitted amounts would be comparable across firms because the firms are all being asked about the maximum amount they could lose over the same time interval. However, the amounts are likely to differ because they would still be based on subjective estimates of the quality of internal risk management and differences in firms' tolerances for risk. Comparability might also be compromised because the cost of capital differs across firms.

With regard to interaction with other supervisory policies, bank supervisors are already required to focus on bank internal risk measurement and management systems. Thus, it is not clear that the adoption of the precommitment approach would eliminate supervisory interest in the validation of such systems.

With regard to enforcement and the role of penalties, there is a concern not only about the types of penalties that should be used, but also whether it would be counterproductive to enforce them during stressful market conditions. The paper notes that in choosing penalties, it will be important to determine what the goal of penalties is—that is, the degree of incentive they are to provide the bank. Some experts believe that to reliably achieve regulatory objectives, the penalties would need to be bank specific and that the appropriate penalty would depend on a bank's cost of capital and its individual investment opportunities. However, these factors are not ascertainable by regulators. In addition, recent work by the original designers of the precommitment approach acknowledges that the link between after-the-fact penalties and regulatory capital objectives is tenuous.[15] In the view of a Federal Reserve official, the appropriate penalty for achieving regulatory capital objectives for market risks is bank specific and depends on characteristics that regulators cannot precisely measure. Moreover, an approach that relies on after-the-fact penalties to influence bank behavior implicitly assumes that the bank is forward-looking and takes potential penalties into account when making current capital allocation decisions. This might be a reasonable assumption for healthy banks, but weak banks may not care about future penalties that, in the extreme, might not be enforceable if the bank is insolvent.

[15]Deposit Insurance, Bank Incentives, and the Design of Regulatory Policy, Paul H. Kupiec and James M. O'Brien, Board of Governors of the Federal Reserve System, Dec. 1997.

The New York Clearing House Association (Clearing House)[16] conducted a four-quarter test of the precommitment approach that began in October 1996. The pilot was designed to assist the bank regulators and the participating banks and bank holding companies in evaluating and assessing the usefulness and viability of the approach for regulatory capital purposes. In a comment letter to the Federal Reserve, the Clearing House suggested that the U.S. bank regulators consider adoption of this approach for two reasons: (1) it might constitute a way to effectively establish a relationship between an institution's calculation of value-at-risk for management purposes and prudent capital requirements for regulatory purposes, and (2) it would result in capital requirements for market risks tailored to the particular circumstances of each institution.

There were 10 participants in the pilot—8 U.S. and 2 foreign banking organizations.[17] During the pilot, each participant precommitted the amount of capital it needed to hold against its market risk for four 3-month periods. The pilot was conducted on a consolidated basis in that participants precommitted capital for the consolidated trading operation of the holding company, including bank and Section 20 subsidiaries. After the end of each period, participants reported their results to their primary regulators and provided copies of the reports to the Clearing House. The participants conducted the pilot under the assumption that the penalty would be disclosure, not financial penalties.

In its report on the pilot's results, the Clearing House said that the participants believe (1) the precommitment approach is a viable alternative to the internal models approach for establishing capital adequacy of a trading business for regulatory purposes; and (2) when properly structured and refined, steps should be taken to implement it as an alternative to existing market risk capital standards. Further, the participants believe this approach provides strong incentives for prudent risk management and more efficient allocation of capital as compared to other existing capital standards. The Clearing House believes the pilot contributed to the development and depth of the participants' thinking about the purpose of capital and about the distinction between economic capital maintained for the benefit of shareholders and minimum regulatory capital.

[16]A clearing house is a voluntary association of depository institutions that facilitates the exchange of payments transactions, such as checks, and the settlement of participants' net debit or credit positions.

[17]The participants in the pilot were BankAmerica Corporation, Bankers Trust New York Corporation, The Chase Manhattan Corporation, Citicorp, First Chicago NBD Corporation, First Union Corporation, The Fuji Bank Limited, J.P. Morgan & Co., Inc., NationsBank Corporation, and Swiss Bank Corporation.

Pilot results showed that the participants' precommitted capital amounts were less than the market risk regulatory capital requirements. No participant reported a negative change that exceeded its precommitted capital amount. Finally, the participants believe the benefits of the precommitment approach are likely to apply to other risks of trading businesses, such as operational risk, as well. In their view, the approach avoids many of the complications and inefficiencies that are generated when capital requirements are set separately for each category of risk.

One high level regulatory official, reflecting the generally held regulatory and industry views, said that the pilot demonstrated that the participants have internal procedures for allocating capital for market and other risks in their portfolios; but it did not, and realistically could not, demonstrate that these internal allocations are sufficiently large to meet regulatory objectives with respect to minimum capital. Even though none of the participants reported losses in excess of their commitments during the pilot, in reality, none of the participants incurred any cumulative loss over any of the four quarters. Hence, no violations would have occurred if no capital had been committed.

An Approach That Emphasizes Supervision Is Being Explored

Another alternative approach to the evolution of bank capital regulation would be one that emphasizes supervision rather than minimum standards. In a 1995 paper, a Federal Reserve official argued that the distinct uses and characteristics of minimum regulatory capital requirements and firm internal capital allocations make it inadvisable to combine them into a single measure.[18] In his view, they are so naturally contradictory that a hybrid would be much less informative than two individual measures. Moreover, he believes an attempt to bring the two constructs closely in line could undermine the useful objectivity of minimum capital and deprive firms of the flexibility they need to determine optimum capital levels. Under this approach, the firm would be accountable for determining its own appropriate level of capital while abiding by sound practices developed in the context of the business. Firms engaged in trading complex instruments would need to apply sophisticated mathematical techniques; those that focus on, for example, small business lending would have to apply different techniques (e.g., traditional credit analysis). The supervisor would monitor the performance of the firm in the firm's determination of its appropriate capital level.

[18]"A Prolegomenon to Future Capital Requirements," Arturo Estrella FRBNY Economic Policy Review, July 1995.

Like the precommitment approach discussed above, this approach also relies on incentives. However, in contrast to the precommitment approach in which penalties are to act as a deterrent to excessive risk taking, the key to the success of this approach would be the supervisor. The supervisor would monitor compliance with minimum requirements as frequently as feasible and then supplement the effectiveness of minimum requirements by ensuring that the firm makes its best efforts to determine an optimum level of capital. In this way, the development and determination of the optimum are best left to the firm, and supervisors would work closely with the firm to ameliorate the situation if they find capital levels declining toward the minimums. The Federal Reserve official also believes this approach would be consistent with the prompt corrective action rules. (See app. I for more information on prompt corrective action.)

An Approach That Emphasizes Disclosure Is Also Being Explored

In their 1997 paper,[19] two Federal Reserve officials noted that a number of different approaches exist that would emphasize disclosure rather than minimum standards. One of these approaches would operate along the same lines as the approach emphasizing supervision discussed above. It would develop a two-pronged capital structure that would separate minimum standards, which would be set by the supervisor, from the optimal capital held by the firm, which should be its own decision. The first prong could be a minimum capital calculation in which the method would be chosen to emphasize comparability across firms; the second prong would be an internal capital calculation in which the bank would have greater freedom to use its own methodology. The bank would publicly disclose the results of both calculations. In the authors' view, this approach would seek to combine public disclosure and the discipline of the marketplace to ensure that banks had appropriate incentives in the development of these internal calculations.

Other Approaches to Changing Bank Capital Regulation Emphasize Reducing the Complexity of the Rules

A number of other approaches to capital regulation are being explored, particularly in the banking area, that would also simplify capital requirements. One possible approach discussed by the Federal Reserve officials in their paper is,[20] in their view, motivated by the desire of some in the industry to keep the capital rules from becoming extremely complex and by the recognition that minimum capital standards serve a different purpose from banks' own internal capital allocation models. This

[19]See footnote 6.

[20]See footnote 19.

approach would develop a capital framework that would not require ever more complex measures of portfolio risk. The hope in developing such a framework is that a suitable proxy for true economic risk could be found. This proxy would not be intended to be extremely precise, but it would need to roughly capture the bulk of the firm's exposures. According to the Federal Reserve officials, the key issue for this alternative approach is whether it is possible to achieve this goal. There are two interpretations for this approach. In the first, the aim is for the simple measure of risk to be roughly accurate in that, on average, it produces a measure of risk that is equivalent to what an ideally precise measure would produce. In the second, the goal would be a simple measure of risk that is good enough to determine whether the firm has a dangerously low level of capital.

Another approach discussed by the Federal Reserve officials in their paper is one that would base capital regulation on observed measures of volatility, such as earnings volatility. This approach is also motivated by a desire to develop a simple but comprehensive approach to bank capital regulation that would not require the separate specification of each risk. One possibility suggested in the paper would be for minimum capital to equal some multiple of quarterly earnings volatility. Such an approach would require almost no additional calculations by the bank and, in the authors' view, it would be objective and verifiable; however, they noted a number of drawbacks to such an approach. First, it is not clear that earnings volatility is itself a good proxy for economic risk. Second, because it is a transformation of publicly available information, it does not provide any additional information to the marketplace. Third, it would potentially create incentives for bank behavior aimed at smoothing reported income.

Bank Risk-Based Capital Standards

The current U.S. bank risk-based capital regulations implement the Basle Accord on risk-based capital.[1] In implementing the Basle Accord each national bank regulator was to make its own regulations at least as strict as the Accord. In the United States, U.S. bank regulators applied it to all banks, rather than just internationally active ones, which were targeted by the Accord. Since 1990, banks and bank holding companies in the United States have been subject to risk-based capital standards. This appendix describes the risk-based capital standards for banks. The standards for bank holding companies are similar.

Although U.S. bank risk-based capital guidelines[2] address a number of types of risk, only credit and market risk are explicitly quantified.[3] The quantified risk-based capital standard is defined in terms of a ratio of qualifying capital divided by risk-weighted assets. In addition to the quantified risk-based capital ratio for credit and market risks, bank regulators are required by the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) to monitor other risks, such as interest rate risk[4] and concentration risk.[5]

Calculating the Risk-Based Capital Ratio for Credit Risk

All banks are required to calculate their credit risk for assets, such as loans and securities; and off-balance sheet items, such as derivatives or letters of credit.[6] The credit risk calculation assigns all assets and off-balance sheet items to one of four broad categories of relative riskiness

[1]The official document referred to as the Basle Accord is entitled International Convergence of Capital Measurement and Capital Standards, Committee on Banking Supervision (Basle, Switzerland: July 1988).

[2]Capital Adequacy Guidelines, Reg. H (12 C.F.R. pt. 208) App. A, Board of Governors of the Federal Reserve System, as amended Dec. 31, 1993. OCC's regulation is at 12 C.F.R. pt. 3.10 and 3.11 FDIC's regulation is at 12 C.F.R. pt. 325.

[3]Credit risk is the potential for financial loss resulting from the failure of a borrower or counterparty to perform on an obligation. Market risk is the potential for financial losses due to the increase or decrease in the value or price of an asset resulting from broad movements in prices, such as interest rates, commodity prices, stock prices, or the relative value of currencies (foreign exchange).

[4]Interest rate risk is the risk of potential loss arising from changes in interest rates. It exists in traditional banking activities, such as deposit-taking and loan provision, as well as in securities and derivatives activities.

[5]Concentration risk exists if a bank is heavily exposed to certain sectors or countries. It deals with the risks of not diversifying the assets so that a problem in any one sector or country might financially affect the bank.

[6]An off-balance sheet item is a financial contract that can create credit losses for the bank but that is not reported on the balance sheet under standard accounting practices. An example of such an off-balance sheet position is a letter of credit or an unused line of credit that commits the bank to making a loan in the future that would be on the balance sheet and thus create a credit risk.

(0, 20, 50, or 100 percent) according to type of borrower/obligor and, where relevant, the nature of any qualifying collateral or guarantee. Off-balance sheet items are converted into credit equivalent amounts. The assets and credit equivalent amount of off-balance sheet items in each category are multiplied by their appropriate risk-weight and then summed to obtain the total risk-weighted assets for the denominator of the credit risk-based capital ratio. Capital, the numerator of the capital ratio, is long-term funding sources for the bank that are specified in the regulations. A bank is to maintain a total risk-based capital ratio (total capital/risk-weighted assets) of at least 8 percent.

Measuring Risk-Weighted Assets for Credit Risk

The credit risk regulation requires the use of two sets of multipliers. One set of multipliers places each off-balance sheet item into one of four categories and converts items in each category into asset equivalents. These conversion factors are multiplied by the face or notional amount of the off-balance sheet items to determine the "credit equivalent" amounts. In addition, for derivatives, these credit equivalent amounts are the value of the bank's claims on the counterparties plus add-on factors to cover the potential future value of the derivative contracts.[7] Then the other set of multipliers applies the risk-weights to assets and off-balance sheet credit equivalent amounts according to the type of borrower/obligor (and, where relevant, the nature of any qualifying collateral or guarantee). The sum of the risk-weighted assets in all categories is the credit risk-weighted assets for the bank.

There are four conversion factors that convert off-balance sheet items into their asset equivalents. The conversions are based on multiplying the conversion factors by the face or notional amounts of the relevant off-balance sheet position.

- The 100 percent credit conversion factor applies to direct credit substitutes, such as guarantee-type letters of credit, risk participations in bankers acceptances, and asset sales with recourse.
- The 50 percent credit conversion factor applies to items such as performance bonds, revolving underwriting facilities, or unused commitments with an original maturity exceeding 1 year.
- The 20 percent credit conversion factor applies to short-term, self-liquidating, trade-related contingencies, including commercial letters of credit.

[7]Off-balance sheet derivatives include interest-rate, exchange-rate, equity-linked derivatives, and commodity derivative contracts.

- The 0 percent credit conversion factor applies to unused portions of commitments with an original maturity of 1 year or less and unused portions of commitments that can be cancelled at any time.

  Credit equivalent amounts are also calculated for off-balance sheet derivatives contracts. The credit equivalent amounts on such contracts are the sum of the present positive value (if any) of the contracts plus estimated potential future exposure.[8]

  Under the capital regulations, the credit equivalent of the potential future exposure of derivatives contracts is estimated by multiplying the notional values of the contracts by specified percentages. The multipliers range from 0 to 15 percent; cover 6 types of derivatives contracts (interest rate, exchange rate, equity, gold, other precious metals, and other commodities); and include maturity categories of 1 year or less, 1 to 5 years, and over 5 years.

  Although the Basle Accord adopted five risk weight categories, U.S. regulations allow only four risk categories.[9]

- Category 1 has a zero risk-weight and includes items such as cash, claims on Organization for Economic Cooperation and Development (OECD)[10] central governments and central banks, and claims on U.S. government agencies.[11] The zero weight reflects the lack of credit risk associated with such positions.

[8]Derivatives are financial products that enable risk to be shifted from one entity to another. The value of the derivative is based on an underlying reference rate, index, or asset, such as stocks, bonds, commodities, interest rates, foreign currency exchange rates, and various market indexes.

[9]These risk-weights for the four categories assume all assets within each category have the same level of credit risk. Thus, a loan to a highly rated corporation generally carries the same 100-percent risk-weight as a start-up loan to a new company or a small business. According to the Federal Deposit Insurance Corporation (FDIC), although this approach in the risk-based guidelines minimizes government-mandated private sector credit allocation, applying the same risk-weights to all commercial loans has been a source of concern to bankers and analysts in the government and the private sector.

[10]When the Basle Accord was adopted, OECD included members of 24 developed countries. Subsequently, other members have joined, and it currently has 29 members. Its goals are to achieve high economic growth, contribute to sound economic expansion, and contribute to the expansion of world trade.

[11]In July 1994, the Basle Committee amended the Capital Accord concerning the qualification for the OECD risk-weighting. For purposes of risk-weighting, the OECD group comprises countries that are full members of OECD (or that have concluded special lending arrangements with the International Monetary Fund associated with the Fund's General Arrangements to Borrow), but it excludes any country within this group that has rescheduled its external sovereign debt in the previous 5 years.

- Category 2 has a 20-percent risk-weight and includes items such as long-term claims on banks in OECD countries, general obligations of OECD governments below the national level, obligations of government-sponsored enterprises, or cash items in the process of collection.
- Category 3 has a risk-weight of 50 percent and includes items such as certain loans secured by first liens on 1 to 4 family residential real estate and obligations of local governments in OECD countries that depend on revenue flows from projects financed by the debt.
- Category 4 has a risk-weight of 100 percent and represents the presumed bulk of the assets of commercial banks. It includes, among other things, commercial loans and claims on non-OECD central governments.

Defining Capital in the Credit-Risk Capital Ratio

Before the capital ratio can be calculated, capital must be defined and quantified. There are two qualifying capital components in the risk-based credit risk computation—"core capital" (tier 1) and "supplementary capital" (tier 2). Tier 1 includes common stockholders' equity; noncumulative perpetual preferred stock (including any related surplus); and minority interests in consolidated subsidiaries, less deductions for certain assets such as goodwill[12] and core deposit intangibles. Tier 1 is stockholder ownership value that cannot be removed if the bank faces financial difficulties. Tier 2 includes the allowance for loan loss reserves, up to a maximum of 1.25 percent of risk-weighted assets; other preferred stock (subject to limitations); and various long-term debt instruments, such as subordinated debt, that provide support to the firm if it is facing financial difficulties because they cannot be readily liquidated by creditors or bond holders prior to maturity. In addition, the regulations limit the amount of tier 2 capital in total capital and the amount and type of qualifying intangible assets[13] that can be recognized for tier 1 capital purposes.

The regulation outlines a number of deductions from the capital base. Goodwill and other intangible assets are to be deducted from tier 1 capital as prescribed in the rules. Other deductions from total capital include

[12]Goodwill means the intangible asset that represents the excess of the purchase price over the fair market value of tangible and identifiable intangible assets acquired in purchases.

[13]Qualifying intangible assets include mortgage servicing assets and purchased credit card relationships. Other intangible assets, such as goodwill, favorable leaseholds, and core deposit intangibles, are deducted in their entirety in calculating tier 1 capital.

- investments in unconsolidated banking and financial subsidiary companies that are deemed to be capital of the subsidiary, and
- reciprocal bank holdings of investments in the capital of other banks and financial institutions.

With capital and risk-weighted assets defined, the ratio calculation is the sum of tier 1 and tier 2 capital divided by total risk-weighted assets. Table I.1 summarizes the mechanics of converting on- and off-balance sheet assets in each category into the risk-weighted assets and computing the credit risk-based capital ratio. The minimum standard risk-based capital ratio is 8 percent, of which core capital (tier 1) is to be at least 4 percent.[14]

Table I.1: The Calculation of the Credit Risk-Based Capital Ratio

Step	Description
1	Convert all off-balance sheet items into credit equivalent amounts using a conversion factor from the regulation. The asset equivalent of each off-balance sheet item is the notional or face amount of that item multiplied by a conversion factor. The converted amount of each off-balance sheet item is then placed into one of the four risk categories.
2	Sum the balance sheet asset values and the credit equivalent amount of off-balance sheet items in each risk category.
3	Determine the risk-weighted assets in each risk category by multiplying the balance sheet asset values and the credit equivalent amount of off-balance sheet items in each risk category by the appropriate risk-weight percentage for that category found in the regulation.
4	Calculate risk-weighted assets as the sum of the risk-weighted assets across the four risk categories.
5	Calculate the credit risk-based capital ratio: $\frac{\text{tier 1 capital + tier 2 capital}}{\text{risk-weighted assets}}$
6	Compare the calculated ratio to the standards in the regulation.

[14]In addition, banks must maintain a minimum leverage ratio of at least 3 percent tier 1 capital divided by adjusted total assets. However, this minimum applies only to banks with the highest supervisory ratings that are not anticipating or experiencing any significant growth. According to FDIC, most banks are subject to a minimum leverage standard of not less than 4 percent.

Calculating the Risk-Based Capital Ratio for Market Risk

The risk-based capital regulation requires a bank with a significant market risk exposure to calculate a risk-based capital ratio that takes into account market risk as well as credit risk. The market risk capital regulation applies to positions in an institution's trading account such as securities and derivatives; and all foreign exchange and commodity positions, wherever they are located in the bank. Market risk exposure is the gross sum of trading assets and liabilities on the bank's balance sheet. To be considered a significant exposure, this gross exposure must exceed 10 percent of total assets or exceed $1 billion. Credit risk determinations are also made, where necessary, for items included in the market risk calculation. Over-the-counter derivatives and foreign exchange positions outside of the trading account are items subject to both market and credit risk charges.

This adjusted risk-based capital ratio requires banks to determine whether positions are subject to market risk capital requirements, credit risk capital requirements, or both. The denominator of the risk-based capital ratio is the sum of credit risk-weighted assets for assets with credit risk and market risk-equivalent assets. To determine market risk-equivalent assets, the bank is required to use its own internal model to calculate its daily value-at-risk (VAR).[15] The numerator of the risk-based capital ratio expands the definition of capital to include a tier 3, which is a special form of subordinated debt as defined in the regulations. The market risk regulation imposes qualitative requirements on the banks and specifies quantitative parameters to be used with the banks' internal models.

Measuring Market Risk and Market Risk-Equivalent Assets

Market risk consists of general market and specific risk components. To determine the market risk-equivalent assets, the risk or capital charges must be calculated for both components.

Market risk capital charges are based on general market and specific risks. Examples of general market risk factors are interest rate movements and other general price movements. Capital charges for general market risks are to be based on internal models developed by each bank to calculate a VAR estimate, i.e., potential loss that capital will need to absorb. The internal VAR estimate for general market risks is to be based on statistical analyses that determine the probability of a given loss, based on at least 1 year of historical data. This VAR estimate is to be calculated daily using a

[15]VAR models use statistical analyses to estimate the maximum amount that the value of all covered positions (trading account, all foreign exchange, and commodities) could decline during a fixed holding period within a stated confidence level. For example, a value-at-risk estimate might be the dollar loss that could occur 1 out of every 100 days based on statistical analyses.

99 percent one-tailed confidence interval with a price shock equivalent to a 10-business day movement in rates and prices; i.e., 99 percent of the time the calculated VAR would not be exceeded in a 10-day period.

Specific risk arises from factors relating to the characteristics of specific issuers of instruments. Specific risk factors reflect both idiosyncratic price movements of individual securities and "event risk" from incidents, such as defaults or credit downgrades, which are unique to the issuer and not related to market factors. If a bank's internal model does not capture all aspects of specific risk, an add-on to the capital charge is required for specific risk. Specific risk estimates based on internal models are subject to adjustments based on the precision of the model.

The total market risk capital charge is the sum of the capital charges for general market and specific risk.[16] The total market risk capital charge is based on the larger of the previous day's VAR estimate and the average of the daily VAR estimates for the past 60 days times the multiplier. The multiplier ranges from 3 up to a maximum of 4 depending on the results of backtesting.[17] Market risk-equivalent assets are the total market risk capital charges multiplied by 12.5.[18]

Defining Capital in the Market Risk Capital Ratio

The market risk capital ratio augments the definitions of qualifying capital in the credit risk requirement by adding an additional capital component (tier 3). Tier 3 capital is unsecured subordinated debt that is fully paid up, has an original maturity of at least 2 years, and is redeemable before maturity only with approval by the regulator. To be included in the definition of tier 3 capital, the subordinated debt is to include a lock-in clause precluding payment of either interest or principal (even at maturity) if the payment would cause the issuing bank's risk-based capital ratio to fall or remain below the minimum requirement. Tier 3 capital provides another capital cushion against losses due to market risk.

[16]In this discussion, de minimis risks are subsumed in the specific risk discussion. De minimis risks are those risks that the regulator permits the bank to calculate in an alternative manner.

[17]Backtests provide information about the accuracy of an internal model by comparing a bank's daily VAR measures to its corresponding daily trading profits and losses.

[18]The multiplier (12.5) is related to the 8-percent minimum risk-based capital ratio in the regulation and is used in order to generate a denominator for the capital requirement that is comparable to the denominator used for credit risk. An 8-percent requirement means that asset values can be, at most, 12.5 times capital values because 8 x 12.5 = 100. If the multiplier were any larger, the 8 percent capital requirement could not be met for market risk.

Calculating the Market Risk-Based Capital Ratio

Application of the market risk capital ratio requires the use of a two-part test. The sum of tiers 1, 2, and 3 capital must equal at least 8 percent of total adjusted risk-weighted assets. The tier 3 capital in this sum is only to be allocated to cover market risk. In addition, the sum of tier 2 and tier 3 capital for market risk may not exceed 250 percent of tier 1 capital allocated for market risk. The regulation includes other restrictions on the use of tier 2 and 3 capital.

Table I.2 shows the mechanisms by which the risk-based capital ratio is calculated for credit and market risk.

Table I.2: The Calculation of the Risk-Based Capital Ratio for Market and Credit Risk

Step	Description
1	Determine whether positions are subject to market risk capital requirements, credit risk capital requirements, or both.
2	For the credit risk assets and off-balance sheet items, calculate the credit risk-weighted assets as described in table I.1.
3	Quantify general market risks using the bank's VAR model to estimate the volatility of the prices of market risk assets and items using a VAR model. The estimated VAR is the higher of the previous VAR or the average of the daily VAR estimates for the past 60 days multiplied by a factor between 3 and 4 depending on the accuracy of the VAR model.
4	Quantify specific risks using risk add-ons or estimates based on the bank's internal model, or some combination of both.
5	Determine the total risk-weighted assets for market risk by summing the measures of general market and specific risks and multiply this sum by 12.5.
6	Calculate the total risk-weighted assets for market risk by summing the credit risk-weighted and market risk-equivalent assets.
7	Determine tier 3 capital and the total capital for the numerator. The mix of the capital tiers in the numerator of the combined credit and market risk-based capital ratio is limited by the regulation.
8	Calculate the total risk capital ratio subject to the capital restrictions in step 7. (tier 1 + tier 2 + tier 3 capital) (credit risk-based assets + market risk-equivalent assets)
9	Compare the calculated ratio to the standards in the regulation.

Internal Model Specifications and Requirements

The regulation requires the bank's internal model to address all major market risk categories[19] using factors sufficient to measure market risks in all covered positions.[20] The regulation specifies certain requirements for the bank's internal model. In developing its internal model, the bank may use any generally accepted measurement technique, such as variance-covariance models, historical simulations, or Monte Carlo simulations. However, the level of sophistication and accuracy of the model must be commensurate with the nature and size of the bank's covered positions.

Quantitative Requirements for General Market Risk

For regulatory capital purposes, the VAR measures must meet the following quantitative requirements:

1. The VAR measure or maximum likely loss is to be calculated on a daily basis with a 99 percent one-tailed confidence level with a price shock equivalent to a 10-business day holding period. This 10-day shock can be calculated directly or be based on the 1-day VAR figures.

2. The VAR calculation is to be based on historical data of at least 1 year.

3. The VAR calculation is to account for nonlinear price characteristics of options positions and the sensitivity of the market value of the positions to changes in the volatility of the underlying rates or prices. That is, the calculation must take into account the fact that certain financial positions imply minimal risk for certain market price movements and much larger risks for other market price movements.

4. The VAR measures may incorporate quantified empirical correlations[21] within and across risk categories, provided that the bank's process for measuring correlations is sound.

5. Beginning 1 year after adoption of the rules, backtesting will be required and it is to be based on the most recent 250 days of trading. The testing is to be done on a 1-day holding period and a 99 percent one-tailed confidence level.

[19]The market risk model does not cover all market risks. For example, it does not cover interest rate risk on mortgages that are not held in the trading book.

[20]Covered positions means all positions in a bank's trading account and all foreign exchange and commodity positions, whether or not in the trading account.

[21]Correlation is a measure of the degree of association between two variables. The empirical correlation can be either positive, negative, or nonexistent.

Quantitative Requirements for Specific Risk

An institution whose internal model does not adequately measure specific risk must continue to calculate standard specific risk capital charges or add-ons to the VAR-based capital charge to determine market risk capital requirements. An institution whose internal model adequately captures specific risk may base its specific risk capital charge on the model's estimates.

Specific risk means the changes in the market value of specific positions due to factors other than broad market movements, including idiosyncratic variations as well as event and default risk. In order to capture specific risk, the internal model is to explain the historic price variation in the portfolio and be sensitive to changes in portfolio concentrations—the extent to which one type of asset dominates the portfolio—requiring additional capital for greater concentrations. The internal model is required to be robust to adverse environments. The model's ability to capture specific risks is to be validated through backtesting. Institutions with models that are not validated with backtesting are to continue to use specific risk add-ons as defined in the regulations.

Qualitative Restrictions in Applying the Market Risk-Based Capital Regulation

The risk management system of any bank subject to the market risk requirement is required to meet the following minimum qualitative requirements. It is to have

- a risk control unit that reports directly to senior management and is independent from business trading units,
- an internal risk management model that is integrated into daily management processes,
- policies and procedures to identify and conduct appropriate stress tests and backtests of the model,[22]
- independent annual reviews of its risk measurement and risk management systems.

FDICIA Required Revisions to U.S. Risk-Based Capital Standards

FDICIA was enacted to make fundamental changes in federal oversight of depository institutions in response to the thrift and banking crisis of the 1980s, which resulted in large federal deposit insurance fund losses. Section 305 of FDICIA required, among other things, that bank regulators revise their risk-based capital standards to include concentration of credit

[22]Stress testing provides information about the impact of adverse market events on a bank's covered positions.

risk, risks of nontraditional activities, and interest rate risk. Inadequate management of these risks had created problems for the bank and thrift deposit insurance funds.

In response, on December 13, 1994, bank regulators amended risk-based capital standards for depository institutions to "ensure that those standards take adequate account of concentration of credit risk and the risks of nontraditional activities," which include derivatives activities. Regulators are to consider the risks from nontraditional activities and management's ability to monitor and control these risks when assessing the adequacy of a bank's capital. Similarly, institutions identified through the examination process as having exposure to concentration of credit risk or as not adequately managing their concentration of risk are required to hold capital above the regulatory minimums. Because no generally accepted approach exists for identifying and quantifying the magnitude of risk associated with concentrations of credit, bank regulators determined that including a formula-based calculation to quantify the related risk was not feasible.

U.S. bank regulators addressed the interest rate risk portion of section 305 through a two-step process. Step one consisted of a final rule issued on August 2, 1995, that amended the capital standards to specify that bank regulators will include in their evaluations of a bank's capital adequacy an assessment of the exposure to declines in the economic value of the bank's capital due to changes in interest rates. The final rules specify that examiners will also consider the adequacy of the bank's internal interest rate risk management. Step one also included a proposed joint policy statement that was issued concurrently with the final rule. This joint policy statement described how bank regulators would measure and assess a bank's exposure to interest rate risk.

Originally, bank regulators intended that step two would be the issuance of a proposed rule based on the August 2, 1995, joint policy statement that would have established an explicit minimum capital requirement for interest rate risk. Subsequently, bank regulators elected not to pursue a standardized measure and explicit capital charge for interest rate risk.

According to the bank regulators' June 26, 1996, joint policy statement on interest rate risk, the decision not to pursue an explicit measure reflects concerns about the burden, accuracy, and complexity of developing a standardized model and the realization that interest rate risk measurement techniques continue to evolve. Nonetheless, bank regulators said they will

continue to place significant emphasis on the level of a bank's interest rate risk exposure and the quality of its risk-management process when they are evaluating its capital adequacy.

The regulators concluded that interest rate risks were too difficult for many institutions to quantify, and concentration risk was too difficult to quantify in a manner that could be used in a risk-based capital calculation. Therefore, instead of developing a quantitative standard for each of these risks, the regulators decided that both risks need to be carefully monitored by examiners and that regulators could increase capital requirements for any institution on a case-by-case basis.

FDICIA Uses Capital Ratios to Determine Bank Capital Adequacy

FDICIA contains several provisions that were intended to collectively improve supervision of federally insured depository institutions. FDICIA's Prompt Regulatory Action provisions created two new sections in the Federal Deposit Insurance Act—sections 38 and 39—which mandate that regulators establish a two-part regulatory framework to improve safeguards for the deposit insurance fund. Section 38 creates a capital-based framework for bank and thrift oversight that is based on the placement of financial institutions into one of five capital categories. FDICIA requires that banks meet both a risk-based and a leverage requirement.

Capital was made the centerpiece of the framework because it represents funds invested by an institution's owners, such as common and preferred stock, that can be used to absorb unexpected losses before the institution becomes insolvent. Thus, capital was seen as serving a vital role as a buffer between bank losses and the deposit insurance system. Although section 38 does not in any way limit regulators' ability to take additional supervisory action, it requires federal regulators to take specific actions against banks and thrifts that have capital levels below minimum standards. The specified regulatory actions are made increasingly severe as an institution's capital drops to lower levels.[23] By focusing on capital, which absorbs losses, and requiring regulators to take actions when capital levels fall below predetermined thresholds, including requiring closure if capital levels become too low, FDICIA was meant to curb failures and deposit insurance losses if regulators had to close an institution.

[23]In November 1996, we reported that inherent limitations of section 38 requirements and the regulatory implementation of section 39 raise questions about their effectiveness in ensuring that regulators will act early and forcefully enough to prevent or minimize losses to the insurance funds. See Bank and Thrift Regulation: Implementation of FDICIA's Prompt Regulatory Action Provisions (GAO/GGD-97-18, Nov. 21, 1996).

Section 38 of FDICIA requires regulators to establish criteria for classifying depository institutions into the following five capital categories: well-capitalized, adequately capitalized, undercapitalized, significantly undercapitalized, and critically undercapitalized. The section does not place restrictions on institutions that meet or exceed the minimum capital standards—that is, those that are well-capitalized or adequately capitalized—other than prohibiting the institution from paying dividends or management fees that would drop them into the undercapitalized category.

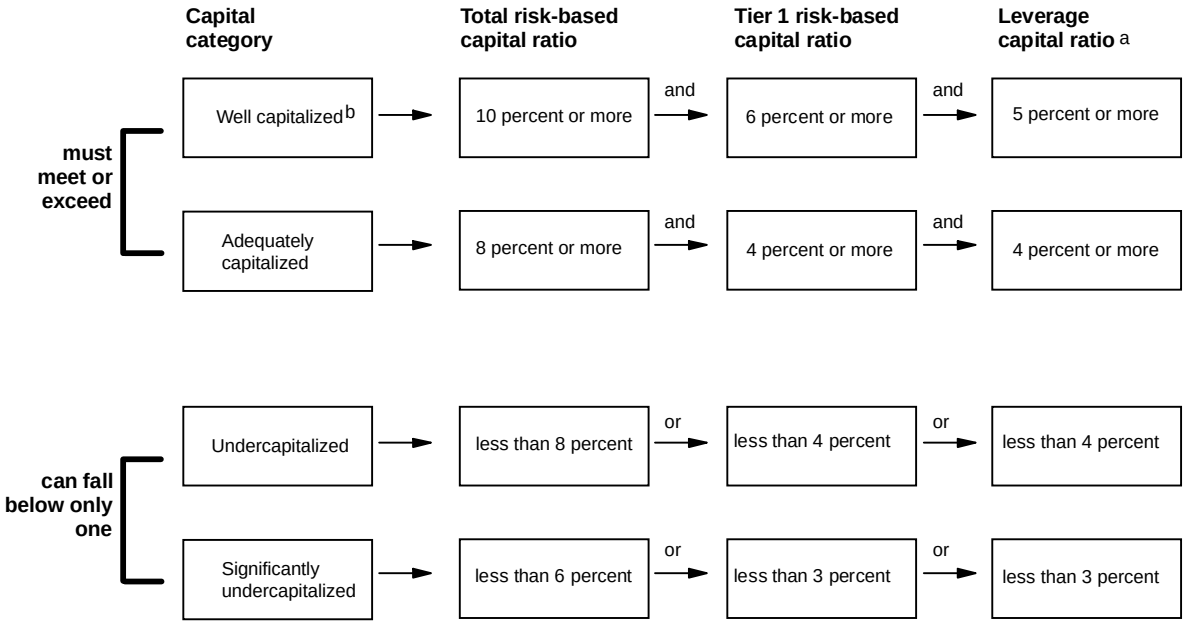
The regulators jointly developed the implementing regulations for section 38 and based the criteria for four of the five capital categories on the international risk-based capital calculation and the leverage capital ratio. The fifth category—critically undercapitalized—is based on a tangible equity-to-total assets ratio.

The four regulators specifically based the benchmarks for an adequately capitalized institution on the Basle Committee's risk-based capital requirement, which stipulates that an internationally active bank must have at least 8 percent total risk-based capital and 4 percent tier 1 risk-based capital. The benchmarks are also based on the U.S. leverage capital standard, which generally requires U.S. banks to have tier 1 capital equal to at least 4 percent of total assets. For the definition of a critically undercapitalized institution, the regulators adopted section 38's requirement of a tangible equity ratio of 2 percent or less.

As shown in figure I.1, three capital ratios are used to determine if an institution is well-capitalized, adequately capitalized, undercapitalized, or significantly undercapitalized. A well-capitalized or adequately capitalized institution must meet or exceed all three capital ratios for its capital category. To be deemed undercapitalized or significantly undercapitalized, an institution need fall below only one of the ratios listed for its capital category. Although not shown in the figure, a fourth ratio—tangible equity—is used to categorize an institution as critically undercapitalized.[24] Any institution that has a 2 percent or less tangible equity ratio is considered critically undercapitalized, regardless of its other capital ratios.

[24]The tangible equity ratio is the sum of common stock, surplus, and retained earnings, net of Treasury stock and currency translation adjustments, with intangible assets subtracted from both the numerator and denominator.

Figure I.1: Summary of Four Section 38 Capital Categories and Ratio Requirements



Note: Only the tangible equity ratio is used to determine whether an institution is critically undercapitalized. Institutions with a tangible equity ratio of 2 percent or less are considered to be critically undercapitalized.

[a]The leverage ratio can be as low as 3 percent if the institution has a regulator-assigned composite rating of 1. Regulators are to assign a composite rating of 1 only to institutions considered to be sound in almost every respect of operations, condition, and performance.

[b]An institution cannot be considered to be well-capitalized if it is subject to a formal regulatory enforcement action that requires the institution to meet and maintain a specific capital level.

Source: Interagency regulations issued on September 29, 1992 (57 Fed. Reg. 44866).

Key SEC Financial Responsibility Rules

The Securities and Exchange Commission's (SEC)[1] uniform net capital rule (15c3-1) and customer protection rule (15c3-3) form the foundation of the securities industry's financial responsibility framework.[2] The net capital rule focuses on liquidity and is designed to protect securities customers, counterparties, and creditors by requiring that broker-dealers have sufficient liquid resources on hand at all times to satisfy claims promptly. Rule 15c3-3, or the customer protection rule, which complements rule 15c3-1, is designed to ensure that customer property (securities and funds) in the custody of broker-dealers is adequately safeguarded. By law, both of these rules apply to the activities of registered broker-dealers, but not to unregistered affiliates.

The SEC Net Capital Rule (Rule 15c3-1)

Background

SEC amended the net capital rule (Rule 15c3-1) in 1975 to establish uniform net capital standards for brokers and dealers[3] registered with SEC under Section 15(b) of the Securities Exchange Act of 1934 (Exchange Act). With few exceptions, all broker-dealers registered with SEC must comply with this liquidity standard.[4] The primary purpose of this rule is to ensure that

[1]SEC is the federal agency responsible for administering the Federal Securities Laws. One objective of the Federal Securities Laws is to protect investors.

[2]Other financial responsibility rules include the records maintenance and preservation rules (17a-3 and 17a-4); the financial reporting rule (17a-5); the early warning or "telegraphic" notice rule (17a-11); the quarterly security counts rule (17a-13); the hypothecation rules (8c-1 and 15c2-1); the initial margin requirements of the Board of Governors of the Federal Reserve System (12 C.F.R. Section 220.3(b)); and the maintenance margin rules of the self-regulatory organizations (e.g., New York Stock Exchange rule 431).

Note: SEC and Commodity Futures Trading Commission (CFTC) officials stated that the futures industry capital adequacy and customer assets protection requirements (CFTC Rules 1.17, and 1.20-1.30, respectively) generally mirror the requirements in SEC rules 15c3-1 and 15c3-3.

[3]A broker is any person that engages in the business of effecting transactions in securities for the account of others, but does not include a bank. A dealer is any person that engages in the business of buying and selling securities for his own account, through a broker or otherwise, but does not include a bank, or any person insofar as he buys or sells securities for his own account, either individually or in some fiduciary capacity, but not as part of a regular business. Broker-dealers combine the functions of brokers and dealers.

[4]The sole market maker (a dealer that makes bids and offers at which he/she will trade) and sole specialist (a member designated by an exchange to be the sole market maker for a particular stock) on the options floor are exempted from the SEC net capital rule; and floor brokers on an exchange, under certain circumstances are exempted from the rule. Also, SEC may exempt certain broker-dealers from the rule upon a determination that it is "not necessary in the public interest or for the protection of investors" to subject the particular broker-dealer to the rule. See Rule 15c3-1(b).

registered broker-dealers maintain at all times sufficient liquid assets[5] to (1) promptly satisfy their liabilities—the claims of customers, creditors, and other broker-dealers; and (2) to provide a cushion of liquid assets in excess of liabilities to cover potential market, credit, and other risks if they should be required to liquidate. The rule achieves its purpose by prescribing a liquidity test that requires a broker-dealer to maintain the greater of a specified minimum dollar amount or specified percentage of net capital in relation to either aggregate indebtedness (generally all liabilities of the broker-dealer) or customer-related receivables (money owed to the broker-dealer by customers) as computed by the reserve requirements of Rule 15c3-3. The net capital rule thus enhances investor/customer[6] confidence in the financial integrity of broker-dealers and the securities market. The net capital rule applies only to the registered broker-dealer and does not apply to the broker-dealer's holding company or unregulated subsidiaries or affiliates.[7]

Net Capital Computation

To comply with SEC's net capital rule, broker-dealers must perform two computations: one computation determines the broker-dealer's net capital (liquid capital), and another computation determines the broker-dealer's appropriate minimum net capital requirement (base capital requirement).

Net capital is defined as U.S. Generally Accepted Accounting Principles (GAAP) equity plus qualified subordinated liabilities[8] and credits less nonallowable assets,[9] certain operational charges (e.g., fail-to-deliver),[10]

[5]Liquid assets are assets that can be converted easily into cash with relatively little loss of value. Broker-dealers must have at all times at least $1 of liquid assets for each $1 of liabilities (except for subordinated liabilities that are treated as part of the broker-dealer's capital) in addition to the minimum requirements of the net capital rule in case they fail the net capital test or voluntarily cease operations. Once liquidation is decided upon, a broker-dealer's operations are generally liquidated in an orderly manner within a short time frame without the use of a formal bankruptcy proceeding.

[6]Generally, a customer is defined as any person from whom or on whose behalf a broker or dealer has received or acquired or holds funds or securities for the account of such person.

[7]An exception to this principle is where the registered broker-dealer guarantees or assumes responsibility for the liabilities of the related unregistered entity. In such a situation, the broker-dealer is required to consolidate into a single computation the assets and liabilities of both itself and the guaranteed entity. See Rule 15c3-1(a) and Appendix C to the rule.

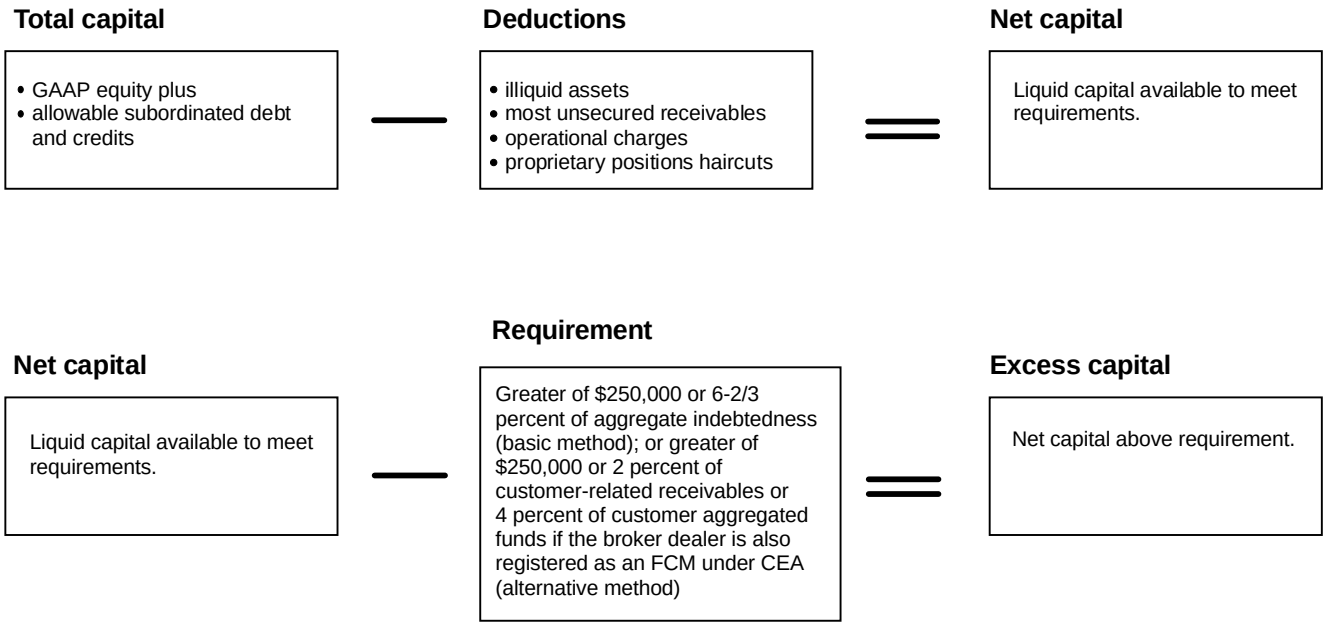
[8]To be counted as capital in the net capital computation, the subordinated liabilities, among other things: (1) must have an initial term of 1 year or more; (2) must be subordinated to the claims of all present and future creditors, including customers; (3) may not be repaid if the repayment would reduce regulatory net capital below certain required amounts; and (4) must be approved for inclusion as net capital by the broker-dealer's self-regulatory organization (SRO).

[9]Nonallowable assets are considered illiquid assets (assets that cannot be immediately or quickly converted into cash) by the net capital rule. Such assets decrease a broker-dealer's net capital, because they are deducted from GAAP equity in the net capital computation.

[10]A fail-to-deliver is a situation in which the selling broker-dealer does not receive securities from the client in time to make delivery with the buying broker-dealer.

and prescribed percentages of the market value (otherwise known as haircuts)[11] of securities and commodities that constitute the broker-dealer's trading and investment positions. See figure II.1 below.

Figure II.1: SEC Net Capital Formulation



Source: GAO analysis of SEC's net capital rule.

The process of computing a broker-dealer's regulatory net capital is really a process of separating its liquid and illiquid assets. In computing net capital, under either the basic or alternative method (discussed below),

[11]The haircut is based on the risk characteristics (i.e., market risk, price volatility, and liquidity) of a particular security. For example, securities perceived as risky typically receive a large haircut (e.g., 100 percent for nonmarketable securities); those perceived as less risky generally receive a small haircut (e.g., 0 percent for short-term government securities). This means that for a 100-percent haircut the broker-dealer must finance 100 percent of the security's value with firm capital. Reduced haircuts are allowed when risk is reduced through utilization of hedging strategies. Hedging is a strategy designed to protect a position in securities or commodities against price movements by taking an offsetting investment position. A haircut serves as a safety margin for market fluctuations and delays encountered in liquidating securities and commodities positions. See pages 140-145 for greater detail on haircuts.

the broker-dealer must first determine its equity in accordance with GAAP. GAAP liabilities deducted from GAAP assets result in GAAP equity. GAAP requires that the broker-dealer mark to market all securities and commodities positions daily, thereby reflecting unrealized gains (which add to equity) and losses (which subtract from equity)—the current market value—and making it difficult to forbear market losses beyond a day.

Once GAAP equity is computed, a number of adjustments are made to reflect the estimated value of the broker-dealer if it was liquidated in a hurry. Liabilities that are properly subordinated to the claims of creditors, including customers, are then added back to GAAP equity as well as certain deferred income tax liabilities and accrued liabilities. Assets considered not readily convertible into cash are deducted from GAAP equity. This includes intangible assets (goodwill); fixed assets (furniture, fixtures, and buildings); prepaid items (rent and insurance); and the value of exchange memberships. The broker-dealer also deducts most unsecured receivables, including unsecured customer debits and bridge loans; and charges for delays in processing securities transactions beyond the normal settlement date. These collective additions and subtractions to GAAP equity result in an amount called tentative net capital. Tentative net capital is then reduced by certain percentage deductions, called haircuts, of the current market value of a broker-dealer's securities and commodities positions and an undue concentration charge, which reflects the risk of a large, concentrated holding in one security, to arrive at the broker-dealer's net capital. Then, the net capital base requirement (required net capital amount) is subtracted from the net capital amount to determine the amount of excess net capital held by the broker-dealer.

Methods Available for Broker-Dealers to Compute Required Net Capital

A broker-dealer may compute its net capital requirement by one of two methods. The first method, called the basic or aggregate indebtedness method, requires that the net capital of a broker-dealer conducting a general securities business (i.e., a firm that clears securities transactions and carries customer accounts) be equal to the greater of $250,000 or 6-2/3 percent of its aggregate indebtedness. The 6-2/3 percent requirement says a broker-dealer must have at least $1 of net capital for every $15 of its indebtedness (i.e., a leverage constraint). In the broker-dealer's first year of operation, its net capital must exceed 12.5 percent of its aggregate indebtedness. Most of the smaller broker-dealers typically use the basic method to compute their net capital requirements because of the nature of their business. Typically, smaller broker-dealers either do not hold

customer or broker-dealer accounts and therefore need less than the $250,000 required for broker-dealers that carry customer accounts; or they want to be subject to the less stringent requirements of Rule 15c3-3.

Under the second method, the so-called alternative method, the broker-dealer is required to have net capital equal to the greater of $250,000 or 2 percent of its customer-related receivables from the reserve calculation of Rule 15c3-3 or, if registered as a futures commission merchant (FCM),[12] 4 percent of the customer funds required to be segregated pursuant to the Commodity Exchange Act (CEA) and the regulations thereunder (less the market value of commodity options purchased by option customers on or subject to the rules of a contract market, each such deduction not to exceed the amount of funds in the customer's account). When a firm is registered both as a securities broker-dealer with SEC and an FCM with CFTC,[13] known as being "dually-registered," it must comply with both agencies' regulations. However, a dually-registered firm is required to meet only the capital standard that would cause it to hold the most capital. SEC offers this method to broker-dealers as a voluntary alternative (with self-regulatory organization approval) to the basic net capital requirement. This method is based on the broker-dealers' responsibilities to customers rather than aggregate indebtedness. Reversion to the basic method by the broker-dealer requires SEC's approval. This option (most commonly used by large broker-dealers because it can result in a lower net capital requirement than under the basic method), in conjunction with Rule 15c3-3 (discussed below), is designed to ensure that sufficient liquid capital exists to return all property (assets—funds and securities) to customers, repay all creditors, and have a sufficient amount of capital remaining to pay the administrative costs of a liquidation if the broker-dealer fails. The broker-dealer's ability to return customer property is addressed by Rule 15c3-3. The repayment of creditors and the payment of the broker-dealer's liquidation expenses is addressed by the 2 percent of customer-related receivables net capital requirement and the deductions from net worth for illiquid assets and risk in securities and commodities positions. See pages 148-151 for an example of a hypothetical simplified net capital computation under the alternative method.

[12]An FCM is an individual, association, partnership, corporation, or trust that solicits or accepts orders for the purchase or sale of any commodity for future delivery on or subject to the rules of any contract market and that accepts payment from or extends credit to those whose orders are accepted.

[13]CFTC is the federal agency responsible for administering the CEA and overseeing the futures and commodity options industry to protect the public from fraud and manipulation in the marketplace.

There are some differences between the two methods of computation. For example:

- The alternative method ties required net capital to customer-related assets (receivables) rather than all liabilities like the basic method.
- The alternative method requires a broker-dealer to provide a bad debt reserve of 3 percent of its customer-related receivables versus 1 percent under the basic method.
- Under the alternative method, stock record differences and suspense account items (prospective losses due to recordkeeping problems) must be included in the calculation of net capital after 7 business days versus the 30 calendar days required under the basic method.

However, both methods limit a broker-dealer's ability to increase its customer commitments only to the extent that net capital supports such an increase.

Also, the type of securities business a broker-dealer conducts determines its minimum net capital requirements. For example, for broker-dealers engaging in all facets of a securities business (involves clearing securities transactions and holding customer and broker-dealer accounts),[14] the minimum dollar net capital requirement is $250,000; for broker-dealers that generally do not carry customer or broker-dealer accounts (introducing brokers), the minimum dollar amount is $5,000. See pages 152-153 for more detail on the SEC minimum net capital requirements for specialized types of business.

Early Warning Capital Levels

In addition to the minimum base net capital requirements, SEC and SROs (such as the National Association of Securities Dealers and the national exchanges)[15] have established "early warning" levels[16] of capital that exceed the broker-dealer's minimum capital requirement. This advance warning alerts SEC and the SROs to the fact that a broker-dealer is experiencing financial difficulty (i.e., broker-dealer's net capital is

[14]A more detailed description is a broker-dealer who buys and sells stocks, bonds, options, or municipal securities, and/or engages in firm commitment underwritings as underwriter or selling group member.

[15]Securities SROs set rules (with oversight by SEC) for fair conduct, license or approve firms engaged in market making activities, and supervise the activities of market participants.

[16]This early warning system also includes other criteria for notification to SEC and the designated SRO by broker-dealers: when the broker-dealer fails to keep books or records current, when the broker-dealer's independent accountant notifies it of a material inadequacy in financial statements, or upon occurrence of other specified events. See Rule 17a-11.

dropping toward its minimum requirement) and allows time for initiation of corrective action. Broker-dealers that violate the early warning levels must immediately notify SEC and their designated SRO[17] and are thereby subject to closer regulatory scrutiny by SEC and the SRO.[18] SROs may also impose additional operating restrictions or warning requirements on their members, which can be more stringent than SEC's. For example, the New York Stock Exchange's rule 326 restricts the business activities of member broker-dealers that are approaching financial or operational difficulties. When a broker-dealer's net capital drops below its minimum net capital requirements, SEC requires the broker-dealer to cease operations immediately and get additional capital to come into capital compliance or liquidate its operations.

The early warning notice levels are as follows:

- Under the basic method, the broker-dealer's ratio of aggregate indebtedness to net capital is greater than 1,200 percent.
- Under the alternative method, the broker-dealer's net capital is less than 5 percent of customer-related receivables or, if an FCM, net capital is less than 6 percent of CEA customer segregated funds.
- The broker-dealer's net capital is less than 120 percent of its required minimum dollar net capital.

Market participants indicated that prudent broker-dealers maintain capital levels far in excess of their required minimum net capital amount. They told us that the largest broker-dealers typically hold $1 billion or more in excess of their required capital levels because, among other reasons, their counterparties require it for conducting business with them.

Financial Reporting Requirements

SEC has delegated to the SROs primary responsibility for enforcing broker-dealer compliance with the net capital and customer protection

[17]If a broker-dealer is a member of more than one SRO, one of them will be designated as the SRO responsible for overseeing the broker-dealer's activities and its compliance with the financial responsibility rules.

[18]A broker-dealer is prohibited from withdrawing equity capital if such withdrawal would cause the broker-dealer's aggregate indebtedness to net capital to exceed 10 times its net capital; its net capital to fall below 120 percent of its minimum dollar requirement; its net capital to fall to less than 5 percent of customer-related receivables under the alternative method; or, if an FCM, less than 7 percent of CEA-segregated funds; or subordinated debt to exceed 70 percent of total capital, or net capital to be less than 25 percent of haircuts used in calculating net capital. This limitation includes withdrawals in the form of redemption or repurchase of stock, dividends, or other distributions as well as unsecured loans or advances to stockholders, partners, sole proprietors, employees, or affiliates (i.e., related persons). Under certain conditions, a broker-dealer is required to notify (written form) SEC and the designated SRO when capital is transferred out of the broker-dealer to related persons. For example, the broker-dealer is required to notify SEC and the designated SRO 2 business days before any withdrawals of equity capital greater than 30 percent of the broker-dealer's excess net capital.

rules. SEC and the SROs have established a uniform system of reporting by broker-dealers and inspection schedules and procedures to routinely monitor broker-dealers' compliance with such rules. Registered broker-dealers, depending on their type of business, are required to file either monthly or quarterly reports with their designated SROs. FOCUS (an acronym for Financial and Operational Combined Uniform Single Report (SEC Form X-17A-5)), the report broker-dealers are required to file, contains confidential key financial and operational information of a broker-dealer's operations. If a broker-dealer has financial or operational difficulties, SEC or the SRO may require it to accelerate its reports filing at any time as specified in Rule 17a-5(a)(2)(iv). FOCUS is an integral part of the SRO's early warning system and provides the SRO with a substantial amount of information to detect existing or potential financial and operational problems. Additionally, Rule 17a-5 requires broker-dealers to file annual audited financial statements supplemented by an accountant's report setting forth any material inadequacies.

The SEC Customer Protection Rule Restricts Broker-Dealer Use of Customer Securities and Funds

SEC Rule 15c3-3, adopted in 1972, provides regulatory safeguards regarding the custody and use of customer securities and free credit balances (funds)[19] held by broker-dealers. The rule, with limited exceptions,[20] requires compliance by all registered broker-dealers. The purpose of Rule 15c3-3 is to protect customer funds and securities held by the broker-dealer.

Rule 15c3-3 has two parts. The first part requires broker-dealers to promptly obtain and maintain the physical possession or control of all fully paid and excess margin customer securities.[21] The second part

[19]Free credit balances are a broker-dealer's liabilities to customers and are subject to immediate cash payment to customers on demand, whether resulting from sales of securities, dividends, interest, deposits, or otherwise. However, they exclude funds in commodity accounts that are segregated in accordance with the CEA or in a similar manner.

[20]Certain types of broker-dealers are exempted from the requirements of the customer protection rule. See Rule 15c3-3(k)(2) for more detail.

[21]Fully paid securities are securities that are purchased in transactions for which the customer has made full payment. Margin securities in a customer account are those securities with a market value equal to or less than 140 percent of the customer's debit balance (the amount the customer owes the broker-dealer for the purchase of the securities). Excess margin securities in a customer account are those securities with a market value greater than 140 percent of the customer's debit balance. An example of excess margin securities: A customer buys $80,000 worth of securities on 50 percent margin. The broker-dealer loans the customer $40,000 (debit balance). The amount of the customer margin securities that can be pledged as collateral for a bank loan is $56,000 (140 percent x $40,000 debit = $56,000 available as collateral). Because only $56,000 of the $80,000 of customer securities can be pledged to the bank, the remaining $24,000 of securities are excess margin securities that must be segregated and held in safekeeping by the broker-dealer.

requires broker-dealers to segregate all customer cash or money obtained from the use of customer property that has not been used to finance transactions of other customers.

Part 1: Physical Possession or Control of Customer Securities

SEC's requirement that broker-dealers maintain possession or control of all customer fully paid and excess margin securities substantially limits broker-dealers' abilities to use customer securities. Rule 15c3-3 requires broker-dealers to determine, each business day, the number of customer fully paid and excess margin securities in their possession or control and the number of fully paid and excess margin securities that are not in the broker-dealer's possession or control. Should a broker-dealer determine that fewer securities are in its possession or control than is required (a deficit position in security), Rule 15c3-3 requires the broker-dealer to initiate action and specifies time frames by which these securities must be placed in the broker-dealer's possession or control. For example, for securities that are subject to a bank loan,[22] the broker-dealer must issue a recall instruction within 1 business day of a deficit position determination, and the securities must be returned to the broker-dealer's possession or control within 2 business days of the recall instruction. Once a broker-dealer obtains possession or control of customer fully paid or excess margin securities, the broker-dealer must thereafter maintain possession or control of those securities.

Rule 15c3-3 also specifies where a security must be located to be considered "in possession or control" of the broker-dealer. "Possession" of securities means the securities are physically located at the broker-dealer. "Control" of securities means the securities are located at one of the approved "control" locations discussed below. "Control" locations include a clearing corporation or depository, free of any lien; a Special Omnibus Account in compliance with Federal Reserve System Regulation T[23] with instructions for segregation; a bona fide item of transfer of up to 40 calendar days (longer with written permission from the transfer agent); foreign banks or depositories approved by SEC; a bank (as defined by the Exchange Act) supervised by a federal banking authority, provided the

[22]Securities that have been pledged to a bank as collateral are an example of securities that are subject to a bank loan.

[23]Federal Reserve System Regulation T (12 C.F.R. 220) regulates the extension of credit by and to broker-dealers. For the purposes of SEC Rule 15c3-3, it deals primarily with broker-dealer margin accounts. In securities industry parlance, margin is credit extended by a broker-dealer to a purchaser of a security to fund part of the purchase price. Interest is charged on the balance amount, and ownership of the stock certificate passes immediately to the purchaser. Regulation T currently allows a purchaser of securities to borrow up to 50 percent of a security's purchase price.

securities are being held free of any lien; in transit between offices of the broker-dealer (for no more than 5 business days) or held by a majority-owned corporate subsidiary of the broker-dealer if the broker-dealer assumes or guarantees all of the subsidiary's obligations or liabilities; or in any other location designated by SEC (e.g., a mutual fund or its agent in the case of a registered open-ended investment company).

Part 2: Segregation of Customer Funds and the Reserve Formula

The second requirement of Rule 15c3-3 dictates how broker-dealers may use customer cash credit balances and cash obtained from the permitted uses of customer securities,[24] including from the pledging of customer margin securities. Essentially, the customer protection rule restricts the use of customer cash or margin securities to activities directly related to financing customer securities purchases. That is, the broker-dealer may not use customer property as a source of working capital for its operations.

The rule requires a broker-dealer to periodically (weekly for most broker-dealers)[25] compute the amount of funds obtained from customers or through the use of customer securities (credits) and compare it to the total amount it has extended to finance customer transactions (debits). If credits exceed debits, the broker-dealer is required to have on deposit in an account for the exclusive benefit of customers[26] at least an equal amount of cash or cash-equivalent securities (e.g., U.S. treasuries). Consequently, the rule serves to protect any required deposit in a secured location from creditors of the broker-dealer in an insolvency. For most broker-dealers, the calculation must be made as of the close of business every Friday, and any required deposit must be made by the following

[24]Permissible uses of customer funds by broker-dealers include, among others: financing customers' margin accounts (i.e., an account in which a customer uses credit from a broker-dealer to take security positions); borrowing of securities to effect customers' short sales (i.e., securities sold but not owned at time of sale by broker-dealer); and delivery on customers' fail-to-deliver (i.e., selling broker-dealer does not receive securities from client in time to make delivery to buying broker-dealer).

[25]A broker-dealer with customer credits (funds) of less than $1 million and aggregate indebtedness of less than 800 percent of net capital can compute the reserve requirement on a monthly basis as of the month's close of business. The broker-dealer is required to make a deposit of 105 percent of the excess credits on the second business day following the computation date. See Rule 15c3-3(e)(3).

[26]Rule 15c3-3(e)(1) requires that a broker-dealer maintain a bank account that is separate from any other account of the broker-dealer and specified as a "Special Reserve Bank Account for the Exclusive Benefit of Customers" (reserve account). The broker-dealer must also obtain written notification from the bank that all cash or qualified securities within the reserve account are being held for the exclusive benefit of customers; are being kept separate from any other accounts maintained by the broker-dealer with the bank; cannot be used directly or indirectly as security for any loan to the broker-dealer by the bank; and shall be subject to no right, charge, security interest, lien, or claim of any kind in favor of the bank or any person claiming through the bank.

Tuesday morning. If the required deposit is not made by the broker-dealer, the broker-dealer must immediately notify its SRO and SEC by telegram and promptly confirm such notice in writing. Such notice must be given even if a broker-dealer is presently in compliance with the reserve portion of the rule but discovers that it was previously out of compliance due to a computational error or otherwise. If a broker-dealer fails to make a deposit to the special reserve account when required to do so, it is a criminal violation, and the broker-dealer must cease doing business. If the debits exceed the credits, no deposit is required.

U.S. Securities Haircuts

The haircuts described below are from SEC Rule 15c3-1(c)(2)(vi)(A)-(M).

Securities Haircuts

The percentage amount of the haircut varies depending on the type of security, the maturity date, the quality, and the marketability. Generally, the haircut is deducted from the market value of the greater of the long or short position in each security; however, in some cases haircuts apply to the lesser position as well. The haircuts are designed to discount the firm's own positions to account for adverse market movements and other risks faced by the firms, including liquidity and operational risks.

U.S. and Canadian Government and Agency Debt Securities

This refers to securities issued (or guaranteed as to principal and interest) by the U.S. or Canadian government or agency. A haircut is applied to aggregate net long or short positions in 4 main categories (and 12 subcategories) of maturity dates ranging from less than 3 months to 25 years or more. The haircuts range from 0 percent for the short-term securities (0-3 months) to 6 percent for securities with later maturities.

For the most part, government securities haircuts are also applied to quasi-agency debt securities, such as those issued by the Export-Import Bank, Tennessee Valley Authority, and the Government National Mortgage Association (Ginnie Mae).

Municipal Debt Securities

These are securities that are direct obligations of, or guaranteed as to principal and interest by, a state or any political subdivision thereof as well as agencies and other state and local instrumentalities. Haircut percentages are applied to the market value of the greater of the long or short position according to maturity date. For municipal securities issued

with stated maturities of 2 years or less, haircuts range from 0 percent for securities maturing under 30 days to 1 percent for those maturing in 456 days but less than 732 days.

For longer term securities with stated maturities of 2 years or longer, haircuts range from 3 percent to 7 percent.

Certain Municipal Bond Trusts and Liquid Asset Funds

These funds are redeemable securities issued by investment companies whose assets consist of cash, securities, or money market instruments. The haircut ranges from 2 percent to 9 percent based upon the types of assets held by the fund.

Commercial Paper, Bankers Acceptances, and Certificates of Deposit

The percentage deductions for highly rated corporate short-term debt instruments (money market instruments) that (1) have a fixed rate of interest or (2) are sold at a discount and that have maturity dates not exceeding 9 months range from 0 percent to 0.5 percent in five maturity categories ranging from less than 30 days to less than 1 year.

Bankers acceptances and certificates of deposit guaranteed by a bank and with maturity dates over 1 year have the same haircuts as U.S. government securities.

Nonconvertible Debt Securities

These securities are corporate bonds that cannot be exchanged for a specified amount of another security, (e.g., equity securities), at a stated price. Highly rated bonds are assigned haircuts ranging from 2 percent to 9 percent for maturity dates ranging from less than 1 year to over 25 years. Certain positions in nonconvertible securities can be excluded from the foregoing haircuts if hedged with U.S. government securities.

Also included in this category are foreign debt securities for which a ready market exists. For purposes of foreign securities, a ready market is deemed to exist if such securities (1) are issued as a general obligation of a sovereign government; (2) have a fixed maturity date; (3) are not traded flat or in default as to principal or interest; and (4) are highly rated (implicitly or explicitly) by at least two nationally recognized statistical rating organizations, such as Standard & Poor's and Moody's Investors Service.

For positions hedged with U.S. government securities, haircuts on the hedged positions range from 1.5 percent for maturities of less than 5 years to 3 percent for maturities of 15 years or more. For positions hedged with nonconvertible debt, haircuts on the hedged positions range from 1.75 percent for a maturity of less than 5 years to 3.5 percent for a maturity of 15 years or more. In either case, no haircut is taken on the hedging position (i.e., the U.S. government securities or the nonconvertible debt).

Convertible Debt Securities

The treatment of debt securities that can be converted into equities and have fixed rates of interest and maturity dates is based on the securities' market value. If the market value is 100 percent or more of the principal amount, the haircut is the same as that applied to "all other securities," or 15 percent of the market value of the greater of the long or short positions, plus 15 percent of the market value of the lesser position, but only to the extent that this lesser position exceeds 25 percent of the greater position. If the market value is less than the principal amount, the haircut is the same as for nonconvertible debt securities.

Preferred Stock

This stock is cumulative, nonconvertible, highly rated, and ranked prior to all other classes of stock. The stock is not in arrears as to dividends and carries a haircut of 10 percent of the market value of the greater of the long or short position.

Open Contractual Commitments

These commitments are haircut at 30 percent of the market value of the greater of the net long or net short position (minus unrealized profits), unless the class and issue of securities are listed on a national securities exchange or are designated as NASDAQ National Market System Securities. If the securities are listed or designated, the haircut is then 15 percent (unless the security is an initial public offering whereupon the percentage deduction reverts to 30 percent).

All Other Securities

These securities include corporate equities and certain foreign securities (other than preferred stock discussed above). They are assigned haircuts of 15 percent of the market value of the greater of the long or short positions, plus 15 percent of the market value of the lesser position, but only to the extent that this lesser position exceeds 25 percent of the greater position (i.e., the first 25 percent of the lesser position incurs no haircut).

Securities With a Limited Market

In cases where there are only one or two independent market makers submitting regular quotations in an interdealer quotation system for the securities, the haircut is 40 percent on both the long and short positions. In cases where there are three or more independent market makers submitting regular quotations, the haircut is the same as for the "all other securities" category above.

Undue Concentration

This refers to a situation where a broker-dealer has a securities position for which the market value is more than 10 percent of the broker-dealer's net capital before haircuts (i.e., "tentative net capital"). For the charge to apply to equities, the market value of the position must exceed the greater of $10,000 or the market value of 500 shares. For debt securities, the provision applies to positions valued over $25,000. The haircut is an extra percentage of the usual haircut applied, and it is applied only to the excess portion of the total position (over 10 percent). The additional haircut for concentrated positions in equity securities is 15 percent. For other securities, it is 50 percent of the normal haircut on the concentrated securities.

Nonmarketable Securities

These are securities for which there is no ready market, and they carry a 100-percent haircut. Such securities have no independent market makers, have no quotations, and are not accepted as collateral for bank loans.

U.S. Options and Commodities Haircuts

The net capital rule also includes deductions for hedged positions, including futures and options contracts. Options to buy and sell securities and commodities are subject to haircuts because their market values change. See Appendix A to Rule 15c3-1 for options contracts and Appendix B to Rule 15c3-1 for relevant haircuts for futures contracts. CFTC generally has jurisdiction over the regulation of futures and options markets, including their relevant haircuts. Since securities broker-dealers hold futures and options positions in their portfolios, SEC incorporates CFTC's haircuts for commodities futures and options into its net capital rule. CFTC also incorporates SEC's securities haircuts into its net capital rule (Rule 1.17).

Appendix A to SEC Rule 15c3-1 (Options Haircuts)

Appendix A to SEC Rule 15c3-1 prescribes haircut methodologies for listed and unlisted options.

Risk-Based Haircut Methodology for Listed Options

Recently, to better reflect the market risk in broker-dealers' options positions and to simplify the net capital rule's treatment of options for capital purposes, SEC adopted a risk-based methodology using theoretical option pricing models to calculate required capital charges (haircuts) for listed options and related hedged positions. A simple, strategy-based methodology, similar to the old haircut methodology, remains for those firms that do not transact enough options business to warrant the expense of using option pricing models. This is the first time SEC has approved the use of modeling techniques for computing regulatory capital charges. The effective date of the new rule was September 1, 1997.

Third-party source models (and vendors) approved by a designated examining authority (i.e., self-regulatory organization) are used to perform the actual theoretical gain and loss calculations on the individual portfolios of the broker-dealers. Such approved vendors provide, for a fee, a service by which the broker-dealers may download the results generated by the option pricing models to allow broker-dealers to then compute the required haircut for their individual portfolios. The greatest loss at any one valuation point would be the haircut. At this time, the only approved vendor/model is the Options Clearing Corporation's Theoretical Intermarket Margining System (TIMS).

Underlying Price Movement Assumptions

Specified underlying price movement assumptions designed to provide for the maintenance of capital sufficient to withstand potential adverse market moves are included. The underlying price movement assumptions were established to be consistent with the volatility assumptions currently incorporated into the net capital rule.[27] Specifically, the models calculate the theoretical gains and losses for a portfolio containing proprietary or market maker options positions at 10 equidistant valuation points using specified increases and decreases in the price of the underlying instrument. The greatest loss at any valuation point becomes the haircut for the entire portfolio.

[27]The option pricing model, for each option series, would calculate theoretical prices at 10 equidistant valuation points within a range consisting of an increase or decrease of the following percentages of the daily market price of the underlying instrument: (i) +(-)15 percent for equity securities with a ready market, narrow-based indexes (as defined), and non-high-capitalization diversified indexes (as defined); (ii) +(-)6 percent for major market currencies (e.g., European Currency Unit, Japanese Yen, and Deutsche Mark); (iii) +(-)10 percent for high-capitalization diversified indexes (as defined); and (iv) +(-)20 percent for currencies other than major market currencies. For nonclearing specialists and market makers, there is a reduction in the underlying price movements: +(-)4-1/2 percent for major market currencies positions, +(-)10 percent for non-high-capitalization diversified indexes, and +6(–8) percent for high-capitalization diversified indexes. **The maximum loss at any one valuation point would be the haircut for the portfolio**. An option series includes option contracts of the same type (a call or a put) and exercise style covering the same underlying instrument with the same exercise price, expiration date, and number of underlying units.

Permissible Offsets

A percentage of a position's gain at any one valuation point is allowed to offset another position's loss at the same valuation point.[28] For example, options covering the same underlying instrument are afforded a 100-percent offset. Other offsets are permitted between qualified stock baskets and index options, futures, or futures options on the same underlying index. Broker-dealers are permitted to offset 95 percent of gains with losses (i.e., a 5 percent capital charge).

Minimum Charge

In addition, broker-dealers must take certain minimum deductions to address decay and liquidity risk if the option pricing model calculated an insignificant or no capital charge for a portfolio. This minimum charge is generally one-quarter of a point, or $25 per option contract, unless the basic equity option contract covers more than 100 shares. In this case, the charge is proportionately increased.

SEC rules also require a deduction of 7.5 percent of the market value for each qualified stock basket of non-high-capitalization diversified indexes. The rules also require 5 percent of the market value for each qualified stock basket of high-capitalization diversified and narrow indexes used to hedge options or futures positions that are subject to the minimum charge.

Alternative Strategy-Based Haircut Methodology for Listed and Unlisted Options

SEC also permits firms with limited options business to use an alternative strategy-based haircut methodology that generally follows the haircut approach in the previous version of Appendix A to the net capital rule. See Table II.1. This rule was designed for firms whose options business would not make it cost effective to use an option pricing model. A similar strategy-based methodology is also employed for broker-dealers that engage in buying and writing unlisted over-the-counter options. See Table II.2.

[28]A valuation point refers to the repricing of an option in relation to assumed changes in the value of the underlying instrument.

Table II.1: Alternative Strategy-Based Haircut Methodology for Listed Options

Type of option[a]/definition[b]	Adjustments to net worth: listed options only	Haircuts on listed options
Uncovered short: Short put or call with no related stock or option position.	Add market value of option. Add time value[c] of short option position.	Appropriate percentage of the current market value of the securities underlying the option security less the out-of-the-money amount, but reduction cannot serve to increase net capital. Minimum haircut is the greater of $250 per 100 share option contract or 50 percent of aforementioned percentage.
Long options (calls or puts): No offsetting securities or options position.	None	50 percent of the current market value of the option.
Hedged call: Long call option vs. short underlying stock.	Deduct time value on long call.	Take applicable haircut on the short stock position not to exceed the out-of-the-money amount on the call option. Minimum haircut of $25 for each 100 share option contract, but minimum charge need not exceed intrinsic value[d] of the option.
Hedged put: Long put option vs. long underlying stock.	Deduct time value on long put.	Take applicable haircut on the long stock position not to exceed the out-of-the-money amount on the call option. Minimum haircut of $25 for each 100 share option contract, but minimum charge need not exceed intrinsic value of the option.
Hedged call: Short call option vs. long underlying stock.	Add time value of short option.	Take applicable haircut on the long stock position reduced by the call's intrinsic value. The minimum charge here is $25 per each 100 share option contract.
Spread: Long put options vs. short put options and long call options vs. short call options.	Add net short market value or deduct net long market value of options.	Call spread: excess of exercise value[e] of long call over short call. If exercise value of long call is less than or equal to the exercise value of the short call, no haircut is required. Put spread: excess of exercise value of short put over long put. If exercise value of long put is greater than or equal to exercise value of short put, no haircut is required.

(Table notes on next page)

[a]A listed option is any option traded on a registered national securities exchange or automated facility of a registered national securities association.

[b]Uncovered means an option that is written without any corresponding security or option position as protection in seller's account. A call is an option giving its holder (buyer) the right to demand the purchase of a certain number of shares of stock at a fixed price any time within a specified period. A put is an option giving its holder (seller) the right to demand acceptance of delivery of a certain number of shares of stock at a fixed price any time within a specified period. Short means the investor sells the option. Long means the investor buys the option. Hedge means any combination of long and/or short positions taken in securities, options, or commodities in which one position tends to reduce the risk of the other. A spread is the simultaneous purchase and sale of the same class of options at different prices.

[c]Time value is the amount by which the current market value of an option exceeds its intrinsic value.

[d]Intrinsic value (or "in-the-money amount") is the amount by which the exercise value, if a call option, is less than the current market value of the instrument underlying the call; and if a put option, the amount by which the exercise value of the option is greater than the current market value of the instrument underlying the put. "Out-of-the-money" is the amount by which the exercise value, if a call, is greater than the current market value of the underlying instrument; and, if a put, the amount by which the exercise value is less than the current market value of the underlying instrument.

[e]Exercise value is the price at which an option can be exercised.

Source: The SEC Division of Market Regulation, Appendix A to SEC Rule 15c3-1, and SEC Release No. 34-38248.

Table II.2: Alternative Strategy-Based Haircut Methodology for Unlisted Options

Type of option[a]	Haircuts on unlisted options
Uncovered calls and puts	15 percent, if equities, (or appropriate other percentage) of the current market value of the underlying security less any out-of-the-money amount. Minimum haircut of $250 per 100 share option contract.
Covered calls and puts	15 percent, if equities, (or appropriate other percentage) of the current market value of the underlying security less any in-the-money amount. Net capital cannot be increased because of haircut.
Conversion accounts[b]	5 percent, if equities, (or 1/2 the appropriate other percentage for other securities as set forth in the rule) of the current market value of the underlying security.
Long options	15 percent, if equities, (or appropriate other percentage for other securities as set forth in the rule) of the current market value of the underlying security. Limited to allowable asset value of the option.

[a]An unlisted option is any option that is not traded on a registered national securities exchange or automated facility of a registered national securities association.

[b]A conversion is a call option created from a put option when a long position in the underlying equity is taken.

Source: The SEC Division of Market Regulation, Appendix A to SEC Rule 15c3-1 under the Exchange Act, and SEC Release No. 34-38248.

Appendix B to SEC Rule 15c3-1 (Commodities and Commodities Futures Haircuts)

As for securities, the net capital rule imposes a series of deductions from the market values of commodities. The amount of the deductions varies depending on whether the commodities are part of a hedged or spread position; whether the commodities stand alone as a long or short position; and what types of commodities accounts (inventory accounts, customer accounts) are at issue. These haircuts generally conform with similar provisions in CFTC's net capital rule and are dependent on the margin requirements set by the commodities boards of trade and clearing organizations. See Table II.3.

Table II.3: Commodities and Commodities Futures Haircuts

Commodities transaction:	Haircut:
1. Inventory registered as deliverable and covered by a futures or option	No charge
2. Covered inventory	5 percent charge of market value
3. Uncovered inventory	20 percent charge of market value
4. Covered commitments and forwards	10 percent charge of market value
5. Uncovered commitments and forwards	20 percent charge of market value
6. Futures and short and long options	Applicable margin requirement[a] 150 percent of applicable maintenance requirement[b] 200 percent of applicable maintenance requirement[c]

[a]If broker-dealer is a clearing member of a contract market with respect to applicable transactions.

[b]If broker-dealer is a member of an SRO.

[c]All other broker-dealers.

Source: The SEC Division of Market Regulation and Appendix B to Rule 15c3-1.

Hypothetical Example of a Broker-Dealer's Net Capital Calculation Under the Alternative Method

Tables II.4 and II.5 and II.6 provide information for calculating net capital. Table II.4, a trial balance, provides a starting point for our simplified hypothetical example of a broker-dealer's net capital calculation under SEC's alternative method. A trial balance is a list of all open accounts in the general ledger and their balances. A general ledger is a collection of all assets, liabilities, capital, revenue, and expense accounts. Accounts are the means by which differing effects on business elements (e.g., revenues) are categorized and collected. In table II.5, we converted the trial balance into a balance sheet of assets, liabilities, and capital. In table II.6, we compute

the broker-dealer's net capital, including haircuts, using information contained in table II.5. The result of the computation shows that the broker-dealer is in capital compliance and has $352.6 million in excess net capital.

Table II.4: Broker-Dealer's Trial Balance as of December 31, 1997

Account title	Debits	Credits
Cash in banks	$400,000,000	
Customer debits[a]	40,000,000	
Customer credits		$115,000,000
Dividends payable		8,000,000
Syndicate payable		30,000,000
Furniture and fixtures (net)	12,000,000	
Advances and loans[b]	20,000,000	
Good faith deposits[c]	13,000,000	
Subordinated loans[d]		40,000,000
Loans payable		30,000,000
Accrued expenses payable		7,000,000
Commission income		40,000,000
Trading account[e]	130,000,000	
Investment account[e]	100,000,000	
Real estate	50,000,000	
Mortgage payable[f]		35,000,000
Interest receivables[g]	5,000,000	
Capital account		465,000,000
Total	**$770,000,000**	**$770,000,000**

Notes to financial statements:

[a]Customer debits are in cash account and are outstanding for less than 7 days.

[b]Advances and loans to employees are unsecured.

[c]Good faith deposits with utility companies.

[d]Subordinated loan from firm's president, not approved by American Stock Exchange.

[e]All securities are listed on the American Stock Exchange and are of long equity positions. As of 12/31/97, the market value of the Investment account is $99,000,000; and the market value of the Trading account is $105,000,000.

[f]Mortgage payable is for business condo.

[g]Interest receivable less than 30 calendar days from payable date.

Source: GAO.

Table II.5 Broker-Dealer's Balance Sheet as of December 31, 1997

Assets	
Allowable assets	
Cash	$400,000,000
Customer debits	40,000,000
Trading account	105,000,000
Investment account	99,000,000
Interest receivables	5,000,000
Total allowable assets	$649,000,000
Non-allowable assets	
Real estate	$ 50,000,000
Furniture & fixtures (net)	12,000,000
Advances & loans	20,000,000
Good faith deposits	13,000,000
Total non-allowable assets	$ 95,000,000
Total assets	$744,000,000
Liabilities	
Aggregate indebtedness	
Customer credits	$115,000,000
Dividends payable	8,000,000
Accrued expenses payable	7,000,000
Loan payable	30,000,000
Mortgage payable	35,000,000
Syndicate payable	30,000,000
Total aggregate indebtedness	$225,000,000
Other liabilities	
Subordinated loan	$ 40,000,000
Total liabilities	$265,000,000
Owners' equity	
Capital account	$465,000,000
Commission income	40,000,000
Mark to market (investment)	(1,000,000)
Mark to market (trading)	(25,000,000)
Total capital	$479,000,000
Total liabilities and capital	**$744,000,000**

Source: GAO.

Table II.6: Broker-Dealer's Net Capital Computation as of December 31, 1997

Accounting steps:	Description	Computation
	Total assets	$744,000,000
minus	Total liabilities	265,000,000
equals	Net worth	$479,000,000
minus	Deductions:	
	Non-allowable assets	95,000,000
equals	Net capital before haircuts	$384,000,000
minus	Total haircut charges[a]	30,600,000
equals	Net capital	$353,400,000
minus	Required minimum net capital	776,000
equals	Excess net capital	$352,624,000

[a]Haircut computation:
The haircut for equity securities is equal to 15 percent of the market value of the greater of the long or short positions, plus 15 percent of the lesser positions, but only to the extent that these positions exceed 25 percent of the market value of the greater position.

15% of trading account:	15% x $105,000,000 =	$15,750,000
15% of investment account:	15% x $99,000,000 =	$14,850,000
Total haircuts		$30,600,000

Computation of Alternative Net Capital Compliance:

Base requirement: broker-dealer's net capital must be the greater of $250,000 or 2 percent of aggregate customer debits (i.e., customer-related receivables) as computed per Rule 15c3-3's reserve formula.

Aggregate customer debits equal (customer debits - (customer debits x 3%)). In our example, aggregate customer debits equal $38,800,000 ($40,000,000 -($40,000,000 x 3%)). The 3 percent is analogous to the broker-dealer's loss reserve for the loans made to customers. Our base requirement is $776,000 (2% x $38,800,000).

Because the $776,000 is more than the $250,000 minimum dollar requirement, the broker-dealer must hold at least a minimum of $776,000 in net capital. The broker-dealer is in compliance with this requirement because it has $353,400,000 in net capital.

Another requirement is that the broker-dealer's subordinated debt to total debt-equity ratio may generally not exceed 70 percent for 90 days. The ratio is calculated by dividing a broker-dealer's total net worth into its subordinated debt ($40,000,000/$479,000,000). With a ratio of only 8.35 percent, the broker-dealer meets this requirement.

Source: GAO.

Table II.7: SEC Minimum Net Capital Requirements for Brokers and Dealers

Type of broker or dealer	Minimum requirement
Brokers or dealers that carry accounts	
1. Firms that carry customer accounts or broker or dealer accounts and receive or hold funds or securities for those persons (known as general securities brokers or dealers).	
i. Basic or aggregate indebtedness (AI) method	Greater of $250,000 or 6-2/3% of AI
ii. Alternative method	Greater of $250,000 or 2% of Rule 15c3-3 Reserve Formula debits
2. Firms that carry customer accounts, receive but do not hold customer funds or securities, and operate under the paragraph (k)(2)(i) exemption of Rule 15c3-3.	Greater of $100,000 or 6-2/3% of AI
Introducing brokers*	
1. Firms that introduce accounts on a fully disclosed basis to another broker or dealer and do not receive funds or securities.	Greater of $5,000 or 6-2/3% of AI
2. Firms that introduce accounts on a fully disclosed basis to another broker or dealer and receive, but do not hold, customer or other broker-dealer securities and do not receive funds.	Greater of $50,000 or 6-2/3% of AI
Dealers*	
1. Brokers or dealers that trade solely for their own accounts, endorse or write options, or effect more than 10 transactions for their investment account in any 1 calendar year.	Greater of $100,000 or 6-2/3% of AI
Mutual fund brokers or dealers*	
1. Brokers or dealers transacting a business in redeemable shares of registered investment companies and certain other share accounts.	
i. Wire orders (or telephone calls)	Greater of $25,000 or 6-2/3% of AI
ii. Application (or subscription) method and do not otherwise receive or hold funds or securities	Greater of $5,000 or 6-2/3% of AI
Market makers*	
1. Brokers or dealers engaged in activities as a market maker	Greater of $100,000 or 6-2/3% of AI or $2,500 per security for securities with a market value greater than $5 per share, and $1,000 per security for securities with a market value of $5 or less with a maximum requirement of $1 million
Other brokers or dealers*	
1. Firms that deal only in Direct Participation Programs (i.e., real estate syndications).	Greater of $5,000 or 6-2/3% of AI
2. Firms that do not take customer orders, hold customer funds or securities or execute customer trades, because of the nature of their activities (e.g., mergers and acquisitions).	Greater of $5,000 or 6-2/3% of AI
Futures commission merchants	
1. Brokers or dealers registered with CFTC.	Greater of $250,000 or 4% of customer funds required to be segregated pursuant to the CEA and regulations thereunder

(continued)

Type of broker or dealer	Minimum requirement
ALTERNATIVE METHOD[a]	
1. Any firm may elect this method; however, the firm will be subject to the $250,000 minimum net capital requirement.	Greater of $250,000 or 2% of Rule 15c3-3 Reserve Formula debits

[a]A broker or dealer electing this method to calculate its net capital levels must notify its examining authority in writing and may not thereafter revert to the Aggregate Indebtedness Method (unless approved by SEC.)

* The minimum capital requirements opposite the type of broker-dealers are under the Basic (or Aggregate Indebtedness) Method.

Source: The SEC Division of Market Regulation and Rule 15c3-1 under the Securities Exchange Act of 1934.

Regulatory Actions and Other Provisions of the Life Risk-Based Capital Model Act

Nearly all life insurers are required to calculate both their total capital and their required risk-based capital and file a risk-based capital report.[1] In the view of the National Association of Insurance Commissioners (NAIC), however, the true impact of the risk-based capital system occurs when the Risk-Based Capital for Insurers Model Act (the act), developed by NAIC, is adopted by the states. When adopted, as it has been in 50 of 51 insurance jurisdictions, this act gives the state's chief insurance regulator the authority to act on the results generated by the risk-based capital formula.[2]

When the act is adopted by a state, all insurers in that state become subject to its provisions. For example, the act requires each insurer to file a report with NAIC; the commissioner of the insurer's domiciliary state; and the commissioner of any state in which the insurer is licensed, if that state's insurance commissioner requests it in writing. In their annual regulatory financial reports, insurers are also required to report their Authorized Control Level Risk-Based Capital (ACLRBC), which is the total risk-based capital an insurer needs to hold to avoid being taken into conservatorship.[3]

The general approach NAIC has taken has been to estimate the expected loss an insurer would suffer in the face of a catastrophic financial event. The size of that expected loss represents the risk-based capital required to deal with it. Each insurer determines the amount of risk-based capital that it is required to set aside by multiplying its holdings of each category of assets and/or liabilities by a factor. The factors are estimates of the potential for a catastrophic loss to the insurer, or, in other words, an estimate of the risk attached to that particular category of assets or liabilities. In addition to risk-based capital, insurers are required to set aside an Asset Valuation Reserve (AVR). The AVR is a prospective reserve that is related to the likelihood that an asset will lose value, and its calculation and value are closely related to the insurer's risk-based capital.

Conceptually, the risks facing insurers are divided into four risk categories (asset, insurance, interest rate, and all other business risks). These are designated as C-0 through C-4 (asset risk is divided into two parts). After the calculation of risk-based capital for each of the risk categories, the total is adjusted for covariance. The covariance adjustment is meant to

[1]All states have adopted a law requiring most insurers in their states to file an annual NAIC form containing information on their assets, liabilities, and capital, including risk-based capital.

[2]New York has adopted a similar law that applies to life insurers.

[3]The material in this appendix has been largely taken from the 1997 NAIC Life Risk-Based Capital Report Including Overview and Instructions for Companies.

take into account that problems in all four risk categories are not likely to occur at the same time.

In order to calculate risk-based capital without requiring life insurers to collect additional data on the assets and liabilities reported by life insurers on their regulatory reporting forms, the NAIC risk-based capital formula divided assets and liabilities already reported among the risk categories C-0 through C-4. Table III.1 summarizes the specific items that are assigned to each risk category.

Table III.1: Summary of the Components of the Life Insurance Risk-Based Capital Formula and Their Relationship to Risk Categories C-0 Through C-4

Risk Factors	Items included
C-0 Asset risk - affiliated amounts	• Affiliated U.S. Property and Casualty Insurers • Affiliated U.S. Life Insurers • Affiliated Alien Life Insurers • Investment Subsidiaries • Investments in Upstream Affiliates (Parents) • Off-balance Sheet Items
C-1 Asset risk - All Other	• Bonds • Mortgages • Preferred Stock and Common Stock • Separate Accounts • Real Estate • Other Long-term Assets • Concentration Factor • Miscellaneous • Reinsurance
C-2 Insurance Risk	• Individual and Industrial Life Insurance • Group and Credit Life Insurance • Health Insurance Claim Reserves • Premium Stabilization Reserve Credit
C-3 Interest Rate Risk	• Low-Risk Category • Medium-Risk Category • High-Risk Category
C-4 Business Risk	• Based on guaranty fund assessments

Source: 1997 NAIC Life Risk-Based Capital Report Including Overview and Instructions for Companies.

C-0: Asset Risk From Affiliated Investments

The insurance subsidiaries risk (C-0) is essentially the risk-based capital requirement of the downstream insurance subsidiaries owned by an insurer. The risk-based capital requirement is the best estimate of the overall risk of an insurance company, so NAIC believes it is appropriate to require the parent to hold an equivalent amount of risk-based capital to

protect against financial downturns of the affiliate. The C-0 component is assumed to be wholly correlated with the parent's total risk-based capital on the assumption that financial problems in the parent will have a contagion effect in the subsidiaries, and vice versa.

The risk-based capital for affiliated investments of U.S. life insurance companies, property and casualty insurance companies, and investment subsidiaries is calculated on a "see through" basis (multiplied by the percent of ownership). This requires "looking through" all holding and subsidiary companies to the lowest level of ownership for each affiliated stock investment. The advantage of this approach is that where there is a choice of whether to have ownership of an asset in either the parent or the subsidiary, risk-based capital results are unlikely to affect that decision.

Some insurance affiliates are themselves subject to risk-based capital requirements. Others are not. The risk-based capital requirement of the reporting life insurer for those insurance subsidiaries that are subject to a risk-based capital requirement is based on the Total Risk-Based Capital After Covariance of the subsidiary, prorated for the percent of ownership of that subsidiary. For affiliates that are not subject to insurance risk-based capital requirements, the risk factors vary from 30 to 100 percent, prorated by the percentage of the reporting company's holdings.

Off-balance sheet items are included in C-0, even though they may or may not have any affiliate relationship with the life insurer. The potential for risk exists in off-balance sheet items. For items other than derivative instruments, a factor of 1 percent was chosen on a judgment basis. The 1-percent factor will differentiate between the companies that have small and large exposures to this risk. Since there is no firm actuarial basis for assigning the 1-percent factor to these risks, off-balance sheet items are included in the sensitivity analysis (described later) using a factor of 3 percent; and leases are added as an additional off-balance sheet item.

C-1: Asset Risks for All Nonaffiliated Assets

Life insurance companies hold several types of assets. The major categories are bonds, stocks, mortgages, and real estate. They also hold other assets that do not fit neatly into these categories.

Bonds

The bond holdings of insurers are split into seven different risk classifications or categories based on bond quality. Class 1 bonds are

those of the highest quality, while Class 6 bonds are those bonds that are in or near default. The seventh bond classification is for U.S. government securities.

Each bond classification has a different risk factor by which bond holdings in that category are multiplied. The risk-based capital requirement for a U.S. government security is zero because there is no default risk for those bonds. The risk factors for other bonds range from 0.003 ($3 per $1000 of value) for Class 1 bonds to 0.300 ($300 per $1000 of value) for high risk bonds in Class 6. As the risk gets higher, the risk-based capital requirement increases. In addition, there are other statutory limitations on the amount of junk bonds that insurers are permitted to carry on their books.

There is also an adjustment, called the bond size factor, that increases the nominal risk factors for insurers that have less diversification in their bond portfolio, after excluding U.S. government issues and certain U.S. agency issues. For insurers with relatively few different issuers (that is, little diversification), the bond size factor increases the risk-based capital factor by 2.5 times. Only a handful of insurers with at least 1,300 issuers in their bond portfolio can use the nominal factors.

Mortgages

The risk-based capital formula treatment of mortgages differs by the type of mortgage and the mortgage status. Mortgages are generally broken down into three main categories—farm, residential, and commercial. These categories are also further subdivided as to whether the mortgage is insured/guaranteed or not. The risk-based capital factors also differ for current mortgages, those 90 days overdue, and those in the process of foreclosure. There is also a company-specific experience adjustment to the risk-based capital factors for farm and commercial mortgages, based on the experience of the insurer relative to the industry as a whole.

Beginning in 1997, the risk-based capital calculation for troubled mortgages is made on a mortgage-by-mortgage basis in order to recognize the extent to which the statement value of each of those troubled mortgages has already been marked to market or otherwise written down.

Unaffiliated Preferred and Common Stocks

In contrast to banks, insurance companies are permitted to hold stocks as investments.

Unaffiliated Preferred Stock

Experience data to develop preferred stock factors are not readily available; however, it is believed that preferred stocks are somewhat more likely to default than bonds, and the loss or default would be somewhat higher than that experienced on bonds. Formula factors are equal to bond factors plus 2 percent (but not more than 30 percent). This is consistent with the approach adopted for preferred stock factors for AVR purposes.

Unaffiliated Common Stock

The factor for unaffiliated common stock is based on studies conducted at two large life insurance companies. Both of these studies indicated that a 30-percent factor is needed to provide capital to cover approximately 95 percent of the greatest losses in common stock value over a 2-year period. This factor assumes capital losses are unrealized and not subject to favorable tax treatment at the time loss in market value occurs. Two other classes of common stock receive a different treatment. Nongovernment money market mutual funds are more like cash than common stock; therefore, the factor used is 0.3 percent, the same factor used for cash. Federal Home Loan Bank stock has characteristics more like a fixed income instrument rather than common stock. A 2.3-percent factor was chosen.

Separate Accounts

Separate accounts are investment pools held separately from all other assets of the insurer. The primary purpose of separate accounts is to allow the insurer to make investments exempt from the usual investment restrictions imposed by state law. Separate accounts are authorized by states to permit insurers to offer customers investment strategies that would not otherwise conform to insurance regulations. Because of the nature of separate accounts, losses cannot exceed the funds held in the separate account and thus are insulated from the general accounts of the insurer. The customer, rather than the insurer, is responsible for all investment gains and losses. Separate accounts are maintained primarily for pension funds and variable life and annuity products. Although separate accounts represent a large segment of the aggregate assets and liabilities of the life insurance industry, they have considerably less of a risk-based capital requirement than other investment assets used to fund general account obligations.

Real Estate

Life insurance risk-based capital makes a distinction between company-occupied real estate, real estate acquired by foreclosure, and investment real estate. Furthermore, real estate may be owned directly, in which case it is reported as “real estate,” or it may be owned through a

partnership. Partnerships and joint ventures are referred to as "Schedule BA" assets and are discussed separately. Like mortgage risk, the real estate risk for real estate directly owned is calculated separately for each property. There is a charge for the statement value of the property as well as a charge for the amount of encumbrances.

Companies that have developed their own risk-based capital factors have used factors ranging from 5 percent to 20 percent. One study indicated real estate volatility is about 60 percent of common stock, suggesting a factor in the range of 18 percent. Assuming some tax effect for losses, a factor of 10 percent was chosen. Foreclosed real estate would carry a somewhat higher risk at 15 percent. The foreclosed real estate factor is lower than the factor for mortgages in foreclosure (20 percent) because mortgages in foreclosure have already been written down when they are moved to the foreclosed real estate category. Because a surplus reduction has already been taken, the factor is lower.

Other Long-Term Assets

Schedule BA on the life insurers' regulatory financial report (known as the Annual Statement) includes those long-term assets that, because of their peculiar nature, are not included elsewhere on the report. These include assets owned by the insurer through partnership arrangements as well as other unusual assets. In recognition of the diverse nature of Schedule BA assets, the risk-based capital is calculated by assigning different risk factors according to the different type of assets. Assets with underlying characteristics of bonds and preferred stocks rated by the NAIC Securities Valuation Office have different factors according to the Office's assigned classification. Unrated fixed-income securities are treated the same as Other Schedule BA Assets and assessed a 30-percent charge. Rated surplus and capital notes have the same factors applied as Schedule BA assets with the characteristics of preferred stock. Schedule BA real estate also has a 15-percent factor because of the additional risks inherent in owning real estate through a partnership. The factors used for Schedule BA mortgages are the same as for commercial mortgages. Where it is not possible to determine the risk-based capital classification of an asset reported on Schedule BA, a 30-percent factor is applied.

Asset Concentration Factor

The purpose of the concentration factor is to reflect the additional risk of high concentrations in single exposures (represented by an individual issuer of a security or a holder of a mortgage, etc.). The concentration factor doubles the risk-based capital factor (with a maximum of

30 percent) of the 10 largest asset exposures, excluding various low-risk categories or categories that already have a 30-percent factor. Because the risk-based capital of the assets included in the concentration factor has already been counted once in the basic formula, this factor itself serves only to add in the additional risk-based capital required. The calculation is completed on a consolidated basis; however, the concentration factor is reduced by amounts already included in the concentration factors of subsidiaries to avoid double counting.

Miscellaneous Assets: Cash, Short-Term Investments, and Derivatives

The factor for cash is 0.3 percent. It is recognized that there is a small risk related to possible insolvency of the bank where cash deposits are held. The 0.3 percent, equivalent to a class 1 bond, reflects the short-term nature of this risk.

The short-term investments to be included here are those that are not reflected elsewhere in the formula. Commercial paper, negotiable certificates of deposit, repurchase agreements, collateralized mortgage obligations, mortgage participation certificates, interest only and principal only certificates, and equipment trust certificates, should be included in appropriate bond classifications (class 1 through class 6) and should be excluded from short-term investments. The 0.3-percent factor is equal to the factor for cash.

For derivative instruments, the statement value exposure net of collateral (the balance sheet exposure) is included under miscellaneous C-1 risks. Because collars, swaps, forwards, and futures can have statement values that are positive, zero, or negative, the potential exposure to default by the counterparty for these instruments cannot be measured by the statement values and must be calculated. The factors applied to the derivative's off-balance sheet exposure are the same as those applied to bonds and reflect the insurer's exposure to loss upon default of the counterparty.

Reinsurance

Insurance companies often lay off part of their risk by purchasing reinsurance. There is a risk associated with recoverability of amounts from reinsurers. The risk is deemed comparable to that represented by bonds rated as risk classes 1 and 2 and is assigned a factor of 0.5 percent. Some types of reinsurance such as reinsurance with nonauthorized companies, reinsurance among affiliated companies, reinsurance with funds withheld, and reinsurance involving policy loans, are subject to a

separate surplus charge. To avoid an overstatement of risk-based capital, the formula gives a 0.5-percent credit for these types of reinsurance.

C-2: Insurance Risk

Life insurance and health insurance are often underwritten and sold by the same companies. Each carries its own unique set of risks.

Life Insurance

Life insurers establish reserves to cover expected claims costs from their outstanding insurance-in-force. The life insurance risk-based capital factors chosen represent the surplus needed to provide for excess claims over expected claims, both from random fluctuations and from inaccurate pricing, for future levels of claims. For a large number of trials, each insured either lives or dies according to a "roll of the dice" reflecting the probability of death. The present value of the claims generated by this process, less expected claims, will be the amount of surplus needed under that trial. The factors chosen under the formula produce a level of surplus at least as much as needed in 95 percent of the trials.

The model was developed for portfolios of 10,000, 100,000, and 1 million lives; and it was found that the surplus needs decreased with larger portfolios, consistent with the law of large numbers.

One set of factors is applied to individual and industrial insurance-in-force and another set for group and credit insurance.

Table III.2: Risk Factors for Life Insurance in Force

Amount of insurance-in-force (in dollars)	Factors for individual and industrial insurance	Factors for group and credit insurance
First 500 million	0.150%	0.12%
Next 4,500 million	0.100%	0.10%
Next 20,000 million	0.075%	0.06%
Over 25,000 million	0.060%	0.05%

Source: GAO analysis of 1997 NAIC Life Risk-Based Capital Report Including Overview and Instructions for Companies.

Premium Stabilization Reserves

Premium stabilization reserves are funds held by the company in order to stabilize the premium a group policyholder must pay from year to year. Usually experience rating refunds are accumulated in such a reserve so

that they can be drawn upon in the event of poor future experience. This reduces the insurer's risk. For group life and health insurance, 50 percent of premium stabilization reserves held in the Annual Statement as a liability (not as appropriated surplus) are permitted as an offset up to the amount of risk-based capital.

Health Insurance

Risk-based capital factors for health insurance are applied to medical and disability income premiums and claim reserves with an offset for health premium stabilization reserves.

C-3: Interest Rate Risk

Interest rate risk is the risk of losses due to changes in interest rate levels. The factors chosen represent the surplus necessary to provide for a lack of synchronization of asset and liability cash flows.

The impact of interest rate changes will be greatest on those products for which the guarantees are most in favor of the policyholder and for which the policyholder is most likely to be responsive to changes in interest rates. Therefore, the risk varies by withdrawal provision. The risk-based capital calculation defines three risk categories: low, medium, and high. Factors for each risk category were developed based on the assumption of well-matched asset and liability durations. A loading of 50 percent was then added on to represent the extra risk of less well-matched portfolios. Companies with well-matched books may be eligible for a reduction in their risk-based capital required for interest rate risk.

C-4: Business Risk

General business risk is based on premium income and annuity considerations. No good proxies for business risk exist in the information usually reported by life insurers. As a result, the formula factors were based on a company's reported guaranty fund assessments. Guaranty funds are the mechanism set up in the insurance industry to indemnify policyholders in the event of an insurance company failure. In all states except New York, the funds are post-assessment; that is, the remaining insurance companies are assessed by the guaranty fund after a company has failed. The assessments reflect each company's share of the cost of failures.

Determining Whether a Life Insurer Has Adequate Risk-Based Capital

Regulatory capital adequacy is determined by calculating a value called the Authorized Control Level Risk-Based Capital (ACLRBC). This value is then compared with the insurer's Total Adjusted Capital (TAC) by computing the ratio (that is, ACLRBC divided by TAC). The value of this ratio determines the regulatory actions to be taken by regulators that are in states that have adopted the Risk-Based Capital for Insurers Model Act.

Calculating the Authorized Control Level Risk-Based Capital

The purpose of the life insurance risk-based capital formula is to estimate the risk-based capital levels required to manage losses that can result from a series of catastrophic financial events. These are the C-0 through C-4 calculations described above. However, chances are remote that all such losses will occur simultaneously. The covariance adjustment states that the combined effect of the C-1, C-2, and C-3 risks are not equal to their sum but are equal to the square root calculation described below. It is statistically assumed that the C-1 risk and C-3 risk are correlated, and the C-2 risk is independent of both. This assumption provides what is considered by NAIC to be a reasonable approximation of the capital requirements needed at any particular level of risks.

ACLRBC is 50 percent of the sum of the C-0 plus the C-4 risk-based capital and the square root of the sum of the C-1 and C-3 risk-based capital squared and the C-2 risk-based capital squared.

Total Adjusted Capital

In order to calculate their TAC capital for risk-based capital purposes, insurers are allowed to make several adjustments to their reported total capital. These include adding to total capital their AVR, part of the provision for future dividends, and an adjustment to avoid double counting for some subsidiary amounts.

Risk-Based Capital Level of Action

Under the Life Risk-Based Capital Model Act, a comparison of the ACLRBC with the level of TAC determines the level of regulatory attention, if any, applicable to the company.

Under the act, the following levels of risk-based capital require specific regulatory actions as detailed in Table III.3:

- No Action
- Company Action Level
- Regulatory Action Level

- Authorized Control Level
- Mandatory Control Level

Table III.3: Regulatory Actions Triggered by Different Total Adjusted Capital Levels Under the Risk-Based Capital for Insurers Model Act

Action level or indicator	Total adjusted capital level
No Action[a]	2 times ACLRBC or more
Company Action Level[b]	1.5 to 2 times ACLRBC
Regulatory Action Level[c]	1 to 1.5 times ACLRBC
Authorized Control Level[d]	0.7 to 1 times ACLRBC
Mandatory Control Level[e]	0.7 times ACLRBC or less

[a]The No Action level means, basically, that the insurer has passed the risk-based capital test and can go on about its business.

[b]In a Company Action Level event, the company is required to prepare a detailed business plan, including a discussion of corrective action to eliminate the event. The plan is to be submitted to the insurance commissioner of the state of domicile for approval. If the commissioner approves the plan, the state insurance department is to monitor the company's progress until its TAC exceeds its Company Action Level. If the company cannot or will not prepare a recovery plan that is satisfactory to the commissioner, or the company fails to adhere to its plan, under some circumstances it will drop into the Regulatory Action Level.

[c]At the Regulatory Action Level, the commissioner of the state of domicile is to (1) require the company to submit a plan for corrective action or, if applicable, a revised plan; (2) perform such examinations as are deemed necessary; and (3) issue a corrective order.

[d]At ACLRBC, the commissioner of the state of domicile is authorized to take all regulatory action considered necessary to protect the best interest of the policyholders and creditors of the insurer.

[e]In a Mandatory Control Level event, the commissioner of the state of domicile is authorized to take the necessary steps to place the company under regulatory control (i.e., rehabilitation or liquidation). The commissioner may delay action up to 90 days if there is a reasonable expectation that the Mandatory Control Level event may be eliminated.

Source: GAO analysis of 1997 NAIC Life Risk-Based Capital Report Including Overview and Instructions for Companies.

Trend Test

Companies whose TAC is between 2.0 and 2.5 times the ACLRBC are subject to a trend test. The trend test calculates the greater of the decrease in the margin between the current year and the prior year and the average of the past 3 years. It assumes that the decrease could occur again in the coming year. Any company with a trend below 1.9 times ACLRBC would trigger Company Action Level risk-based capital regulatory action.

Sensitivity Tests

The sensitivity tests provide a "what if" scenario to the calculation of risk-based capital by recalculating ACLRBC or TAC using a specified alternative for a particular factor in the formula.

The amounts reported in the sensitivity tests are an actual recalculation of ACLRBC and TAC. If a company does not have any of the assets or liabilities specified by the sensitivity tests, including affiliates, noncontrolled assets, guarantees for affiliates, contingent liabilities, long-term leases, and interest swaps, the amounts reported after the tests are the same ACLRBC and TAC as originally calculated.

Other Provisions of the Model Act

The Model Act extends confidentiality to any information contained in a company's risk-based capital report, except that information the company publishes in a publicly available annual statement. The act also prohibits any person or organization engaged in the insurance business from publishing a company's risk-based capital figures. However, a company may publish its correct level if a materially misleading level has been published by others. According to NAIC, the purpose of this provision is to prevent insurers or their agents and brokers from using risk-based capital levels for marketing purposes. In NAIC's view, risk-based capital levels were not designed for marketing purposes, and their publication could be misleading to consumers.[4] Moreover, NAIC states that (1) risk-based capital levels determined under its formula are still minimum capital levels, (2) the ratio indicates whether or not a company is subject to regulatory action because it fell below the minimum standard, and (3) any attempt to rank companies by their levels indicates a lack of understanding of the risk-based capital system.

[4]A number of state insurance department representatives and insurance company officials told us that risk-based capital figures have been used as a "beauty contest" for marketing and competition purposes.

Risk-Adjusted Return on Capital

To maximize value for stockholders, firms try to maximize returns for a given risk or minimize risk for a given return. To evaluate whether they are maximizing stockholder value, firms develop ratios of returns to risks. These ratios permit them to simultaneously consider how changes in risks and returns are related. In general, if the ratio of return to risk is increasing, stockholder value has increased. The general risk management principles discussed in chapter 3 require firms to develop measures of risk-adjusted returns, whenever possible. In the large firms that we interviewed, measures of risk-adjusted returns have been developed most commonly for market and credit risks.

Among the firms we visited, this tracking, measuring, and managing is often done via Risk-Adjusted Return on Capital (RAROC), a term first used by Bankers Trust. RAROC permits a firm to evaluate the return, risk, and capital trade-off. Each line of business or instrument in a fully developed RAROC system can be evaluated to determine if its returns are high enough to warrant the risks undertaken and if the capital allocated to cover the risks is adequate.

In RAROC, risk is measured as a variability in returns and is based on probability or frequency distributions of returns observed in historical data. By putting all risks in terms of loss distributions and allocating capital according to profit variability, risk is aggregated and priced all in one exercise. That is, the trade-off between risk and return can be done for the whole firm at once across all risks. The RAROC approach is based on economic theory and is consistent with statistical models, such as VAR, Monte Carlo, and the portfolio model approach to credit risk.

According to our interviews and our review of relevant literature, RAROC or equivalent processes are in use or are under development in large banks, securities firms, and life insurance companies. RAROC is used to help firm management determine the capital required to protect the firm against most, but not all, potential losses. Firm representatives stressed to us that in practice, they used RAROC along with judgment for their decisions on firmwide capital needs.

In conjunction with the determination of the amount of capital needed to protect the firm, RAROC generates a determination of returns from each investment for the firm. The firm's return depends on the returns from each particular investment and how the investment's return correlates with returns from other investments or products. That is, a RAROC system takes into account the consequences of diversifying a firm's investments

so that losses and gains on a diversified portfolio of investments can cancel each other out. RAROC also takes into account how hedges affect returns and risks.

The basic steps in a RAROC system are:

1. The firm analyzes each activity and product in the firm and determines the basic risk categories embedded in the investment or product. This unbundling of risks in each product permits the firm to analyze the level of risks in each risk category on a firmwide basis.

2. The firm quantifies firmwide the amount of risk and return in each basic risk category and for each product. The firm measures each risk category and product using standardized measures of return; and, when possible, the returns on risk measures are based on widely traded instruments with readily available market prices. When such prices are not available, firms can use internal models. The measurement is based on weekly or daily measures of returns and risks. This time period is consistent with day-to-day use of VAR modeling—setting limits and allocating capital to current risks in the trading book.

3. On the basis of the risk measures determined in step two, the firm determines the risk levels for all risk categories consistent with its planning horizon. (For the assets that are commonly traded, the planning period may be less than 1 year.)

4. The firm computes the amount of capital required for each risk category to reduce the probability of a loss to the agreed upon capital limit. For example, the amount of capital required might be the amount needed to protect a bank against losses 99 percent of the time over the next year.

Given that capital is to be set aside to cover risks at a 1 percent confidence interval, the ratio of returns to such risks can be used as a measure of relative profitability, hence the name risk-adjusted return on capital.

RAROC has several uses in addition to the basic use of determining the amount of capital to set aside to cover risk. It can also be used to

- evaluate the extent to which a firm has diversified its risks so that losses on one product are not positively correlated over time with losses on another product;

- determine, on a risk-adjusted basis, the performance of different products or lines of business;
- allocate resources in order to earn a satisfactory return for shareholders;
- evaluate the accuracy of product pricing in order to affect risks, return, and capital; and
- help determine employee compensation and rewards on the basis of the risk-adjusted returns generated.

Financial Firms Inteviewed by GAO

Bank Holding Companies

BankAmerica Corporation[1]
Bankers Trust New York Corporation
Canadian Imperial Bank of Commerce
The Chase Manhattan Corporation
Citicorp[2]
First Chicago NBD Corporation[3]

Securities/Futures Firms

ED&F Man International, Inc.
Goldman, Sachs & Co.
Lehman Brothers, Inc.
Merrill Lynch & Co., Inc.
Morgan Stanley & Co., Inc.[4]
Salomon Brothers, Inc.[5]

Insurance Companies

Hartford Life Insurance Companies
Lincoln-National Corporation
The Prudential Insurance Company of America
Swiss Re Financial Products Corporation

[1]In 1998, BankAmerica Corp. and NationsBank Corp. announced plans to merge and to create a new holding company called BankAmerica Corp.

[2]In 1998, Citicorp and Travelers Group, Inc. announced their intention to merge and form a new entity called Citigroup.

[3]In 1998, Bank One Corp. and First Chicago NBD Corp. announced their intention to merge. The new entity is to be called Bank One Corp.

[4]In 1997, Morgan Stanley Group, Inc. merged with Dean Witter Discover & Co. to form Morgan Stanley, Dean Witter, Discover & Co. Morgan Stanley & Co., Inc. and Dean Witter Reynolds, Inc. remain as separately registered broker-dealers.

[5]In 1997, Travelers Group, Inc. bought Salomon Inc. and merged it with Smith Barney Holdings, Inc. to create a new company called Salomon Smith Barney Holdings, Inc. Salomon Brothers, Inc. and Smith Barney, Inc. remain as separately registered broker-dealers.

Comments From the Office of the Comptroller of the Currency

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

Comptroller of the Currency
Administrator of National Banks

Washington, DC 20219

June 16, 1998

Mr. Thomas J. McCool
Director, Financial Institutions and Markets Issues
General Government Division
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. McCool:

We have reviewed your draft audit report titled RISK-BASED CAPITAL: Regulatory and Industry Approaches to Capital and Risk. The report summarizes the results of the GAO's self-initiated review of regulatory capital requirements and financial firms' theoretical approaches to relating capital to risk. The report presents regulatory views on the purpose of capital and current regulatory requirements; the approaches of some large financial firms to risk measurement and capital allocation; and issues in capital regulation and initiatives being considered for changes to regulatory capital requirements.

Framework for Implementing Capital Policy

It is important for readers to understand that the process for establishing capital requirements is complex -- perhaps more so than is implied by the report. Both domestically and internationally the OCC plays an integral role, along with the other bank regulatory agencies, in the formulation and implementation of capital policies and regulations. The Federal Financial Institutions Examination Council (FFIEC) provides a forum for these agencies to raise issues relating to capital policy and work through them on an interagency basis. Upon coming to agreement, the agencies must issue the agreed-upon regulations individually, because the FFIEC is not a rulemaking body.

Internationally, the OCC works through the Basle Committee. Ten years ago, the Basle Committee on Banking Supervision adopted the accord on International Convergence of Capital Measurement and Capital Standards (Basle Accord). As noted in your report, the OCC and the other Federal banking agencies implemented the provisions of the Accord through revisions to each agency's existing capital regulations in 1989.

See comment 1.

Scope of the Report

The evaluators interviewed a number of financial market participants as listed in an appendix and reviewed some of the empirical studies on the issue of capital regulation in general, and risk-based capital in particular. However, only a few empirical studies are cited, although a number of the issues and questions raised by the GAO have been addressed in the empirical literature. Other important issues are briefly discussed without mention of existing research or are omitted altogether.

For example, the report discusses some of the initiatives and issues for changing the risk-based capital standards. Such an analysis is incomplete if it fails to recognize how capital regulations change bank behavior and also how they influence overall economic activity. To ignore these issues is to assume either that capital regulations have no impact, or that the impact is invariant to changes in capital regulations. To date, there is some empirical evidence to suggest that both of these assumptions are wrong, and that capital regulations have a significant effect on bank behavior and macroeconomic activity. For example, a recently published research study by two OCC economists finds that banks adjusted their capital ratios and risk levels in response to implementation of the risk-based standards.[1] Other empirical research suggests that the risk-based capital standards were a major factor behind the credit crunch in the early 1990s.[2] A review and discussion of these issues could improve the report's analysis.

Assessment of Models

Your report recognizes, as we do, that if firms use internal risk models, examiners may have difficulty in evaluating the validity and use of the model. That applies not only to models for capital allocation, but also to models that banks use to measure and manage risk exposures. To address this issue, in July 1994, the OCC established the Risk Analysis Division (RAD) which is staffed by Ph.D. economists. RAD economists are members of OCC bank examination teams and they assess the statistical properties and applications of complex internal models used by individual banks.

The OCC is also an active participant in the Basle Committee's Internal Model Working Group. The working group provides a forum for sharing information and addressing issues regarding the use of models for establishing capital standards.

---

[1]Jacques, Kevin and Peter Nigro. "Risk-Based Capital, Portfolio Risk, and Bank Capital: A Simultaneous Equations Approach." Journal of Economics and Business 1997 49: 533-547.

[2]Hall, Brian J. "How Has the Basle Accord Affected Bank Portfolios." Journal of the Japanese and International Economies 7 (1993): 408-440.

Future Direction

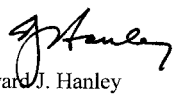
Consistent with the discussion in your report, the OCC and the other financial regulators recognize that there is a need to analyze how to improve the effectiveness of the capital assessment system in light of institutions' changing business strategies and product mix. As an initial step in this analysis, Comptroller of the Currency Eugene A. Ludwig, as chairman of the FFIEC, sponsored a one-day conference last December to bring together experts to examine the financial institutions' regulatory capital framework from the perspectives of bankers, Wall Street, academia and non-U.S. bank supervisors.

In addition, as part of our ongoing efforts in this area , the OCC recently formed a Capital Rethink Project Team to review our present regulatory capital framework, consider deficiencies in that structure, and assess potential alternative regulatory capital regimes. The principal objectives of the Capital Rethink Project Team are to provide senior OCC policy-making officials with information necessary to develop an agency position on the future of bank capital regulation and to ensure that the OCC continues to play an effective role in the development and maintenance of international capital standards. The Project Team will be considering the theories and practices presented in your report. In addition, the Team will consider empirical evidence on how capital regulations change bank behavior and also how they influence overall economic activity. One such piece of evidence is a paper by Raj Aggarwal and Kevin T. Jacques entitled "A Simultaneous Equations Estimation of the Impact of Prompt Corrective Action on Bank Capital and Risk," which was presented earlier this year at a conference organized by the Federal Reserve Bank of New York.

Technical comments, including citations to the OCC's risk-based capital regulations, have been provided separately to the evaluators. If you need additional information, please contact me or Tommy Snow, our Director for Capital Policy.

Thank you for the opportunity to review and comment on the draft report.

Sincerely,



Edward J. Hanley
Senior Deputy Comptroller for Administration

The following are GAO's comments on the Office of the Comptroller of the Currency's letter dated June 16, 1998.

GAO Comments

1. OCC commented that the report fails to recognize how capital regulations change bank behavior and also how they influence overall economic activity. In OCC's view, to ignore these issues is to assume either that capital regulations have no impact, or that the impact is invariant to changes in capital regulations. Our purpose in presenting issues in capital regulation was to discuss the potential effects of capital regulation on behavior. It was not our purpose, however, to analyze in detail the extent or interaction of those effects.

Comments From the Federal Reserve Board

BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM
WASHINGTON, D. C. 20551

DIVISION OF BANKING
SUPERVISION AND REGULATION

June 17, 1998

Mr. Thomas J. McCool
Director, Financial Institutions
and Market Issues
General Accounting Office
General Government Division
Washington, D.C. 20543

Dear Mr. McCool:

Thank you for sharing your draft report entitled Risk-based Capital: Regulator and Industry Approaches to Capital and Risk. We have reviewed the report and commend your staff for its comprehensive analysis. The Division of Banking Supervision and Regulation staff has a few technical edits on the banking sections that they will provide to the General Accounting Office under separate cover.

Sincerely,

Richard Spillenkothen
Director

cc: Mr. Frost
Ms. Wells

Comments From the Federal Deposit Insurance Corporation

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

FDIC
Federal Deposit Insurance Corporation
Washington, D.C. 20429
Office of Internal Control Management

June 17, 1998

Thomas J. McCool
Director, Financial Institutions and
Market Issues
U.S. General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. McCool:

Thank you for the opportunity to review the General Accounting Office draft report entitled, Risk-Based Capital: Regulator and Industry Approaches to Capital and Risk (job code 233513). The report is an excellent summary of the current discussion on capital requirements and is both generally balanced and fairly comprehensive.

From the perspective of the FDIC, two points deserve additional emphasis:

(1) FDIC, as the deposit insurer, must pay particular attention to losses that fall on the insurance fund in the event of a bank failure. In contrast, the report concentrates on the economic risk without distinguishing who bears what portion of the risk.

Now on p. 42.

The GAO report correctly observes that bank regulators focus on safety and soundness of banks (p.62f). However, most of the report discusses economic risk without addressing the issue of who bears what portion of the risk. Stockholders and bondholders face most of the economic risk, and the various models discussed in the report have been developed to control that risk. On the other hand, the FDIC faces losses to the insurance fund in the event of a bank failure. Banks and the FDIC will estimate necessary capital differently because the risk to the FDIC differs from that to the stockholders and to bank creditors. The GAO does make this point in different terms (p. 164), but the focus on economic risk means that the GAO underemphasizes FDIC's concern with bank failures.

See comment 1.

Now on p. 94.

Bank failures and losses to the fund are very unusual. Even in 1988, the peak year for bank failures in the post-Depression period, the number of bank failures represented only two percent of the number of banks at the beginning of the year. Because losses large enough to fail a bank are infrequent, there are very little, if any, data that could be used in a model to estimate risk to the fund.

The GAO does repeatedly note the difficulties of getting enough reliable data to develop and test mathematical models of risk. The problem is much more severe if the models are to measure the risk of exceptional events such as those that produce bank failures. The GAO observes that these models are likely to underestimate the probability of "major market events" (p. 169). These unusual events are precisely the events that concern the FDIC.

Now on p. 97.

Now on p. 103.

The GAO also observes that credit models (e.g. CreditMetrics) are especially problematic (p. 181). The economy has gone through only a handful of credit cycles in the postwar era, so there is very little data on how different types of loans perform during periods of economic stress. Moreover, the rapid evolution of financial markets suggests that data from these cycles might be unrepresentative of the risks in the current environment. Importantly, most bank failures have resulted from credit problems. From the perspective of the FDIC, the models that are of the most interest are also the models that are the most difficult to develop and test.

See comment 2.

(2) Capital requirements are only one method of controlling risk; the report notes this fact without analyzing the interaction between the regulatory tools meant to mitigate risk.

Now on p. 32.

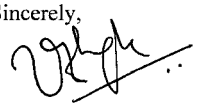
GAO correctly notes that, besides capital requirements, regulators have many other tools to ensure the stability of the financial system (p. 44f). However, the GAO does not consider the interaction of capital requirements with the rest of the regulatory system. For example, the report does not allude to the much-discussed relationship between capital requirements and deposit insurance premiums.

Now on p. 96.

The FDIC *History of the Eighties* demonstrated that bank examinations have a critical role. Even the advocates of the pre-commitment approach to bank capital have noted that it would not work for undercapitalized banks, and they have specifically suggested that such banks be subjected to regular examinations and close supervision. This point is especially important in light of the report's well-justified concern that methods of measuring risk often ignore operational and some other forms of risk (p. 168).

If you have any additional questions, please feel free to contact me at (202) 736-3014 or Howard Furner at (202) 736-0304.

Sincerely,



Vijay Deshpande
Director

cc: Dennis F. Geer
Paul L. Sachtleben
Roger A. Hood
James D. Collins
Nicholas J. Ketcha, Jr.
Roger Watson
Arthur Murton

The following are GAO's comments on the Federal Deposit Insurance Corporation's letter dated June 17, 1998.

GAO Comments

1. FDIC commented that the report's focus on economic risk means that it underemphasizes FDIC's concern with bank failures. Our intent in chapters 2 and 3 was to describe the difference in the purpose of regulatory capital as seen by financial regulators and economic capital as seen by financial firms. We did not intend to underemphasize FDIC's concern with bank failures but, rather, place FDIC's concern in the context of both other regulators and firms themselves. In chapter 4, we explicitly point out that regulators have different views from firms and this, in part, reflects concerns about protecting the bank insurance fund.

2. FDIC commented that the report notes that capital requirements are only one method of controlling risk, but that it does not analyze the interaction between the regulatory tools meant to mitigate risk. Our purpose in discussing the other regulatory tools was to place capital requirements in their context within the bank regulatory system. Our purpose was not to evaluate capital requirements and their interaction with other regulatory tools.

Comments From the Securities and Exchange Commission

DIVISION OF
MARKET REGULATION

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

June 17, 1998

Mr. Thomas J. McCool
Director, Financial Institutions and Markets Issues
United States General Accounting Office
441 G Street NW
Washington, DC 20548

Dear Mr. McCool:

Thank you for your May 18, 1998 letter to Chairman Levitt and the opportunity to review and provide comments on the draft report being prepared by the General Accounting Office ("GAO") entitled Risk-Based Capital: Regulator and Industry Approaches to Capital and Risk, which is intended to describe (1) regulatory views on the purpose of capital and current regulatory requirements; (2) the approaches of some large financial firms to risk measurement and capital allocation; and (3) issues in capital regulation and initiatives being considered for changes to regulatory capital requirements. As you know, during the preparation of the draft report, Securities and Exchange Commission ("Commission") staff from the Division of Market Regulation ("Division") provided background materials to the GAO, met with GAO staff several times to discuss the issues presented in the report, and commented on the various sections of the report.

The draft report reflects the hard work and deliberate analysis of the GAO staff. The Division appreciates the consideration that you, Mr. Lawrence Cluff, Ms. Barbara Keller, and others on the GAO staff have given to the Division's comments and views.

The Purpose of Capital and Current Regulatory Requirements

As you point out in your draft report, regulatory capital requirements for securities firms are based on the concept of a net liquid worth of a firm so, in the event of a firm's failure, it would have sufficient liquid resources to promptly satisfy the claims of customers and other market participants.

Capital standards for brokers and dealers based upon liquidity have been in effect since 1934 when the Securities Exchange Act was adopted. The net capital rule's emphasis on liquidity is a direct reflection of the Commission's mission of protecting investors and ensuring the integrity of the U.S. securities markets. The rule establishes a liquidation threshold that permits orderly self-liquidation, reducing the likelihood that the Securities Investor Protection Corporation ("SIPC") will have to step in.

We believe that the rule has worked well. Combined with our other financial and operational responsibility requirements, the net capital rule has resulted in an industry that is well capitalized, liquid, and adequately managed. In instances where broker-dealers have experienced financial difficulties, the existing securities regulatory system has been successful in winding down firms - including large firms such as Drexel Burnham Lambert and Thomson McKinnon - without the loss of customer assets or the need for contributions from SIPC. We are proud that due to this philosophy and its implementation and enforcement, broker-dealer failures to date have not required any resources from U.S. taxpayers.

Chapter two and Appendix II of your draft report present a general overview of the Commission's net capital rule and the process by which net capital is determined for a broker-dealer. As the capital rule assesses a charge on proprietary positions a firm holds, a large securities firm's inventory can lead to sizable haircut charges. Although the net capital rule contains separate minimum requirements, due to the sheer size of a typical dealer's inventory, the dealer's haircuts serve as a de facto capital requirement.

The current capital rule for broker-dealers has sought to build a cushion of capital into the market risk requirements to account for other categories of risk. These risks include liquidation risk, funding risk, settlement risk, liquidity risk, operational risk, legal risk, and leverage risk. It is this cushion for non-quantifiable exposures that prompts the criticism that the net capital rule does not reflect the true risk exposure of a firm.

Moving to a pure estimation of market risk, such as value at risk ("VAR"), may be theoretically more comprehensive in terms of a market risk analysis, but will tend to reduce, in some cases dramatically, the cushion of capital required by the rule. This effect is due to the fact that models used by the firms tend to understate or ignore completely other types of risks, as you correctly point out in your draft report. Incorporating VAR into capital requirements has particular significance for securities firms, whose capital requirements are derived primarily from their proprietary trading positions, in contrast to banks, whose capital requirements are derived primarily from credit charges associated with their loan portfolios.

Approaches to Risk Measurement and Capital Allocation

Chapter three of your draft report discusses how some large, diversified financial firms are measuring risks with mathematical models. Securities firms are increasingly turning to VAR modeling as a method of analyzing, controlling, and reporting the amount of market risk incurred through their trading activities, particularly with regard to derivatives trading.

The objective of the VAR model is to determine how much value in a portfolio might be lost over a given time, with a given level of probability. However, as you note in your draft report, there is wide variation in how VAR is applied across firms. Some rely on a correlation-based approach and other on historical simulations.

The Division has spent a considerable amount of time studying the subject of VAR models and their role in the Commission's capital rule. The Division has benefited from the experience of the Derivatives Policy Group ("DPG"), the Basle Committee on Banking Supervision ("Basle Committee") and the International Organization of Securities Commissions ("IOSCO") studying the use of VAR models. As a result of this experience, securities regulators have fewer reservations with using models as a method to estimate market risk, and it seems that the approaches set forth in the Basle Committee's model-based approach to capital and in the DPG report are industry recognized approaches to estimating market risk.

The Division's focus in this area is not on the validity of the models as a method of estimating market risk, but more the nature and adequacy of capital requirements generally. At its core, the recognition of VAR models by securities regulators raises fairly fundamental questions regarding the composition of broker-dealer capital and contrasts the nature of securities firms and capital requirements.

These questions were highlighted in the May 1998 IOSCO Technical Committee report entitled Methodologies for Determining Minimum Capital Standards for Internationally Active Securities Firms Which Permit the Use of Models Under Prescribed Conditions ("Report"). The Report states that supervisors (1) need to ensure that they have the resources and expertise to make judgments about the quantitative and qualitative aspects of a VAR approach; (2) need to be mindful of the limitations of a VAR approach; and (3) require the market risk charge to be increased over and above the VAR output to address these limitations.

The Report also notes that the adoption of VAR models involves a shift to greater reliance on a firm's controls and therefore requires an enhancement in the supervisors' ability to assess their effectiveness. To address this issue, the IOSCO Technical Committee concurrently published a report entitled Risk Management and Control Guidance for Securities Firms and Their Supervisors, which is based on the premise that, although risk management and controls are an integral part of a well-run securities firm and the industry as a whole, they are not a substitution for adequate capital.

Banks derive a significant amount of their capital requirements from credit risk charges associated with their loan portfolios. Banking regulators therefore have the luxury of having a cushion of capital built into their requirements upon which the recent model-based market risk charges are an addition.

Capital Regulation Issues and Initiatives

Notwithstanding the successes of the Commission's current broker-dealer capital requirements, it is clear that we must reassess the way in which we determine capital charges. The challenges presented by our rapidly evolving securities markets are particularly significant for the Commission's capital requirements:

- We see dramatic growth in the use of significantly more complex financial products, such as customized over-the-counter ("OTC") contracts and complicated options products;
- We see a trend among large securities firms to develop substantial proprietary trading positions in debt and OTC derivatives;
- We are witnessing the opening of many more economic markets worldwide, significant technological advances, and deregulation of various national securities markets - which have created an explosion in international securities trading activities; and
- We see an escalating trend toward increasingly complex corporate structures in the industry, characterized by the emergence of global financial conglomerates.

Accordingly, we believe that certain modifications to the Commission's capital requirements can be made that would better accommodate complex new products and produce predictable capital charges that accurately reflect a firm's risk exposures. However, any modifications to the current requirements must not compromise the high levels of protection now offered by our current broker-dealer financial responsibility regulatory structure.

In May 1993, the Commission began a comprehensive review of the capital rule by issuing a concept release soliciting comment on alternative methods for computing haircuts on derivative financial instruments. Although this concept release's focus was on derivative instruments, the Commission intended to commence a dialogue with the securities industry regarding how the capital rule could better reflect the market and credit risks inherent in a broker-dealer's proprietary securities portfolio.

In March 1995, after discussions with the Commission, the DPG published its Framework for Voluntary Oversight under which the members of the DPG agreed to report voluntarily to the Commission on their activities in the OTC derivative markets by providing credit risk and market risk information and the use of the each firm's proprietary statistical models to measure capital at risk from their OTC derivatives activities.

In February 1997, the Commission completed an important step in its review of the net capital rule by amending the rule to allow broker-dealers to use theoretical option pricing models to determine capital charges for listed equity, index, and currency options and the related positions that hedge these options. This represented the first time the Commission allowed modeling techniques for regulatory capital purposes.

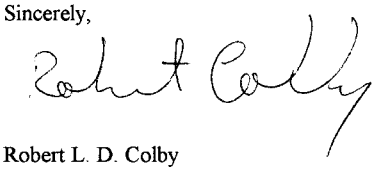
In December 1997, the Commission issued a concept release soliciting comment on how the net capital rule could be modified to incorporate modern risk management techniques as to a broker-dealer's proprietary positions and to reflect the continuing evolution of the securities markets. Specifically, the Commission is seeking comment on how the existing haircut structure could be modified and whether the net capital rule should be amended to allow firms to statistical models to calculate net capital requirements.

Concurrently with the issuance of this concept release, the Commission issued a rule release proposing a new limited regulatory regime for OTC derivatives dealers. As part of this proposal, the Commission is contemplating giving OTC derivatives dealers the option of taking either the existing securities haircuts or haircuts based on statistical models. OTC derivatives dealers electing to use models would have to calculate potential losses and specific capital charges for both market and credit risk. The models used to determine these charges would have to meet certain minimum qualitative and quantitative requirements that are substantially similar to the requirements adopted by the U.S. banking regulators.

The compilation and review of the regulatory and industry approaches to capital and risk of the various securities, banking and insurance agencies within the U.S. financial regulatory community was a monumental task for the GAO staff. As noted above, the Division appreciates the consideration given in the report to its comments and views.

If you have any questions regarding these comments, please contact Michael Macchiaroli, Associate Director, at (202) 942-0131.

Sincerely,



Robert L. D. Colby
Deputy Director

Comments From the Commodity Futures Trading Commission

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

U.S. COMMODITY FUTURES TRADING COMMISSION
Three Lafayette Centre, 1155 21st Street, NW, Washington, DC 20581

Brooksley Born
Chairperson

(202) 418-5030
(202) 418-5520 Facsimile

June 24, 1998

Thomas J. McCool
Director, Financial Institutions and Markets Issues
General Accounting Office
Washington, DC 20548

Dear Mr. McCool:

Thank you for the opportunity to comment on the General Accounting Office (GAO) draft report entitled "RISK-BASED CAPITAL: Regulatory and Industry Approaches to Capital and Risk." I commend you on an in-depth look at an important and timely issue, which will contribute to a broader understanding of the regulatory purposes of capital standards. I am especially appreciative of GAO's responsiveness to CFTC staff's comments on an earlier draft.

For this draft, we have only a relatively minor comment. Specifically, in one place, the draft observes that CFTC capital standards "focus on protecting customers and the markets," correctly reflecting the Commission's dual regulatory concerns for protecting both customers and the markets used by them. However, the paper indicates elsewhere that the focus of the Commission's capital standards is limited to customer funds, without mentioning our concern that the functioning of the futures markets be protected by ensuring that FCMs meet their obligations to other market participants. We recommend that the concerns should be discussed together.

See comment 1

Attached is a staff memorandum suggesting changes related to this point, as well as a few other points regarding mostly editorial concerns with the current draft.

Sincerely yours,

Brooksley Born

Brooksley Born,
Chairperson

The following are GAO's comments on the Commodity Futures Trading Commission's letter dated June 24, 1998.

GAO Comments

1. CFTC commented that the report correctly recognized its concern with protecting both customers and the markets in one place, but that this dual concern was not reflected elsewhere in the report. We have made this correction throughout the report.

Major Contributors to This Report

General Government Division, Washington, D.C.

Lawrence D. Cluff, Assistant Director
Barbara I. Keller, Project Manager
Mitchell B. Rachlis, Senior Economist
Joe E. Hunter, Senior Evaluator
John H. Treanor, Banking Advisor
Desiree W. Whipple, Communications Analyst

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. VISA and MasterCard credit cards are accepted, also. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 37050
Washington, DC 20013

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (202) 512-6061, or TDD (202) 512-2537.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:

info@www.gao.gov

or visit GAO's World Wide Web Home Page at:

http://www.gao.gov

PRINTED ON RECYCLED PAPER

United States
General Accounting Office
Washington, D.C. 20548-0001

Bulk Rate
Postage & Fees Paid
GAO
Permit No. G100

Official Business
Penalty for Private Use $300

Address Correction Requested