

July 2009

# FINANCIAL MARKETS REGULATION

## Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and across System

On July 27, 2009, this report was revised to replace figure 6 on page 41 with the correct graphic.



GAO

Accountability \* Integrity \* Reliability



Highlights of [GAO-09-739](#), a report to congressional committees

## Why GAO Did This Study

The Emergency Economic Stabilization Act directed GAO to study the role of leverage in the current financial crisis and federal oversight of leverage. GAO's objectives were to review (1) how leveraging and deleveraging by financial institutions may have contributed to the crisis, (2) regulations adopted by federal financial regulators to limit leverage and how regulators oversee compliance with the regulations, and (3) any limitations the current crisis has revealed in regulatory approaches used to restrict leverage and regulatory proposals to address them. To meet these objectives, GAO built on its existing body of work, reviewed relevant laws and regulations and academic and other studies, and interviewed regulators and market participants.

## What GAO Recommends

As Congress considers establishing a systemic risk regulator, it should consider the merits of assigning such a regulator with responsibility for overseeing systemwide leverage. As U.S. regulators continue to consider reforms to strengthen oversight of leverage, we recommend that they assess the extent to which reforms under Basel II, a new risk-based capital framework, will address risk evaluation and regulatory oversight concerns associated with advanced modeling approaches used for capital adequacy purposes. In their written comments, the regulators generally agreed with our conclusions and recommendation.

View [GAO-09-739](#) or [key components](#).  
For more information, contact Orice Williams Brown at (202) 512-8678 or [williamso@gao.gov](mailto:williamso@gao.gov).

## FINANCIAL MARKETS REGULATION

### Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and across System

#### What GAO Found

Some studies suggested that leverage steadily increased in the financial sector before the crisis, and deleveraging by financial institutions may have contributed to the crisis. First, the studies suggested that deleveraging by selling financial assets could cause prices to spiral downward during times of market stress. Second, the studies suggested that deleveraging by restricting new lending could slow economic growth. However, other theories also provide possible explanations for the sharp price declines observed in certain assets. As the crisis is complex, no single theory is likely to fully explain what occurred or rule out other explanations. Regulators and market participants we interviewed had mixed views about the effects of deleveraging. Some officials told us that they generally have not seen asset sales leading to downward price spirals, but others said that asset sales have led to such spirals.

Federal regulators impose capital and other requirements on their regulated institutions to limit leverage and ensure financial stability. Federal bank regulators impose minimum risk-based capital and leverage ratios on banks and thrifts and supervise the capital adequacy of such firms through on-site examinations and off-site monitoring. Bank holding companies are subject to similar capital requirements as banks, but thrift holding companies are not. The Securities and Exchange Commission uses its net capital rule to limit broker-dealer leverage and used to require certain broker-dealer holding companies to report risk-based capital ratios and meet certain liquidity requirements. Other important market participants, such as hedge funds, use leverage. Hedge funds typically are not subject to regulatory capital requirements, but market discipline, supplemented by regulatory oversight of institutions that transact with them, can serve to constrain their leverage.

The crisis has revealed limitations in regulatory approaches used to restrict leverage. First, regulatory capital measures did not always fully capture certain risks. For example, many financial institutions applied risk models in ways that significantly underestimated certain risk exposures. As a result, these institutions did not hold capital commensurate with their risks and some faced capital shortfalls when the crisis began. Federal regulators have called for reforms, including through international efforts to revise the Basel II capital framework. The planned U.S. implementation of Basel II would increase reliance on risk models for determining capital needs for certain large institutions. Although the crisis underscored concerns about the use of such models for determining capital adequacy, regulators have not assessed whether proposed Basel II reforms will address these concerns. However, such an assessment is critical to ensure that changes to the regulatory framework address the limitations revealed by the crisis. Second, regulators face challenges in counteracting cyclical leverage trends and are working on reform proposals. Finally, the crisis has reinforced the need to focus greater attention on systemic risk. With multiple regulators responsible for individual markets or institutions, none has clear responsibility to assess the potential effects of the buildup of systemwide leverage or the collective activities of institutions to deleverage.

---

# Contents

---

<b>Letter</b>		<b>1</b>
	Results in Brief	3
	Background	8
	Research Suggests Leverage Increased before the Crisis and Subsequent Deleveraging Could Have Contributed to the Crisis	13
	Regulators Limit Financial Institutions' Use of Leverage Primarily Through Regulatory Capital Requirements	28
	Regulators Are Considering Reforms to Address Limitations the Crisis Revealed in Regulatory Framework for Restricting Leverage, but Have Not Reevaluated Basel II Implementation	49
	Conclusions	70
	Matter for Congressional Consideration	71
	Recommendation for Executive Action	72
	Agency Comments and Our Evaluation	72
<b>Appendix I</b>	<b>Scope and Methodology</b>	<b>76</b>
<b>Appendix II</b>	<b>Briefing to Congressional Staff</b>	<b>79</b>
<b>Appendix III</b>	<b>Transition to Basel II Has Been Driven by Limitations of Basel I and Advances in Risk Management at Large</b>	<b>101</b>
<b>Appendix IV</b>	<b>Three Pillars of Basel II</b>	<b>106</b>
<b>Appendix V</b>	<b>Comments from the Board of Governors of the Federal Reserve System</b>	<b>111</b>
<b>Appendix VI</b>	<b>Comments from the Federal Deposit Insurance Corporation</b>	<b>113</b>

---

<b>Appendix VII</b>	<b>Comments from the Office of the Comptroller of the Currency</b>	115
---------------------	--	-----

---

<b>Appendix VIII</b>	<b>Comments from the Securities and Exchange Commission</b>	117
----------------------	---	-----

---

<b>Appendix IX</b>	<b>Letter from the Federal Reserve Regarding Its Authority to Regulate Leverage and Set Margin Requirements</b>	121
--------------------	---	-----

---

<b>Appendix X</b>	<b>GAO Contact and Staff Acknowledgments</b>	126
-------------------	--	-----

---

<b>Bibliography</b>		127
---------------------	--	-----

---

<b>Related GAO Products</b>		129
-----------------------------	--	-----

---

## **Tables**

Table 1: Comparison of Various Regulatory Reform Proposals to Address Systemic Risk	68
Table 2: U.S. Basel I Credit risk Categories	102

---

## **Figures**

Figure 1: Supervisors for a Hypothetical Financial Holding Company	9
Figure 2: Effect of a Gain or Loss on a Leveraged Institution's Balance Sheet	11
Figure 3: Nominal GDP, Real GDP, Total Debt, and Ratio of Total Debt to Nominal GDP, 2002 to 2007	13

---

---

Figure 4: Total Assets, Total Equity, and Leverage (Assets-to-Equity) Ratio in Aggregate for Five Large U.S. Broker-Dealer Holding Companies, 1998 to 2007	18
Figure 5: Total Assets, Total Equity, and Assets-to-Equity Ratio in Aggregate for Five Large U.S. Bank Holding Companies, 1998 to 2007	19
Figure 6: Ratio of Total Assets to Equity for Four Broker-Dealer Holding Companies, 1998 to 2007	41
Figure 7: Margin Debt and Margin Debt as a Percentage of the Total Capitalization of the NYSE and NASDAQ Stock Markets, 2000 through 2008	48
Figure 8: Foreclosures by Year of Origination—Alt-A and Subprime Loans for the Period 2000 to 2007	52
Figure 9: Example of an Off-Balance Sheet Entity	58
Figure 10: Key Developments and Resulting Challenges That Have Hindered the Effectiveness of the Financial Regulatory System	60
Figure 11: Computation of Wholesale and Retail Capital Requirements under the Advanced Internal Ratings-based Approach for Credit Risk	107

---

---

### Abbreviations

CAMELS	capital, asset quality, management, earnings, liquidity, sensitivity to market risk
CDO	collateralized debt obligations
CORE	capital, organizational structure, risk management, and earnings
CSE	Consolidated Supervised Entity
CFTC	Commodity Futures Trading Commission
FDIC	Federal Deposit Insurance Corporation
FINRA	Financial Industry Regulatory Authority
FSOC	Financial Services Oversight Council
GAAP	Generally Accepted Accounting Principles
GDP	gross domestic product
IG	inspector general
MRA	Market Risk Amendment
NYSE	New York Stock Exchange
OCC	Office of the Comptroller of the Currency
OTC	over the counter
OTS	Office of Thrift Supervision
PCA	Prompt Corrective Action
SEC	Securities and Exchange Commission
SPE	special purpose entity
SRC	systemic risk council
SRO	self-regulatory organization
VaR	value-at-risk

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



United States Government Accountability Office  
Washington, DC 20548

July 22, 2009

## Congressional Committees

The United States is in the midst of the worst financial crisis in more than 75 years. To date, federal regulators and authorities have taken unprecedented steps to stem the unraveling of the financial services sector by committing trillions of dollars of taxpayer funds to rescue financial institutions and restore order to credit markets. Although the current crisis has spread across a broad range of financial instruments, it was initially triggered by defaults on U.S. subprime mortgage loans, many of which had been packaged and sold as securities to buyers in the United States and around the world. With financial institutions from many countries participating in these activities, the resulting turmoil has afflicted financial markets globally and has spurred coordinated action by world leaders in an attempt to protect savings and restore the health of the markets.

The buildup of leverage during a market expansion and the rush to reduce leverage, or “deleverage,” when market conditions deteriorated was common to this and other financial crises. Leverage traditionally has referred to the use of debt, instead of equity, to fund an asset and been measured by the ratio of total assets to equity on the balance sheet. But as witnessed in the current crisis, leverage also can be used to increase an exposure to a financial asset without using debt, such as by using derivatives.<sup>1</sup> In that regard, leverage can be defined broadly as the ratio between some measure of risk exposure and capital that can be used to absorb unexpected losses from the exposure.<sup>2</sup> However, because leverage can be achieved through many different strategies, no single measure can capture all aspects of leverage. Federal financial regulators are responsible for establishing regulations that restrict the use of leverage by financial

---

<sup>1</sup>Derivatives are financial products whose value is determined from an underlying reference rate (interest rates, foreign currency exchange rates); an index (that reflects the collective value of various financial products); or an asset (stocks, bonds, and commodities). Derivatives can be traded through central locations, called exchanges, where buyers and sellers, or their representatives, meet to determine prices; or privately negotiated by the parties off the exchanges or over the counter (OTC).

<sup>2</sup>Capital generally is defined as a firm’s long-term source of funding, contributed largely by a firm’s equity stockholders and its own returns in the form of retained earnings. One important function of capital is to absorb losses.

---

institutions under their authority and supervising their institutions' compliance with such regulations.

On October 3, 2008, the Emergency Economic Stabilization Act of 2008 (the act) was signed into law.<sup>3</sup> The act's purpose is to provide the Secretary of the Department of the Treasury (Treasury) with the authority to restore liquidity and stability to the U.S. financial system and to ensure the economic well-being of Americans. To that end, the act established the Office of Financial Stability within Treasury and authorized the Troubled Asset Relief Program. The act provided Treasury with broad, flexible authorities to buy or guarantee up to \$700 billion in "troubled assets," which include mortgages and mortgage-related instruments, and any other financial instrument the purchase of which Treasury determines is needed to stabilize the financial markets.<sup>4</sup>

The act also established several reporting requirements for GAO. One of these requires the U.S. Comptroller General to "undertake a study to determine the extent to which leverage and sudden deleveraging of financial institutions was a factor behind the current financial crisis."<sup>5</sup> Additionally, the study is to include an analysis of the roles and responsibilities of federal financial regulators for monitoring leverage and the authority of the Board of Governors of the Federal Reserve System (Federal Reserve) to regulate leverage.<sup>6</sup> To address this mandate, we sought to answer the following questions:

1. How have leveraging and deleveraging by financial institutions contributed to the current financial crisis, according to primarily academic and other studies?
2. What regulations have federal financial regulators adopted to try to limit the use of leverage by financial institutions, and how do the regulators oversee the institutions' compliance with the regulations?

---

<sup>3</sup>Pub. L. No. 110-343, div. A, 122 Stat. 3765 (2008), codified at 12 U.S.C. §§ 5201 et seq.

<sup>4</sup>Section 102 of the act, 12 U.S.C. § 5212, authorizes Treasury to guarantee troubled assets originated or issued prior to March 14, 2008, including mortgage-backed securities.

<sup>5</sup>Section 117 of the act, 12 U.S.C. § 5227.

<sup>6</sup>In a May 26, 2009, letter, the Federal Reserve outlined its authority to monitor and regulate leverage and to set margin requirements (see app. IX).

- 
3. What, if any, limitations has the current financial crisis revealed about the regulatory framework used to restrict leverage, and what changes have regulators and others proposed to address these limitations?

To satisfy our responsibility under the act's mandate to report the results of this work by June 1, 2009, we provided an interim report on the results of this work in the form of a briefing to the committees' staffs on May 27, 2009. Appendix II contains the full briefing. This letter represents the final report.

To address our objectives, we reviewed and analyzed academic and other studies assessing the buildup of leverage prior to the current financial crisis and the economic mechanisms that possibly helped the mortgage-related losses spread to other markets and expand into the current crisis. We reviewed and analyzed relevant laws and regulations, and other regulatory guidance and materials, related to the oversight of financial institutions' use of leverage by the Federal Reserve, Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), Office of Thrift Supervision (OTS), and Securities and Exchange Commission (SEC). We also collected and analyzed various data to illustrate leverage and other relevant trends. We assessed the reliability of the data and found that they were sufficiently reliable for our purposes. In addition, we interviewed staff from these federal financial regulators and officials from two securities firms, a bank, and a credit rating agency. We also reviewed and analyzed studies done by U.S. and international regulators and others identifying limitations in the regulatory framework used to restrict leverage and proposals to address such limitations. Finally, we reviewed prior GAO work on the financial regulatory system.

The work upon which this report is based was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This work was conducted between February and July 2009. A more extensive discussion of our scope and methodology appears in appendix I.

---

## Results in Brief

According to studies we reviewed, leverage steadily increased within the financial sector before the crisis began around mid-2007, and banks, securities firms, hedge funds, and other financial institutions have sought

---

to deleverage and reduce their risk since the onset of the crisis. Some studies suggested that the efforts taken by financial institutions to deleverage by selling financial assets and restricting new lending could have contributed to the current crisis. First, some studies we reviewed suggested that deleveraging through asset sales could trigger downward spirals in financial asset prices. In times of market crisis, a sharp drop in an asset's price can lead investors to sell the asset, which could push the asset's price even lower. For leveraged institutions holding the asset, the impact of their losses on capital will be magnified. The subsequent price decline could induce additional sales that cause the asset's price to fall further. In the extreme, this downward asset spiral could cause the asset's price to be set below its fundamental value, or at a "fire sale" price. In addition, a decline in a financial asset's price could trigger sales, when the asset is used as collateral for a loan. In such a case, the borrower could be required to post additional collateral for its loan, but if the borrower could not do so, the lender could take ownership of the collateral and then sell it, which could cause the asset's price to decline further. However, other theories, such as that the current market prices are the result of asset prices reverting to their fundamental values after a period of overvaluation, provide possible explanations for the sharp price declines in mortgage-related securities and other financial instruments. As the crisis is complex, no single theory likely is to explain in full what occurred. Second, some studies we reviewed suggested that deleveraging by restricting new lending could contribute to the crisis by slowing economic growth. In short, the concern is that banks, because of their leverage, will need to cut back their lending by a multiple of their credit losses. Moreover, rapidly declining asset prices can inhibit the ability of borrowers to raise money in the securities markets. Financial regulators and market participants we interviewed had mixed views about the effects of deleveraging by financial institutions in the current crisis. Some regulatory officials and market participants told us that they generally have not seen asset sales leading to downward price spirals, but others said that asset sales involving a variety of debt instruments have contributed to such spirals. Regulatory and credit rating agency officials told us that banks have tightened their lending standards for some loans, such as ones with less favorable risk-adjusted returns. They also said that some banks rely on the securities markets to help them fund loans and, thus, need conditions in the securities markets to improve. As we have discussed in our prior work, since the crisis began, federal regulators and

---

authorities have undertaken a number of steps to facilitate financial intermediation by banks and the securities markets.<sup>7</sup>

Federal financial regulators generally impose capital and other requirements on their regulated institutions as a way to limit the use of leverage and ensure the stability of the financial system and markets. Specifically, federal banking and thrift regulators have imposed minimum risk-based capital and leverage ratios on their regulated institutions. The risk-based capital ratios generally are designed to require banks and thrifts to hold more capital for more risky assets. Although regulators have imposed minimum leverage ratios on regulated institutions, some regulators told us that they primarily focus on the risk-based capital ratios to limit the use of leverage. In addition, they supervise the capital adequacy of their regulated institutions through on-site examinations and off-site monitoring. Bank holding companies are subject to capital and leverage ratio requirements similar to those imposed on banks, but thrift holding companies are not subject to such requirements. Instead, capital levels of thrift holding companies are individually evaluated based on each company's risk profile. SEC primarily uses its net capital rule to limit the use of leverage by broker-dealers. The rule serves to protect market participants from broker-dealer failures and to enable broker-dealers that fail to meet the rule's minimum requirements to be liquidated in an orderly fashion. For the holding companies of broker-dealers that participated in SEC's discontinued Consolidated Supervised Entity (CSE) program, they calculated their risk-based capital ratios in a manner designed to be consistent with the method used by banks.<sup>8</sup> In addition to the capital ratio, SEC imposed a liquidity requirement on CSE holding companies. Other financial institutions, such as hedge funds, have become important participants in the financial markets, and many use leverage. But, unlike banks and broker-dealers, hedge funds typically are not subject to regulatory capital requirements that limit their use of leverage. Rather,

---

<sup>7</sup>For example, see, GAO, *Troubled Asset Relief Program: March 2009 Status of Efforts to Address Transparency and Accountability Issues*, [GAO-09-504](#) (Washington, D.C.: Mar. 31, 2009).

<sup>8</sup>Under its CSE program, SEC supervised five broker-dealer holding companies—Bear Stearns, Lehman Brothers, Merrill Lynch, Goldman Sachs, and Morgan Stanley—on a consolidated basis. Following the sale of Bear Stearns to JPMorgan Chase, the Lehman Brothers bankruptcy filing, and the sale of Merrill Lynch to Bank of America, the remaining CSEs opted to become bank holding companies subject to Federal Reserve oversight. SEC terminated the CSE program in September 2008 but continues to oversee these firms' registered broker-dealer subsidiaries.

---

their use of leverage is to be constrained primarily through market discipline, supplemented by regulatory oversight of banks and broker-dealers that transact with hedge funds as creditors and counterparties. Finally, the Federal Reserve regulates the use of securities as collateral to finance security purchases, but federal financial regulators told us that such credit did not play a significant role in the buildup of leverage in the current crisis.

The financial crisis has revealed limitations in existing regulatory approaches that serve to restrict leverage. Federal financial regulators have proposed reforms, but have not yet fully evaluated the extent to which these proposals would address these limitations. First, although large banks and broker-dealers generally held capital above the minimum regulatory capital requirements prior to the crisis, regulatory capital measures did not always fully capture certain risks, particularly those associated with some mortgage-related securities held on and off their balance sheets. As a result, a number of these institutions did not hold capital commensurate with their risks and some lacked adequate capital or liquidity to withstand the market stresses of the crisis. Federal financial regulators have acknowledged the need to improve the risk coverage of the regulatory capital framework and are considering reforms to better align capital requirements with risk. Furthermore, the crisis highlighted past concerns about the approach to be taken under Basel II, a new risk-based capital framework based on an international accord, such as the ability of banks' models to adequately measure risks for regulatory capital purposes and the regulators' ability to oversee them. Federal financial regulators have not formally assessed the extent to which Basel II reforms proposed by U.S. and international regulators may address these concerns. Such an assessment is critical to ensure that Basel II reforms, particularly those that would increase reliance on complex risk models for determining capital needs, do not exacerbate regulatory limitations revealed by the crisis. Second, the crisis illustrated how the existing regulatory framework, along with other factors, might have contributed to cyclical leverage trends that potentially exacerbated the current crisis. For example, minimum regulatory capital requirements may not provide adequate incentives for banks to build loss-absorbing capital buffers in benign markets when it is relatively less expensive to do so. When market conditions deteriorated, minimum capital requirements became binding for many institutions that lacked adequate buffers to absorb losses and faced sudden pressures to deleverage. As discussed, actions taken by individual institutions to deleverage by selling assets in stressed markets may exacerbate a financial crisis. Regulators are considering several options to counteract potentially harmful cyclical leverage trends, but

---

implementation of these proposals presents challenges. Finally, the financial crisis has illustrated the potential for financial market disruptions, not just firm failures, to be a source of systemic risk. As some studies we reviewed suggested, ensuring the solvency of individual institutions may not be sufficient to protect the stability of the financial system, in part because of the potential for deleveraging by institutions to have negative spillover effects. In our prior work, we have noted that a regulatory system should focus on risk to the financial system, not just institutions.<sup>9</sup> With multiple regulators primarily responsible for individual markets or institutions, none of the financial regulators has clear responsibility to assess the potential effects of the buildup of leverage and deleveraging by a few institutions or by the collective activities of the industry for the financial system. As a result, regulators may be limited in their ability to prevent or mitigate future financial crises.

To ensure that there is a systemwide approach to addressing leverage-related issues across the financial system, we are providing a matter for congressional consideration. In particular, as Congress moves toward the creation of a systemic risk regulator, it should consider the merits of tasking this entity with the responsibility for measuring and monitoring systemwide leverage and evaluating options to limit procyclical leverage trends. Furthermore, to address concerns about the Basel II approach highlighted by the current financial crisis, we are making one recommendation to the heads of the Federal Reserve, FDIC, OCC, and OTS. Specifically, these regulators should assess the extent to which Basel II reforms may address risk evaluation and regulatory oversight concerns associated with advanced modeling approaches used for capital adequacy purposes.

We provided the heads of the Federal Reserve, FDIC, OCC, OTS, SEC, and Treasury with a draft of this report for their review and comment. We received written comments from the Federal Reserve, FDIC, OCC, and SEC, which are reprinted in appendices V through VIII, respectively. The regulators generally agreed with our conclusions and recommendation. We did not receive written comments from OTS and Treasury. Except for Treasury, the agencies also provided technical comments that we incorporated in the report where appropriate.

---

<sup>9</sup>See GAO, *Financial Regulation: A Framework for Crafting and Assessing Proposals to Modernize the Outdated U.S. Financial Regulatory System*, [GAO-09-216](#) (Washington, D.C.: Jan. 8, 2009).

---

## Background

The financial services industry comprises a broad range of financial institutions—including broker-dealers, banks, government-sponsored enterprises, hedge funds, insurance companies, and thrifts. Moreover, many of these financial institutions are part of a holding company structure, such as a bank or financial holding company.<sup>10</sup> In the United States, large parts of the financial services industry are regulated under a complex system of multiple federal and state regulators, and self-regulatory organizations (SRO) that operate largely along functional lines (see fig. 1).<sup>11</sup> Such oversight serves, in part, to help ensure that the financial institutions do not take on excessive risk that could undermine their safety and soundness. Primary bank supervisors—the Federal Reserve, FDIC, OCC, and OTS—oversee banks and thrifts according to their charters. Functional supervisors—primarily SEC, the Commodity Futures Trading Commission (CFTC), SROs, and state insurance regulators—oversee entities engaged in the securities and insurance industries as appropriate. Consolidated supervisors oversee holding companies that contain subsidiaries that have primary bank or functional supervisors—the Federal Reserve oversees bank holding companies and OTS oversees thrift holding companies.<sup>12</sup> In the last few decades, nonbank lenders, hedge funds, and other firms have become important participants in the financial services industry but are unregulated or less regulated.

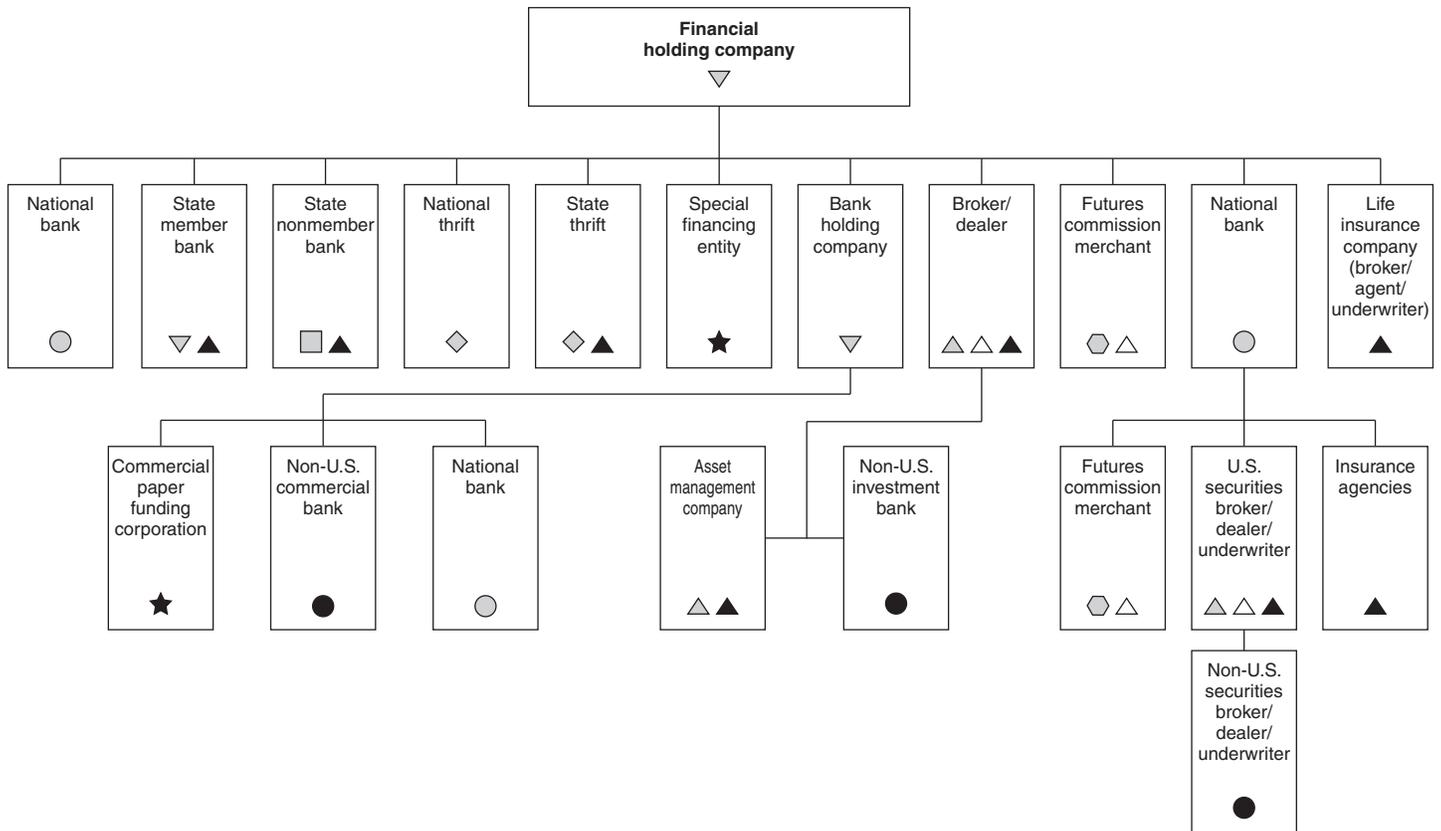
---

<sup>10</sup>For more detailed information about bank and financial holding companies, see GAO, *Financial Market Regulation: Agencies Engaged in Consolidated Supervision Can Strengthen Performance Measurement and Collaboration*, [GAO-07-154](#) (Washington, D.C.: Mar. 15, 2007).

<sup>11</sup>For a more detailed discussion of the regulatory structure, see [GAO-07-154](#) and [GAO-09-216](#).

<sup>12</sup>As discussed below, SEC used to oversee certain broker-dealer holding companies on a consolidated basis.

**Figure 1: Supervisors for a Hypothetical Financial Holding Company**



- |                         |       |                      |
|-------------------------|-------|----------------------|
| U.S. federal regulators |       | Other                |
| ⬡ CFTC                  | ◇ OTS | ▲ State regulator    |
| ■ FDIC                  | △ SEC | ● Non-U.S. regulator |
| ▽ Federal Reserve       | △ SRO | ★ Unregulated        |
| ○ OCC                   |       |                      |

Source: GAO.

To varying degrees, all financial institutions are exposed to a variety of risks that create the potential for financial loss associated with

- failure of a borrower or counterparty to perform on an obligation—credit risk;
- broad movements in financial prices—interest rates or stock prices—market risk;

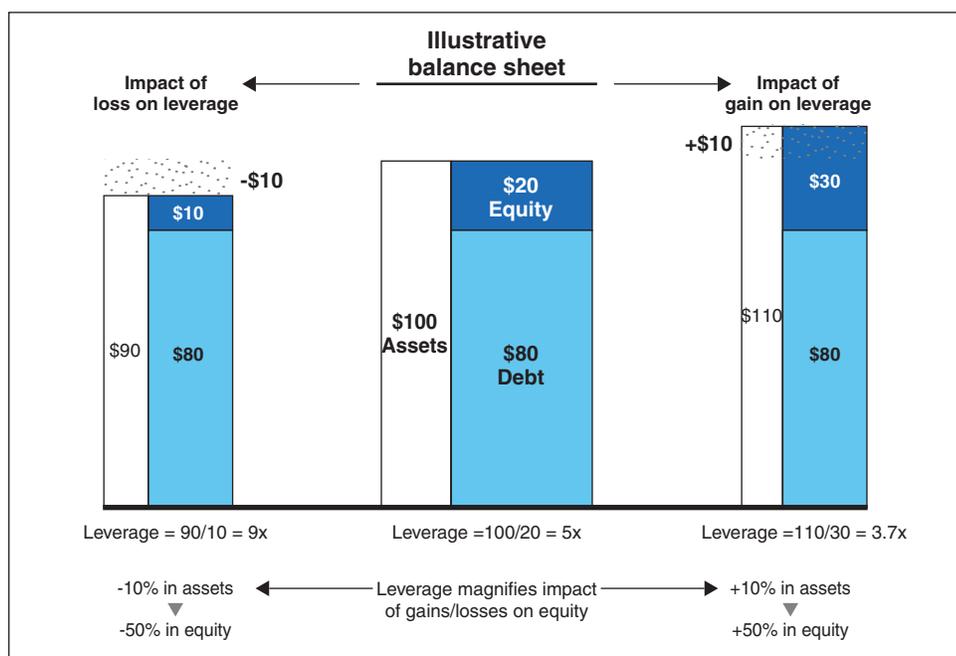
- 
- failure to meet obligations because of inability to liquidate assets or obtain funding—liquidity risk;
  - inadequate information systems, operational problems, and breaches in internal controls—operational risk;
  - negative publicity regarding an institution’s business practices and subsequent decline in customers, costly litigation, or revenue reductions—reputation risk;
  - breaches of law or regulation that may result in heavy penalties or other costs—legal risk;
  - risks that an insurance underwriter takes in exchange for premiums—insurance risk; and
  - events not covered above, such as credit rating downgrades or factors beyond the control of the firm, such as major shocks in the firm’s markets—business/event risk.

In addition, the industry as a whole is exposed to systemic risk, the risk that a disruption could cause widespread difficulties in the financial system as a whole.

Many financial institutions use leverage to expand their ability to invest or trade in financial assets and to increase their return on equity. A firm can use leverage through a number of strategies, including by using debt to finance an asset or entering into derivatives. Greater financial leverage, as measured by lower proportions of capital relative to assets, can increase the firm’s market risk, because leverage magnifies gains and losses relative to equity. Leverage also can increase a firm’s liquidity risk, because a leveraged firm may be forced to sell assets under adverse market conditions to reduce its exposure. As illustrated in figure 2, a 10 percent decline in the value of assets of an institution with an assets-to-equity ratio of 5-to-1 would deplete the institution’s equity by 50 percent. Although commonly used as a leverage measure, the ratio of assets to equity captures only on-balance sheet assets and treats all assets as equally risky. Moreover, the ratio of assets to equity helps to measure the extent to which a change in total assets would affect equity but provides no information on the probability of such a change occurring. Finally, a leveraged position may not be more risky than a non-leveraged position, when other aspects of the position are not equal. For example, a non-

leveraged position in a highly risky asset could be more risky than a leveraged position in a low risk asset.

**Figure 2: Effect of a Gain or Loss on a Leveraged Institution's Balance Sheet**



Source: GAO.

During the 1980s, banking regulators became concerned that simple leverage measures—such as the ratio of assets to equity or debt to equity—required too much capital for less-risky assets and not enough for riskier assets. Another concern was that such measures did not require capital for growing portfolios of off-balance sheet items. In response to these concerns, the Basel Committee on Banking Supervision adopted Basel I, an international framework for risk-based capital that required banks to meet minimum risk-based capital ratios, in 1988.<sup>13</sup> By 1992, U.S.

<sup>13</sup>The Basel Committee on Banking Supervision (Basel Committee) seeks to improve the quality of banking supervision worldwide, in part by developing broad supervisory standards. The Basel Committee consists of central bank and regulatory officials from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The Basel Committee's supervisory standards are also often adopted by nonmember countries.

---

regulators had fully implemented Basel I; and in 1996, they and supervisors from other Basel Committee member countries amended the framework to include explicit capital requirements for market risk from trading activity (called the Market Risk Amendment).<sup>14</sup> In response to the views of bankers and many regulators that innovation in financial markets and advances in risk management have revealed limitations in the existing Basel I risk-based capital framework, especially for large, complex banks, the Basel Committee released the Basel II international accord in 2004. (App. III discusses limitations of Basel I, and app. IV describes the three pillars of Basel II.) Since then, individual countries have been implementing national rules based on the principles and detailed framework. In a prior report, we discussed the status of efforts by U.S. regulators to implement the Basel II accord.<sup>15</sup>

The dramatic decline in the U.S. housing market precipitated a decline in the price of financial assets around mid-2007 that were associated with housing, in particular mortgage assets based on subprime loans that lost value as the housing boom ended and the market underwent a dramatic correction. Some institutions found themselves so exposed that they were threatened with failure—and some failed—because they were unable to raise the necessary capital as the value of their portfolios declined. Other institutions, ranging from government-sponsored enterprises such as Fannie Mae and Freddie Mac to large securities firms, were left holding “toxic” mortgages or mortgage-related assets that became increasingly difficult to value, were illiquid, and potentially had little worth. Moreover, investors not only stopped buying securities backed by mortgages but also became reluctant to buy securities backed by many types of assets. Because of uncertainty about the financial condition and solvency of financial entities, the prices banks charged each other for funds rose dramatically, and interbank lending effectively came to a halt. The resulting liquidity and credit crunch made the financing on which businesses and individuals depend increasingly difficult to obtain as cash-strapped banks held on to their assets. By late summer of 2008, the potential ramifications of the financial crisis ranged from the continued failure of financial institutions to increased losses of individual savings

---

<sup>14</sup>According to OTS staff, OTS did not adopt the capital requirements for trading book market risk.

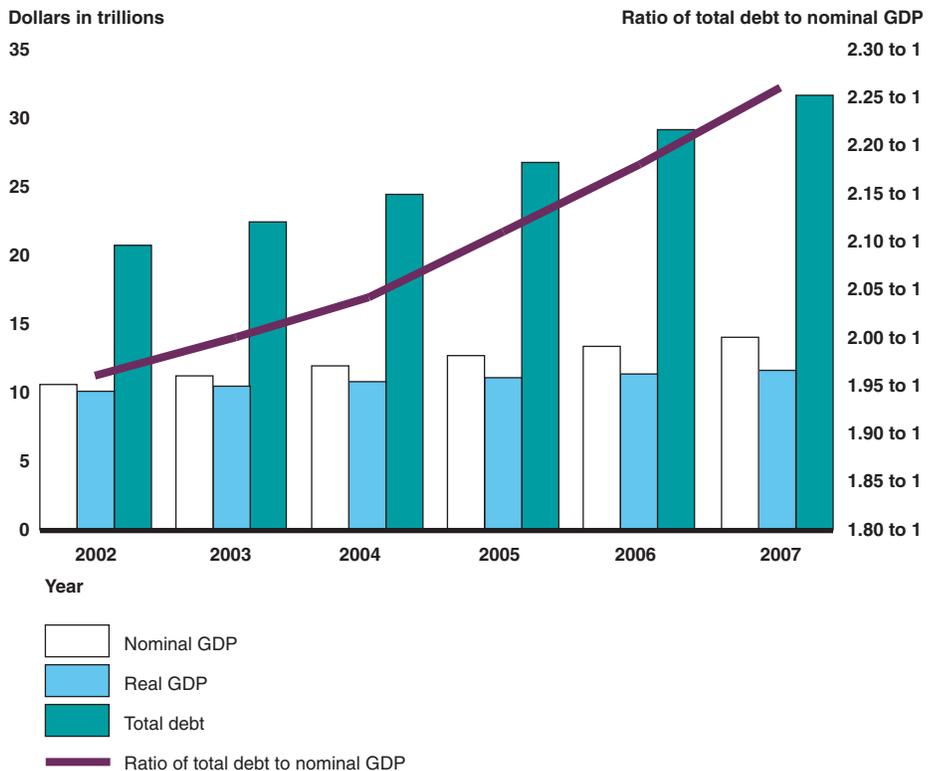
<sup>15</sup>GAO, *Risk-Based Capital: New Basel II Rules Reduced Certain Competitive Concerns, but Bank Regulators Should Address Remaining Uncertainties*, [GAO-08-953](#) (Washington, D.C.: Sept. 12, 2008).

and corporate investments and further tightening of credit that would exacerbate the emerging global economic slowdown that was beginning to take shape.

## Research Suggests Leverage Increased before the Crisis and Subsequent Deleveraging Could Have Contributed to the Crisis

The current financial crisis is complex and multifaceted; and likewise, so are its causes, which remain subject to debate and ongoing research. Before the current crisis, leverage broadly increased across the economy. For example, as shown in figure 3, total debt in the United States increased from \$20.7 trillion to \$31.7 trillion, or by nearly 53 percent, from year-end 2002 to year-end 2007, and the ratio of total debt to gross domestic product (GDP) increased from 1.96 to 1 to 2.26 to 1, or by 15 percent, during the same period. In general, the more leveraged an economy, the more prone it is to crisis generated by moderate economic shocks.

**Figure 3: Nominal GDP, Real GDP, Total Debt, and Ratio of Total Debt to Nominal GDP, 2002 to 2007**



Source: GAO analysis of the Federal Reserve's Flow of Funds data and the Bureau of Economic Analysis's GDP data.

---

According to many researchers, the crisis initially was triggered by defaults on U.S. subprime mortgages around mid-2007. Academics and others have identified a number of factors that possibly helped fuel the housing boom, which helped set the stage for the subsequent problems in the subprime mortgage market. These factors include

- imprudent mortgage lending that permitted people to buy houses they could not afford;
- securitization of mortgages that reduced originators' incentives to be prudent;
- imprudent business and risk management decisions based on the expectation of continued housing price appreciation;
- faulty assumptions in the models used by credit rating agencies to rate mortgage-related securities;
- establishment of off-balance sheet entities by banks to hold mortgages or mortgage-related securities that allowed banks to make more loans during the expansion; and
- economic conditions, characterized by permissive monetary policies, ample liquidity and availability of credit, and low interest rates that spurred housing investment.<sup>16</sup>

Around mid-2007, the losses in the subprime mortgage market triggered a reassessment of financial risk in other debt instruments and sparked the current financial crisis. Academics and others have identified a number of economic mechanisms that possibly helped to cause the relatively small subprime mortgage-related losses to become a financial crisis. However, given our mandate, our review of the economic literature focused narrowly on deleveraging by financial institutions as one of the potential mechanisms.<sup>17</sup> (See the bibliography for the studies included in our literature review.) The studies we reviewed do not provide definitive

---

<sup>16</sup>See, for example, Mark Jickling, Causes of the Financial Crisis, Congressional Research Service, R40173 (Washington, D.C.: Jan. 29, 2009).

<sup>17</sup>Our review of the literature included primarily academic studies analyzing the events surrounding the current financial crisis. Because the crisis began around mid-2007, we limited the scope of our literature search to studies issued after June 2007. These studies include published papers and working papers.

---

findings about the role of deleveraging relative to other mechanisms, and we relied on our interpretation and reasoning to develop insights from the studies reviewed. Other theories that do not involve deleveraging may provide possible explanations for the sharp price declines in mortgage-related securities and other financial instruments. Because such theories are largely beyond the scope of our work, we discuss them only in brief.

---

### Leverage within the Financial Sector Increased before the Financial Crisis, and Financial Institutions Have Sought to Deleverage Since the Crisis Began

Leverage steadily increased in the financial sector during the prolonged rise in housing and other asset prices and created vulnerabilities that have increased the severity of the crisis, according to studies we reviewed.<sup>18</sup> Leverage can take many different forms, and no single measure of leverage exists; in that regard, the studies generally identified a range of sources that aided in the buildup of leverage before the crisis. One such source was the use of short-term debt, such as repurchase agreements, by financial institutions to help fund their assets.<sup>19</sup> The reliance on short-term funding made the institutions vulnerable to a decline in the availability of such credit.<sup>20</sup> Another source of leverage was special purpose entities (SPE), which some banks created to buy and hold mortgage-related and other assets that the banks did not want to hold on their balance sheets.<sup>21</sup>

---

<sup>18</sup>See, for example, Financial Services Authority, *The Turner Review: A Regulatory Response to the Global Banking Crisis* (London: March 2009); Willem H. Buiter, "Lessons from the North Atlantic Financial Crisis," paper prepared for presentation at the conference "The Role of Money Markets," jointly organized by Columbia Business School and the Federal Reserve Bank of New York on May 29-30, 2008 (May 2008); Martin Neil Baily, Robert E. Litan, and Matthew S. Johnson, "The Origins of the Financial Crisis," *Fixing Finance Series-Paper 3*, (Washington, D.C.: The Brookings Institution, November 2008); and Ben Cohen and Eli Remolona, "The Unfolding Turmoil of 2007–2008: Lessons and Responses," Proceedings of a Conference, Sydney, Australia, Reserve Bank of Australia, Sydney.

<sup>19</sup>Under a repurchase agreement, a borrower generally acquires funds by selling securities to a lender and agreeing to repurchase the securities after a specified time at a given price. Such a transaction is called a repurchase agreement when viewed from the perspective of the borrower, and a reverse repurchase agreement from the point of view of the lender.

<sup>20</sup>For example, a market observer commented that Lehman Brothers' failure stemmed partly from the firm's high level of leverage and use of short-term debt. According to the market observer, Lehman Brothers used short-term debt to finance more than 50 percent of its assets at the beginning of the crisis, which is a profitable strategy in a low interest rate environment but increases the risk of "runs" similar to the ones a bank faces when it is rumored to be insolvent. Any doubt about the solvency of the borrower makes short-term lenders reluctant about renewing their lending.

<sup>21</sup>See, for example, Acharya, V. and P. Schnabl, How Banks Played the Leverage "Game"? in Acharya, V., Richardson, M. (Eds.) *Restoring Financial Stability: How to Repair a Failed System*, John Wiley and Sons (chap. 2) (2009).

---

To obtain the funds to purchase their assets, SPEs often borrowed by issuing shorter-term instruments, such as commercial paper and medium-term notes, but this strategy exposed the SPEs to the risk of not being able to renew their debt. Similarly, to expand their funding sources or provide additional capacity on their balance sheets, financial institutions securitized mortgage-backed securities, among other assets, to form collateralized debt obligations (CDO). In a basic CDO, a group of debt securities are pooled, and securities are then issued in different tranches (or slices) that vary in risk and return. Through pooling and slicing, CDOs can give investors an embedded leveraged exposure.<sup>22</sup> Finally, the growth in credit default swaps, a type of OTC derivative, was another source of leverage. Credit default swaps aided the securitization process by providing credit enhancements to CDO issuers and provided financial institutions with another way to leverage their exposure to the mortgage market.

For securities firms, hedge funds, and other financial intermediaries that operate mainly through the capital markets, their balance sheet leverage, or ratio of total assets to equity, tends to be procyclical.<sup>23</sup> Historically, such institutions tended to increase their leverage when asset prices rose and decrease their leverage when asset prices fell.<sup>24</sup> One explanation for this behavior is that they actively measure and manage the risk exposure of their portfolios by adjusting their balance sheets. For a given amount of equity, an increase in asset prices will lower a firm's measured risk exposure and allow it to expand its balance sheet, such as by increasing its debt to buy more assets. Because measured risk typically is low during booms and high during busts, the firm's efforts to control its risk will lead to procyclical leverage. Another possible factor leading financial institutions to manage their leverage procyclically is their use of fair value accounting to revalue their trading assets periodically at current market

---

<sup>22</sup>For a discussion of embedded leverage in CDOs, see The Joint Forum, Credit Risk Transfer, Basel Committee on Banking Supervision (Basel, Switzerland: October 2004).

<sup>23</sup>We use the term "securities firms" generally to refer to the holding companies of broker-dealers.

<sup>24</sup>See, for example, Adrian, Tobias, and Hyun Song Shin, "Liquidity, Financial Cycles and Monetary Policy," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, vol. 14, no. 1, January/February 2008.

---

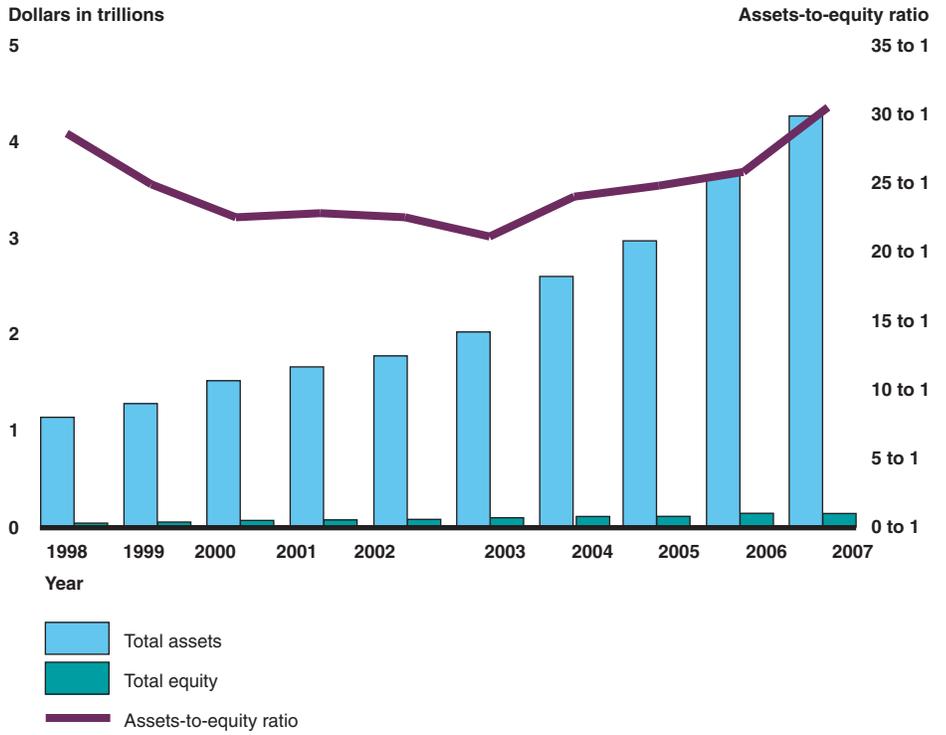
values.<sup>25</sup> When asset prices rise, financial institutions holding the assets recognize a gain that increases their equity and decreases their leverage ratio. In turn, the institutions will seek profitable ways to use their increase in equity by expanding their balance sheets and thereby increasing their leverage. Consistent with this research, the ratio of assets to equity for five large broker-dealer holding companies, in aggregate, increased from an average ratio of around 22 to 1 in 2002 to around 30 to 1 in 2007 (see fig. 4).<sup>26</sup> In contrast, the ratio of assets to equity for five large bank holding companies, in aggregate, was relatively flat during this period (see fig. 5). As discussed in the background, the ratio of assets to equity treats all assets as equally risky and does not capture off-balance sheet risks.

---

<sup>25</sup>Fair value accounting, also called “mark-to-market,” is a way to measure assets and liabilities that appear on a company’s balance sheet and income statement. Measuring companies’ assets and liabilities at fair value may affect their income statement. For more detailed information, see SEC’s Office of Chief Accountant and Division of Corporate Finance, “Report and Recommendations Pursuant to Section 133 of the Emergency Economic Stabilization Act of 2008: Study on Mark-To-Market Accounting” (Washington, D.C.: Dec. 30, 2008).

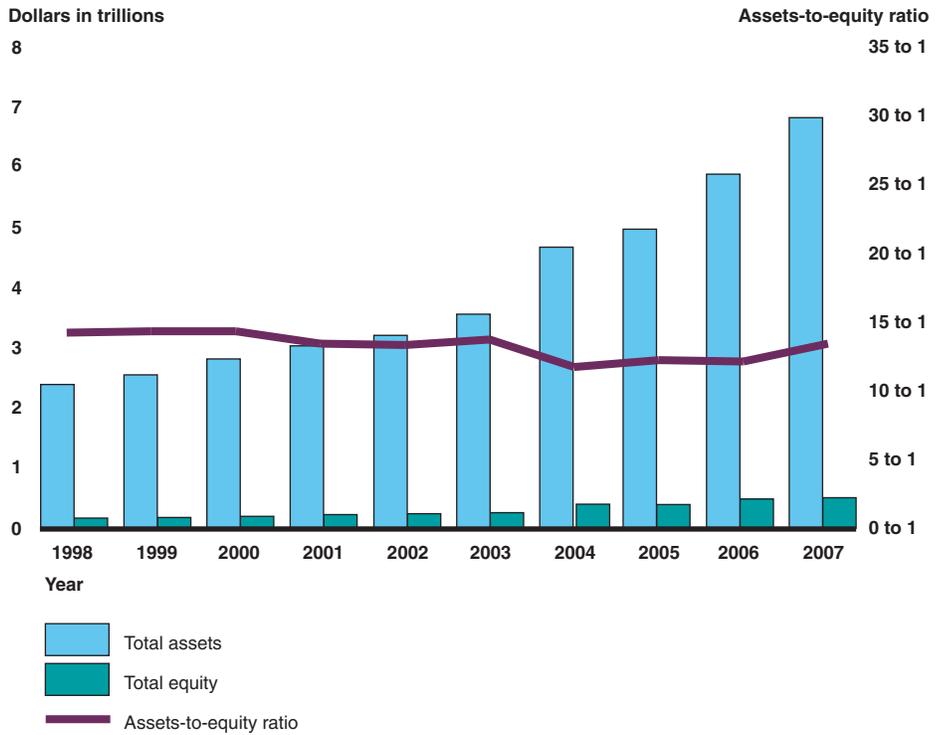
<sup>26</sup>The 30-to-1 ratio of assets to equity is not unprecedented. In 1998, four of the five broker-dealer holding companies had assets-to-equity ratio equal to or greater than 30 to 1.

**Figure 4: Total Assets, Total Equity, and Leverage (Assets-to-Equity) Ratio in Aggregate for Five Large U.S. Broker-Dealer Holding Companies, 1998 to 2007**



Source: GAO analysis of annual report data for Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley.

**Figure 5: Total Assets, Total Equity, and Assets-to-Equity Ratio in Aggregate for Five Large U.S. Bank Holding Companies, 1998 to 2007**



Source: GAO analysis of annual report and Federal Reserve Y-9C data for Bank of America, Citigroup, JPMorgan Chase, Wachovia, and Wells Fargo.

The securitization of subprime mortgages and other loans can enable banks and securities firms to transfer credit risk from their balance sheets to parties more willing or able to manage that risk. However, the current crisis has revealed that much of the subprime mortgage exposure and losses have been concentrated among leveraged financial institutions, including banks, securities firms, and hedge funds.<sup>27</sup> For example, some banks and securities firms ended up with large exposures because they (1) were holding mortgages or mortgage-related securities for trading or investment purposes, (2) were holding mortgages or mortgage-related securities in inventory, or warehouses, that they planned to securitize but could not do so after the crisis began, or (3) brought onto their balance

<sup>27</sup>See, for example, David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, "Leveraged Losses: Lessons from the Mortgage Meltdown," paper for the U.S. Monetary Policy Forum (2008).

---

sheets mortgage-related securities held by SPEs. According to an equity analyst report, 10 large banks and securities firms had over \$24 billion and \$64 billion in writedowns in the third and fourth quarters of 2007, respectively.<sup>28</sup> Importantly, higher leverage magnifies market risk and can magnify liquidity risk if leveraged firms experiencing losses are forced to sell assets under adverse market conditions.

As their mortgage-related and other losses grew after the onset of the crisis, banks, securities firms, hedge funds, and other financial institutions have attempted to deleverage and reduce their risk. Deleveraging can cover a range of strategies, including raising new equity, reducing dividend payouts, diversifying sources of funds, selling assets, and reducing lending. After the crisis began, U.S. banks and securities firms initially deleveraged by raising more than \$200 billion in new capital from private sources and sovereign wealth funds.<sup>29</sup> However, raising capital began to be increasingly difficult in the subsequent period, and financial institutions have deleveraged by selling assets, including financial instruments and noncore businesses. For example, in the fourth quarter of 2008, broker-dealers reduced assets by nearly \$785 billion and banks reduced bank credit by nearly \$84 billion.

---

<sup>28</sup>Meredith Whitney, Kaimon Chung, and Joseph Mack, "No Bad Bank Please," Oppenheimer Equity Research Industry Update, Financial Institutions (New York: Jan. 29, 2009).

<sup>29</sup>Sovereign wealth funds generally are pools of government funds invested in assets in other countries.

---

## Some Studies Suggested That Deleveraging Could Have Led to Downward Spirals in Asset Prices, but Other Theories also May Explain Price Declines

Some studies we reviewed highlighted the possibility that deleveraging through asset sales by financial institutions could trigger downward spirals in asset prices and contribute to a financial crisis.<sup>30</sup> These studies generally build on a broader theory that holds a market disruption, such as a sharp drop in asset prices, can be a source of systemic risk under certain circumstances.<sup>31</sup> Today, the securities markets, rather than banks, are the primary source of financial intermediation—the channeling of capital to investment opportunities. For example, in 1975, banks and thrifts held 56 percent of the total credit to households and businesses; by 2007, they held less than 30 percent.<sup>32</sup> To function efficiently, the securities markets need market liquidity, generally defined as the ability to buy and sell a particular asset without significantly affecting its price. According to the theory, a sharp decline in an asset’s price can become self-sustaining and lead to a financial market crisis. Following a sharp decline in an asset’s price, investors normally will buy the asset after they deem its price has dropped enough and help stabilize the market, but in times of crisis, investors are unable or unwilling to buy the asset. As the asset’s price declines, more investors sell and push the price lower. At the extreme, the asset market’s liquidity dries up and market gridlock takes hold. However, not all academics subscribe to this theory, but because the alternative theories are largely beyond the scope of our work, we only discuss them briefly.

Some studies we reviewed suggested that deleveraging through asset sales can lead to a downward asset spiral during times of market stress when market liquidity is low. Following a drop in an asset’s price, one or more financial institutions may sell the asset. As noted above, certain financial institutions tend to adjust their balance sheets in a procyclical manner

---

<sup>30</sup>See, for example, Markus K. Brunnermeier, “Deciphering the 2007-08 Liquidity and Credit Crunch,” *Journal of Economic Perspectives* 23, no. 1 (2009), pp. 77-100; Greenlaw et al. (2008); and Anil K. Kashyap, Raghuram G. Rajan, and Jeremy C. Stein, “Rethinking Capital Regulation,” paper prepared for Federal Reserve Bank of Kansas City symposium on “Maintaining Stability in a Changing Financial System,” Jackson Hole, Wyoming, August 21-23, 2008 (September 2008).

<sup>31</sup>Darryll Hendricks, John Kambhu, and Patricia Mosser, “Systemic Risk and the Financial System, Appendix B: Background Paper,” *Federal Reserve Bank of New York Economic Policy Review* (November 2007).

<sup>32</sup>A full analysis of the role played by banks in financial intermediation would need to consider the share of credit intermediated or securitized by affiliates, subsidiaries, and sponsored investment vehicles of bank holding companies and financial holding companies.

---

and, thus, may react in concert to a drop in an asset's price by selling the asset. When market liquidity is low, asset sales may cause further price declines. Under fair value accounting, financial institutions holding the asset will revalue their positions based on the asset's lower market value and record a loss that reduces their equity. For leveraged institutions holding the asset, the impact of their losses on capital will be magnified. To lower their leverage or risk, the institutions may sell more of their asset holdings, which can cause the asset's price to drop even more and induce another round of selling. In other words, when market liquidity is low, namely in times of market stress, asset sales establish lower market prices and result in financial institutions marking down their positions—potentially creating a reinforcing cycle of deleveraging. In the extreme, this downward asset spiral could cause the asset's price to be set below its fundamental value, or at a “fire sale” price.

Some studies we reviewed also suggested that deleveraging through asset sales could lead to a downward asset spiral when funding liquidity is low. In contrast to market liquidity, which is an asset-specific characteristic, funding liquidity generally refers to the availability of funds in the market that firms can borrow to meet their obligations. For example, financial institutions can increase their leverage by using secured or collateralized loans, such as repurchase agreements, to fund assets. Under such transactions, borrowers post securities with lenders to secure their loans. Lenders typically will not provide a loan for the full market value of the posted securities, with the difference called a margin or haircut. This deduction protects the lenders against default by the borrowers. When the prices of assets used to secure or collateralize loans decline significantly, borrowers may be required to post additional collateral, for example, if the value of the collateral falls below the loan amount or if a lender increased its haircuts.<sup>33</sup> Leveraged borrowers may find it difficult to post additional collateral, in part because declining asset prices also could result in losses that are large relative to their capital. If borrowers faced margin calls, they could be forced to sell some of their other assets to obtain the cash collateral. If the borrowers cannot meet their margin calls, the lenders may take possession of the assets and sell them. When market liquidity is low, such asset sales may cause the asset prices to drop more. If that occurred, other firms that have borrowed against the same assets could face margin

---

<sup>33</sup>In addition to increases in haircuts, other factors can cause liquidity stress. For example, financial institutions negotiate margins on OTC derivatives to protect themselves from the risk of counterparty default. Changes in the value of OTC derivatives can result in margin calls and result in liquidity stress.

---

calls to post more collateral, which could lead to another round of asset sales and subsequent price declines. Moreover, asset spirals stemming from reduced market or funding liquidity can reinforce each other.

Importantly, other theories that do not involve asset spirals caused by deleveraging through asset sales provide possible explanations for the sharp price declines in mortgage-related securities and other financial instruments. Moreover, as the crisis is complex, no single theory likely is to explain in full what occurred or necessarily rule out other explanations. Because such theories are largely beyond the scope of our work, we discuss them only in brief. First, given the default characteristics of the mortgages underlying their related securities and falling housing prices, the current valuations of such securities may reflect their true value, not “fire sale” prices. While there may have been some overreaction, this theory holds that low market prices may result from asset prices reverting to more reasonable values after a period of overvaluation. Second, the low prices of mortgage-related securities and other financial instruments may have resulted from the uncertainty surrounding their true value. This theory holds that investors may lack the information needed to distinguish between the good and bad securities and, as a result, discount the prices of the good securities.<sup>34</sup> In the extreme, investors may price the good securities far below their true value, leading to a collapse of the market. These two theories and the deleveraging hypothesis may provide some insight into how the financial crisis has unfolded and are not mutually exclusive. Nonetheless, at this juncture, it is difficult to determine whether a return to fundamentals, uncertainty, or forced asset sales played a larger causal role.

---

### Studies Suggested That Deleveraging Could Have a Negative Effect on Economic Growth

In addition to deleveraging by selling assets, banks and broker-dealers can deleverage by restricting new lending as their own financial condition deteriorates, such as to preserve their capital and protect themselves against future losses. However, the studies we reviewed stated that this deleveraging strategy raises concerns because of the possibility it may

---

<sup>34</sup>The seminal paper on this issue is Akerlof, George A., “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism,” *Quarterly Journal of Economics*, 84(3), pp. 488-500, 1970.

---

slow economic growth.<sup>35</sup> In short, the concern is that banks, because of their leverage, will need to cut back their lending by a multiple of their credit losses to restore their balance sheets or capital-to-asset ratios. The contraction in bank lending can lead to a decline in consumption and investment spending, which reduces business and household incomes and negatively affects the real economy. Moreover, rapidly declining asset prices can inhibit the ability of borrowers to raise money in the securities markets.

One study suggested that the amount by which banks reduce their overall lending will be many times larger than their mortgage-related losses.<sup>36</sup> For example, the study estimated that if leveraged institutions suffered about \$250 billion in mortgage-related losses, it would lead them to reduce their lending by about \$1 trillion. However, these results should be interpreted with caution given that such estimates are inherently imprecise and subject to great uncertainty. Moreover, a portion of any reduction in bank lending could be due to reasons independent of the need to deleverage, such as a decline in the creditworthiness of borrowers, a tightening of previously lax lending standards, or the collapse of securitization markets.<sup>37</sup> In commenting on the study, a former Federal Reserve official noted that banks are important providers of credit but a contraction in their balance sheets would not necessarily choke off all lending.<sup>38</sup> Rather, he noted that a key factor in the current crisis is the sharp decline in securities issuances, and the decline has to be an important part of the story of why the current financial market turmoil is affecting economic activity. In summary, the Federal Reserve official said that the mortgage credit losses are a problem because they are hitting bank balance sheets at the same time that the securitization market is experiencing difficulties. As

---

<sup>35</sup>See, for example, Devlin, Will, and Huw McKay, *The Macroeconomic Implications of Financial "Deleveraging,"* Economic Roundup, Issue 4, 2008; Greenlaw et al. (2008); and Kashyup et al. (2008). Devlin and Hew (2008) note that there is a large and growing body of empirical evidence to suggest that shocks to a bank capital-to-asset ratios that lead to a contraction in the availability of credit within an economy can have large and long-lasting economic effects.

<sup>36</sup>Greenlaw et al. (2008).

<sup>37</sup>On the other hand, any decline in lending may be partially offset by the Troubled Asset Relief Program, the Term Asset-Backed Securities Loan Facility, or other monetary and fiscal policies designed to mitigate the effects of the financial crisis.

<sup>38</sup>Frederic S. Mishkin, Governor of the Board of the Federal Reserve System, *Speech on "Leveraged Losses: Lessons from the Mortgage Meltdown,"* at the U.S. Monetary Policy Forum (New York, N.Y.: Feb. 29, 2008).

---

mentioned above, the securities markets have played an increasingly dominant role over banks in the financial intermediation process.

---

### Regulators and Market Participants Had Mixed Views about the Effects of Deleveraging in the Current Crisis

Officials from federal financial regulators, two securities firms, a bank, and a credit rating agency whom we interviewed had mixed views about the effects of deleveraging by financial institutions in the current crisis. Nearly all of the officials told us that large banks and securities firms generally have sought to reduce their risk exposures since late 2007, partly in response to liquidity pressures. The institutions have used a number of strategies to deleverage, including raising new capital; curtailing certain lines of business based on a reassessment of their risk and return; and selling assets, including trading assets, consumer and commercial loans, and noncore businesses. Regulatory officials said that hedge funds and other asset managers, such as mutual funds, also have deleveraged by selling assets to meet redemptions or margin calls. According to officials at a securities firm, raising capital and selling financial assets was easier in the beginning of the crisis, but both became harder to do as the crisis continued. Regulatory and credit rating agency officials also said that financial institutions have faced challenges in selling mortgages and other loans that they planned to securitize, because the securitization markets essentially have shut down during the crisis.

The regulators and market participants we interviewed had mixed views on whether sales of financial assets contributed to a downward price spiral. Officials from one bank and the Federal Reserve staff said that due to the lack of market liquidity for some instruments and the unwillingness of many market participants to sell them, declines in prices that may be attributed to market-driven asset spirals generally resulted from the use of models to price assets in the absence of any sales. Federal Reserve staff also said that it is hard to attribute specific factors as a cause of an observed asset spiral because of the difficulty in disentangling the interacting factors that can cause financial asset prices to move down. In contrast, officials from two securities firms and a credit rating agency, and staff from SEC and OCC told us that asset spirals occurred in certain mortgage and other debt markets. The securities firm officials said that margin calls forced sales in illiquid markets and caused the spirals. Officials from one securities firm said that financial institutions, such as hedge funds, generally sought to sell first those financial assets that were hardest to finance, which eventually caused their markets to become illiquid. The absence of observable prices for such assets then caused their prices to deteriorate even more. According to the securities firm officials, firms that needed to sell assets to cover losses or meet margin calls helped

---

to drive such asset sales. OCC staff attributed some of the downward price spirals to the loss of liquidity in the securitization markets. They said that traditional buyers of securitized assets became sellers, causing the securitization markets to become dislocated.

As suggested in an April 2008 testimony by the former president of the Federal Reserve Bank of New York, reduced funding liquidity may have resulted in a downward price spiral during the current crisis:

Asset price declines—triggered by concern about the outlook for economic performance—led to a reduction in the willingness to bear risk and to margin calls. Borrowers needed to sell assets to meet the calls; some highly leveraged firms were unable to meet their obligations and their counterparties responded by liquidating the collateral they held. This put downward pressure on asset prices and increased price volatility. Dealers raised margins further to compensate for heightened volatility and reduced liquidity. This, in turn, put more pressure on other leveraged investors. A self-reinforcing downward spiral of higher haircuts forced sales, lower prices, higher volatility and still lower prices.<sup>39</sup>

Similarly, in its white paper on the Public-Private Investment Program, Treasury has indicated that deleveraging through asset sales has led to price spirals:

The resulting need to reduce risk triggered a wide-scale deleveraging in these markets and led to fire sales. As prices declined further, many traditional sources of capital exited these markets, causing declines in secondary market liquidity. As a result, we have been in a vicious cycle in which declining asset prices have triggered further deleveraging and reductions in market liquidity, which in turn have led to further price declines. While fundamentals have surely deteriorated over the past 18-24 months, there is evidence that current prices for some legacy assets embed substantial liquidity discounts.<sup>40</sup>

---

<sup>39</sup>Timothy F. Geithner, “Actions by the New York Fed in Response to Liquidity Pressures in Financial Markets,” Testimony before the U.S. Senate Committee on Banking, Housing and Urban Affairs (Washington, D.C.: Apr. 3, 2008).

<sup>40</sup>Treasury, Public-Private Investment Program, \$500 Billion to \$1 Trillion Plan to Purchase Legacy Assets, White Paper.

---

FDIC and OCC staff and officials from a credit rating agency told us that some banks have tightened their lending standards for certain types of loans, namely those with less-favorable risk-adjusted returns. Such loans include certain types of residential and commercial mortgages, leverage loans, and loans made to hedge funds. OCC staff said that some banks began to tighten their lending standards in 2007, meaning that they would not be making as many marginal loans, and such action corresponded with a decline in demand for loans. According to credit rating officials, banks essentially have set a target of slower growth for higher-risk loans that have performed poorly and deteriorated their loan portfolios. In addition, OCC and credit rating officials said that the largest banks rely heavily on their ability to securitize loans to help them make such loans. To that end, they said that the securitization markets need to open up and provide funding.

As we have discussed in our prior work, since the crisis began, federal regulators and authorities have undertaken a number of steps to facilitate financial intermediation by banks and the securities markets.<sup>41</sup> To help provide banks with funds to make loans, Treasury, working with the regulators, has used its authority under the act to inject capital into banks so that they would be stronger and more stable. Similarly, the Federal Reserve has reduced the target interest rate to close to zero and has implemented a number of programs designed to support the liquidity of financial institutions and foster improved conditions in financial markets. These programs include provision of short-term liquidity to banks and other financial institutions and the provision of liquidity directly to borrowers and investors in key credit markets. To support the functioning of the credit markets, the Federal Reserve also has purchased longer-term securities, including government-sponsored enterprise debt and mortgage-backed securities. In addition, FDIC has created the Temporary Liquidity Guarantee Program, in part to strengthen confidence and encourage liquidity in the banking system by guaranteeing newly issued senior unsecured debt of banks, thrifts, and certain holding companies.

---

<sup>41</sup>See, for example, [GAO-09-504](#).

---

## Regulators Limit Financial Institutions' Use of Leverage Primarily Through Regulatory Capital Requirements

Federal financial regulators generally have imposed capital and other requirements on their regulated institutions as a way to limit excessive use of leverage and ensure the stability of the financial system and markets. Federal banking and thrift regulators have imposed minimum risk-based capital and non-risk-based leverage ratios on their regulated institutions. In addition, they supervise the capital adequacy of their regulated institutions through ongoing monitoring, including on-site examinations and off-site tools. Bank holding companies are subject to capital and leverage ratio requirements similar to those for banks.<sup>42</sup> Thrift holding companies are not subject to such requirements; rather, capital levels of thrift holding companies are individually evaluated based on each company's risk profile. SEC primarily uses its net capital rule to limit the use of leverage by broker-dealers. Firms that had participated in SEC's now defunct CSE program calculated their risk-based capital ratios at the holding company level in a manner generally consistent with the method banks used.<sup>43</sup> Other financial institutions, such as hedge funds, use leverage but, unlike banks and broker-dealers, typically are not subject to regulatory capital requirements; instead, market discipline plays a primary role in limiting leverage. Finally, the Federal Reserve regulates the use of securities as collateral to finance security purchases, but federal financial regulators told us that such credit did not play a significant role in the buildup of leverage leading to the current crisis.

---

<sup>42</sup>Bank holding companies are permitted to include certain debt instruments in regulatory capital that are impermissible for insured banks and, as discussed below, are not subject to statutory Prompt Corrective Action.

<sup>43</sup>Under its CSE program, SEC supervised broker-dealer holding companies—Bear Stearns, Lehman Brothers, Merrill Lynch, Goldman Sachs, and Morgan Stanley—on a consolidated basis. Following the sale of Bear Stearns to JPMorgan Chase, the Lehman Brothers bankruptcy filing, and the sale of Merrill Lynch to Bank of America, the remaining CSEs opted to become bank holding companies subject to Federal Reserve oversight. SEC terminated the CSE program in September 2008 but continues to oversee these firms' registered broker-dealer subsidiaries.

---

## Federal Banking and Thrift Regulators Have Imposed Minimum Capital and Leverage Ratios on Their Regulated Institutions to Limit the Use of Leverage

Federal banking and thrift regulators (Federal Reserve, FDIC, OCC, and OTS) restrict the excessive use of leverage by their regulated financial institutions primarily through minimum risk-based capital requirements established under the Basel Accord and non-risk based leverage requirements. If a financial institution falls below certain capital requirements, regulators can impose certain restrictions, and must impose others, and thereby limit a financial institution's use of leverage. Under the capital requirements, banks and thrifts are required to meet two risk-based capital ratios, which are calculated by dividing their qualifying capital (numerator) by their risk-weighted assets (denominator).<sup>44</sup> Total capital consists of core capital, called Tier 1 capital, and supplementary capital, called Tier 2 capital.<sup>45</sup> Total risk-weighted assets are calculated using a process that assigns risk weights to the assets according to their credit and market risks. This process is broadly intended to assign higher risk weights and require banks to hold more capital for higher-risk assets. For example, cash held by a bank or thrift is assigned a risk weight of 0 percent for credit risk, meaning that the asset would not be counted in a bank's total risk-weighted assets and, thus, would not require the bank or thrift to hold any capital for that asset. OTC derivatives also are included in the calculation of total risk-weighted assets. Banks and thrifts are required to meet a minimum ratio of total capital to risk-weighted assets of 8 percent, with at least 4 percent taking the form of Tier 1 capital. However, regulators told us that they can recommend that their institutions hold capital in excess of the minimum requirements, if warranted (discussed in more detail below).

Banks and thrifts also are subject to minimum non-risk-based leverage standards, measured as a ratio of Tier 1 capital to total assets. The minimum leverage requirement to be adequately capitalized is between 3 and 4 percent, depending on the type of institution and a regulatory

---

<sup>44</sup>The Prompt Corrective Action regulations and the key regulatory capital requirements for banks and thrifts are outlined in 12 C.F.R. pts. 3, 6 (OCC); 208 (FRB); 325 (FDIC) and 565, 567 (OTS).

<sup>45</sup>Regulations limit what may be included in Tier 1 and Tier 2 capital. Tier 1 capital can include common stockholders' equity, noncumulative perpetual preferred stock, and minority equity investments in consolidated subsidiaries. For example, see 12 C.F.R. pt. 325, app. A (I)(A)(1). The remainder of a bank's total capital also can consist of tier 2 capital which can include items such as general loan and lease loss allowances (up to a maximum of 1.25 percent of risk-weighted assets), cumulative preferred stock, certain hybrid (debt/equity) instruments, and subordinated debt with a maturity of 5 years or more. For example, see 12 C.F.R. pt. 325, app. A(I)(A)(2).

---

assessment of the strength of its management and controls.<sup>46</sup> Leverage ratios have been part of bank and thrift regulatory requirements since the 1980s, and regulators continued to use the leverage ratios after the introduction of risk-based capital requirements to provide a cushion against risks not explicitly covered in the risk-based capital requirements, such as operational weaknesses in internal policies, systems, and controls or model risk or related measurement risk. The greater level of capital required by the risk-based or leverage capital calculation is the binding overall minimum requirement on an institution.

Federal banking regulators are required to take increasingly severe actions as an institution's capital deteriorates under Prompt Corrective Action (PCA).<sup>47</sup> These rules apply to banks and thrifts but not to bank holding companies. Under PCA, regulators are to classify insured depository institutions into one of five capital categories based on their level of capital: well-capitalized, adequately capitalized, undercapitalized, significantly undercapitalized, and critically undercapitalized.<sup>48</sup> Institutions that fail to meet the requirements to be classified as well or adequately capitalized generally face several mandatory restrictions or requirements. Specifically, the regulator will require an undercapitalized institution to submit a capital restoration plan detailing how it is going to become adequately capitalized. Moreover, no insured institution may pay a dividend if it would be undercapitalized after the dividend. When an institution becomes significantly undercapitalized, regulators are required to take more forceful corrective measures, including requiring the sale of

---

<sup>46</sup>Banks holding the highest supervisory rating have a minimum leverage ratio of 3 percent; all other banks must meet a leverage ratio of at least 4 percent. Bank holding companies that have adopted the Market Risk Amendment or hold the highest supervisory rating are subject to a 3 percent minimum leverage ratio; all other bank holding companies must meet a 4 percent minimum leverage ratio. According to FDIC officials, in practice, a bank with a 3 to 4 percent leverage ratio would be less than well capitalized for Prompt Corrective Action purposes (discussed below) and would be highly unlikely to be assigned the highest supervisory rating.

<sup>47</sup>12 U.S.C. § 1831o. 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.

<sup>48</sup>Regulators use three different capital measures to determine an institution's capital category: (1) a total risk-based capital measure, (2) a Tier 1 risk-based capital measure, and (3) a leverage (or non-risk-based) capital measure. For additional information, see GAO, *Deposit Insurance: Assessment of Regulators' Use of Prompt Corrective Action Provisions and FDIC's New Deposit Insurance Program*, [GAO-07-242](#) (Washington, D.C.: Feb. 15, 2007).

---

equity or debt, restricting otherwise allowable transactions with affiliates, or restricting the interest rates paid on deposits. After an institution becomes critically undercapitalized, regulators have 90 days to place the institution into receivership or conservatorship or to take other actions that would better prevent or reduce long-term losses to the insurance fund.<sup>49</sup>

---

### Regulators Can Use Various Oversight Approaches to Monitor and Enforce Capital Adequacy

Federal bank and thrift regulators can supervise the capital adequacy of their regulated institutions by tracking the financial condition of their regulated entities through on-site examinations and continuous monitoring for the larger institutions.<sup>50</sup> According to Federal Reserve officials, the risk-based capital and leverage measures are relatively simple ratios and are not sufficient, alone, for assessing overall capital adequacy. In that regard, the supervisory process enables examiners to assess the capital adequacy of banks at a more detailed level. On-site examinations serve to evaluate the institution's overall risk exposure and focus on an institution's capital adequacy, asset quality, management and internal control procedures, earnings, liquidity, and sensitivity to market risk (CAMELS).<sup>51</sup> For example, the examination manual directs Federal Reserve examiners to evaluate the internal capital management processes and assess the risk and composition of the assets held by banks. Similarly, OCC examiners told us that they focused on the capital levels of large banks in their examinations during the current crisis and raised concerns

---

<sup>49</sup>Any determination to take other action in lieu of receivership or conservatorship for a critically undercapitalized institution is effective for no more than 90 days. After the 90-day period, the regulator must place the institution in receivership or conservatorship or make a new determination to take other action. Each new determination is subject to the same 90-day restriction. If the institution is critically undercapitalized, on average, during the calendar quarter beginning 270 days after the date on which the institution first became critically undercapitalized, the regulator is required to appoint a receiver for the institution. Section 38 contains an exception to this requirement, if, among other things, the regulator and chair of the FDIC Board of Directors both certify that the institution is viable and not expected to fail.

<sup>50</sup>Banks usually are 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.

<sup>51</sup>At each examination, examiners assign a supervisory CAMELS rating, which assesses six components of an institution's financial health: capital, asset quality, management, earnings, liquidity, and sensitivity to market risk. An institution's CAMELS rating is known directly only by the institution's senior management and appropriate regulatory staff. Regulators never publicly release CAMELS ratings, even on a lagged basis.

---

about certain banks' weak results from the stress testing of their capital adequacy.

Federal bank and thrift regulatory officials told us that they also can encourage their regulated institutions to hold more than the minimum required capital, if warranted. For example, if examiners find that an institution is exceeding its capital ratios but holding a large share of risky assets, the examiners could recommend that the bank enhance its capital. As stated in the Federal Reserve's examination manual, because risk-based capital does not take explicit account of the quality of individual asset portfolios or the range of other types of risks to which banks may be exposed, banks generally are expected to operate with capital positions above the minimum ratios. Moreover, banks with high levels of risk also are expected to maintain capital well above the minimum levels. According to OTS officials, under certain circumstances, OTS can require an institution to increase its capital ratio, whether through reducing its risk-weighted assets, boosting its capital, or both. For example, OTS could identify through its examinations that downgraded securities could be problematic for a firm. OTS can then require a troubled institution under its supervisory authority, through informal and formal actions, to increase its capital ratio. Moreover, the charter application process for becoming a thrift institution can provide an opportunity to encourage institutions to increase their capital. Bank and thrift regulators also can use their enforcement process, if warranted, to require a bank or thrift to take action to address a capital-adequacy weakness.

Federal bank and thrift regulators told us that they also use off-site tools to monitor the capital adequacy of institutions. For example, examiners use Consolidated Reports of Condition and Income (Call Report) and Thrift Financial Report data to remotely assess the financial condition of banks and thrifts, respectively, and to plan the scope of on-site examinations.<sup>52</sup> Regulators also use computerized monitoring systems that use Call Report data to compute, for example, financial ratios, growth trends, and peer-group comparisons. OCC officials with whom we spoke said that they review Call Reports to ensure that banks are calculating their capital ratios correctly. FDIC officials also told us that they used the

---

<sup>52</sup>All FDIC-insured banks and savings institutions that are supervised by FDIC, OCC, or the Federal Reserve must submit quarterly Consolidated Reports on Condition and Income (Call Reports), which contain a variety of financial information, including capital amounts. FDIC-insured thrifts supervised by OTS must file similar reports, called Thrift Financial Reports.

---

data on depository institutions to conduct informal analyses to assess the potential impact a credit event or other changes could have on banks' capital adequacy. They said that FDIC has performed such analyses on bank holdings of various types of mortgage-related securities.

In addition, federal bank and thrift regulators also can conduct targeted reviews, such as those related to capital adequacy of their regulated entities. For example, in 2007, a horizontal study led by the Federal Reserve Bank of New York examined how large banks determined their economic capital, which banks use to help assess their capital adequacy and manage risk. Federal Reserve examiners told us that they typically do not conduct horizontal studies on leverage, because they cover the institutions' use of leverage when routinely supervising their institutions' capital adequacy. Federal Reserve officials told us supervisors believe that capital adequacy is better reviewed and evaluated through continuous monitoring processes that evaluate capital adequacy against the individual risks at a firm and compare capital and risk levels across a portfolio of institutions, rather than through the use of horizontal exams that would typically seek to review banks' processes.

---

**Bank Holding Companies  
Are Subject to Capital and  
Leverage Ratio  
Requirements Similar to  
Those for Banks, but Thrift  
Holding Companies Are  
Not**

Bank holding companies are subject to risk-based capital and leverage ratio requirements, which are similar to those applied to banks except for the lack of applicability of PCA and the increased flexibility afforded to bank holding companies to use debt instruments in regulatory capital. The Federal Reserve requires that all bank holding companies with consolidated assets of \$500 million or more meet risk-based capital requirements developed in accordance with the Basel Accord. In addition, it has required, with the other bank supervisors, revised capital adequacy rules to implement Basel II for the largest bank holding companies.<sup>53</sup> To be considered well-capitalized, a bank holding company with consolidated assets of \$500 million or more generally must have a Tier 1 risk-based capital ratio of 4 percent, and a minimum total risk-based capital ratio of 8 percent, and a leverage ratio of at least 4 percent.<sup>54</sup>

---

<sup>53</sup>On December 7, 2007, the banking regulatory agencies issued a final rule entitled "Risk-Based Capital Standards: Advanced Capital Adequacy Framework – Basel II." 72 Fed. Reg. 69288 (Dec. 7, 2007). In addition to this final rule, the agencies issued a proposed revision to the market risk capital rule. 71 Fed. Reg. 55958 (Sept. 25, 2006).

<sup>54</sup>Well-capitalized for bank holding companies does not have the same meaning as in a PCA context; it is used in the application process.

---

According to OTS officials, thrift holding companies generally are not subject to minimum capital or leverage ratios because of their diversity. Rather, capital levels of thrift holding companies are individually evaluated based on each company's risk profile. OTS requires that thrift holding companies hold a "prudential" level of capital on a consolidated basis to support the risk profile of the holding company.<sup>55</sup> For its most complex firms, OTS requires a detailed capital calculation that includes an assessment of capital adequacy on a groupwide basis and identification of capital that might not be available to the holding company or its other subsidiaries, because it is required to be held by a specific entity for regulatory purposes. Under this system, OTS benchmarks thrift holding companies against peer institutions that face similar risks.

In supervising the capital adequacy of bank and thrift holding companies, the Federal Reserve and OTS are to focus on those business activities posing the greatest risk to holding companies and managements' processes for identifying, measuring, monitoring, and controlling those risks. The Federal Reserve's supervisory cycle for large complex bank holding companies generally begins with the development of a systematic risk-focused supervisory plan, which it then implements, and ends with a rating of the firm. The rating includes an assessment of holding companies' risk management and controls; financial condition, including capital adequacy; and impact on insured depositories.<sup>56</sup> In addition, the Federal Reserve requires that all bank holding companies serve as a source of financial and managerial strength to their subsidiary banks. Similarly, OTS applies the CORE (Capital, Organizational Structure, Risk Management, and Earnings) rating system for large complex thrift holding companies. CORE focuses on consolidated risks, internal controls, and capital adequacy rather than focusing solely on the holding company's impact on subsidiary thrifts. In reviewing capital adequacy, particularly in large, complex thrift holding companies, OTS considers the risks inherent in the

---

<sup>55</sup>Under the Homeowners' Loan Act of 1933, as amended, companies that own or control a savings association are subject to supervision by OTS. 12 U.S.C. § 1467a.

<sup>56</sup>Each bank holding company is assigned a composite rating (C) based on an evaluation and rating of its managerial and financial condition and an assessment of future potential risk to its subsidiary depository institution(s). The main components of the rating system represent: Risk Management (R); Financial Condition (F); and potential Impact (I) of the parent company and nondepository subsidiaries on the subsidiary depository institution(s). The Impact rating focuses on downside risk—that is, on the likelihood of significant negative impact on the subsidiary depository institutions. A fourth component rating, Depository Institution (D), will generally mirror the primary regulator's assessment of the subsidiary depository institution(s).

---

enterprise's capital to absorb unexpected losses, support the level and composition of the parent company's and subsidiaries' debt, and support business plans and strategies.

The Federal Reserve and OTS have a range of formal and informal actions they can take to enforce their regulations for holding companies. Federal Reserve officials noted that the law provides explicit authority for any formal actions that may be warranted and incentives for bank holding companies to address concerns promptly or through less formal enforcement actions, such as corrective action resolutions adopted by the company's board of directors or memoranda of understanding in which the relevant Federal Reserve bank enters.<sup>57</sup> Similarly, OTS also has statutory authority to take enforcement actions against thrift holding companies and any subsidiaries of those companies.<sup>58</sup>

Both the Federal Reserve and OTS also monitor the capital adequacy of their respective regulated holding companies using off-site tools. For example, the Federal Reserve noted that it obtains financial information from bank holding companies in a uniform format through a variety of periodic regulatory reports and uses the data to conduct peer analysis, including a comparison of their capital adequacy ratios. Similarly, according to a June 2008 testimony by an OTS official, OTS in 2008 conducted an extensive review of capital levels at the thrift holding companies and found that savings and loan holding company peer group averages were strong.<sup>59</sup>

---

<sup>57</sup>The Federal Reserve's formal enforcement powers for bank holding companies and their nonbank subsidiaries are set forth at 12 U.S.C. § 1818(b)(3).

<sup>58</sup>See 12 U.S.C. § 1467a(g), (i) and 12 U.S.C. § 1818(b)(9).

<sup>59</sup>Senior Deputy Director and Chief Operating Officer, Scott M. Polakoff, before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, U.S. Senate (Washington, D.C.: June 19, 2008).

---

## SEC Has Regulated the Use of Leverage by Broker-Dealers Primarily through Its Net Capital Rule

According to SEC staff, the agency regulates the use of leverage by registered broker-dealers primarily through the risk-based measures prescribed in its net capital and customer protection rules.<sup>60</sup> SEC adopted these rules pursuant to its broad authority to adopt rules and regulations regarding the financial responsibility of broker-dealers that it finds necessary in the public interest or for the protection of customers.<sup>61</sup>

Under the net capital rule, broker-dealers are required to maintain a minimum amount of net capital at all times. Net capital is computed in several steps. A broker-dealer's net worth (assets minus liabilities) is calculated using U.S. Generally Accepted Accounting Principles (GAAP). Certain subordinated liabilities are added back to GAAP equity because the net capital rule allows them to count toward capital, subject to certain conditions. Deductions are taken from GAAP equity for assets that are not readily convertible into cash, such as unsecured receivables and fixed assets. The net capital rule further requires prescribed percentage deductions from GAAP equity, called "haircuts." 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 liquidation depend on the liquidity and market risk of the assets.

Under the net capital rule, a broker-dealer must at all times have net capital equal to the greater of two amounts: (1) a minimum amount based on the type of business activities conducted by the firm or (2) a financial

---

<sup>60</sup>SEC has broad authority to adopt rules and regulations regarding the financial responsibility of broker-dealers that it finds are necessary or appropriate in the public interest or for the protection of investors and, pursuant to that authority, adopted the net capital rule (17 C.F.R. § 240.15c3-1) and related rules. 40 Fed. Reg. 29795, 29799 (July 16, 1975). Specifically, the SEC determined that the net capital rule was necessary and appropriate to provide safeguards with respect to the financial responsibility and related practices of brokers or dealers; to eliminate illiquid and impermanent capital; and to assure investors that their funds and securities are protected against financial instability and operational weaknesses of brokers or dealers. *Id.* See also 17 C.F.R. 240.15c3-3.

<sup>61</sup>15 U.S.C. § 78o(c)(3).

---

ratio.<sup>62</sup> The broker-dealers must elect one of two financial ratios: the basic method (based on aggregate indebtedness) or the alternative method (based on aggregate debit items). That is, broker-dealers must hold different minimum levels of capital based on the nature of their business and whether they handle customer funds or securities. According to SEC staff, most broker-dealers that carry customer accounts use the alternative method. Under this method, broker-dealers are required to have net capital equal to the greater of \$250,000 or 2 percent of aggregate debit items, which generally are customer-related receivables, such as cash and securities owned by customers but held by their broker-dealers.<sup>63</sup> This amount serves to ensure that broker-dealers have sufficient capital to repay creditors and pay their liquidation expense if they fail.

According to SEC staff, the customer protection rule, a separate but related rule, requires broker-dealers to safeguard customer property, so that they can return such property if they failed.<sup>64</sup> The rule requires a broker-dealer to take certain steps to protect the credit balances and securities it holds for customers. Under the rule, a broker-dealer must, in essence, segregate customer funds and fully paid and excess margin securities held by the firm for the accounts of customers. The intent of the rule is to require a broker-dealer to hold customer assets in a manner that enables their prompt return in the event of an insolvency, which increases the ability of the firm to wind down in an orderly self-liquidation and thereby avoid the need for a proceeding under the Securities Investor Protection Act of 1970.<sup>65</sup>

SEC oversees U.S. broker-dealers but delegates some of its authority to oversee broker-dealers to one or more of the various self-regulatory organizations, including the Financial Industry Regulatory Authority

---

<sup>62</sup>CFTC imposes capital requirements on futures commission merchants, which are similar to broker-dealers but act as intermediaries in commodity futures transactions. Some firms are registered as both a broker-dealer and futures commission merchant and must comply with both SEC's and CFTC's regulations.

<sup>63</sup>In comparison, under the basic method, broker-dealers must have net capital equal to at least 6 2/3 percent of their aggregate indebtedness. The 6-2/3 percent requirement implies that broker-dealers must have at least \$1 of net capital for every \$15 of its indebtedness (that is, a leverage constraint). Most small broker-dealers typically use the basic method because of the nature of their business.

<sup>64</sup>See 17 C.F.R. § 240.15c3-3.

<sup>65</sup> Pub. L. No. 91-598, 84 Stat. 1636, codified at 15 U.S.C. §§ 78aaa-78lll.

---

(FINRA), an SRO that was established in 2007 through the consolidation of NASD and the member regulation, enforcement, and arbitration functions of the New York Stock Exchange (NYSE). SEC and the SROs conduct regularly scheduled target examinations that focus on the risk areas identified in their risk assessments of firms and on compliance with relevant capital and customer protection rules.<sup>66</sup> SEC's internal control risk-management examinations, which started in 1995, cover the top 15 wholesale and top 15 retail broker-dealers and a number of mid-sized broker-dealers with a large number of customer accounts. SEC conducts examinations every 3 years at the largest institutions, while the SROs conduct more frequent examinations of all broker-dealers. For instance, FINRA examines all broker-dealers that carry customer accounts at least once annually. According to SEC and FINRA, they receive financial and risk area information on a regular basis from all broker-dealers. In addition, the largest brokers and those of financial concern provide additional information through monitoring programs and regular meetings with the firms.

---

### SEC Regulated the Use of Leverage by Selected Broker-Dealers under an Alternative Net Capital Rule from 2005 to 2008

From 2005 to September 2008, SEC implemented the voluntary CSE program, in which five broker-dealer holding companies had participated. In 2004, SEC adopted the program by amending its net capital rule to establish a voluntary, alternative method of computing net capital. A broker-dealer became a CSE by applying for an exemption from the net capital rule and, as a condition of the exemption, the broker-dealer holding company consented to consolidated supervision (if it was not already subject to such supervision). According to SEC staff, a broker-dealer electing this alternative method is subject to enhanced net capital, early warning, recordkeeping, reporting, liquidity, and certain other requirements, and must implement and document an internal risk management system. Under the new alternative net capital rule, CSE broker-dealers were permitted to use their internal mathematical risk measurement models, rather than SEC's haircut structure, to calculate their haircuts for the credit and market risk associated with their trading and investment positions. Expecting that firms would be able to lower their haircuts and, in turn, capital charges by using their internal risk models, SEC required as a safeguard that CSE broker-dealers maintain at

---

<sup>66</sup> As part of its oversight, SEC also evaluates the quality of FINRA oversight in enforcing its members' compliance through oversight inspections of FINRA and inspections of broker-dealers. SEC also directly assesses broker-dealer compliance with federal securities laws through special and cause examinations.

---

least \$500 million in net capital and at least \$1 billion in tentative net capital (equity before haircut deductions). According to SEC staff, because of an early warning requirement set at \$5 billion for tentative net capital, CSE broker-dealers effectively had to maintain a minimum of \$5 billion in tentative net capital. If a firm fell below that level, it would need to notify SEC, which could require the firm to take remedial action. Recognizing that capital is not synonymous with liquidity, SEC also expected each CSE holding company to maintain a liquid portfolio of cash and highly liquid and highly rated debt instruments in an amount based on its liquidity risk management analysis, which includes stress tests that address, among other things, illiquid assets.<sup>67</sup>

In addition to consenting to consolidated regulation, the CSE holding companies agreed to calculate their capital ratio consistent with the Basel II capital standards. SEC expected CSE holding companies to maintain a risk-based capital ratio of not less than 10 percent. According to SEC staff, the 10-percent risk-based capital ratio was the threshold that constituted a well-capitalized institution under the Basel standards and was consistent with the threshold used by banking regulators, but it was not a regulatory requirement. The CSE holding companies were required to notify SEC if they breached or were likely to breach the 10-percent capital ratio. According to SEC staff, if it received such a notification, the staff would have required the CSE holding company to take remedial action. Moreover, SEC staff said that they received and monitored holding company capital calculations on a monthly basis. SEC staff also said that the CSE holding companies were holding capital above the amount needed to meet the 10-percent risk-based capital ratio during the current crisis, except for one institution that later restored its capital ratio.

The holding companies and their broker-dealers that participated in the CSE program were not subject to explicit non-risk based leverage limits before or after SEC created the program. According to SEC staff, the broker-dealers' ability to increase leverage was limited through the application of haircuts on their proprietary positions under the net capital rule. To the extent that the use of their internal models (instead of SEC's haircut structure) by the broker-dealers enabled them to reduce the amount of their haircuts, they could take on larger proprietary positions

---

<sup>67</sup>To assess the adequacy of both capital and liquid assets, SEC staff takes a scenario-based approach. A key premise of the scenario analysis is that during a liquidity stress event, the holding company would not receive additional unsecured funding.

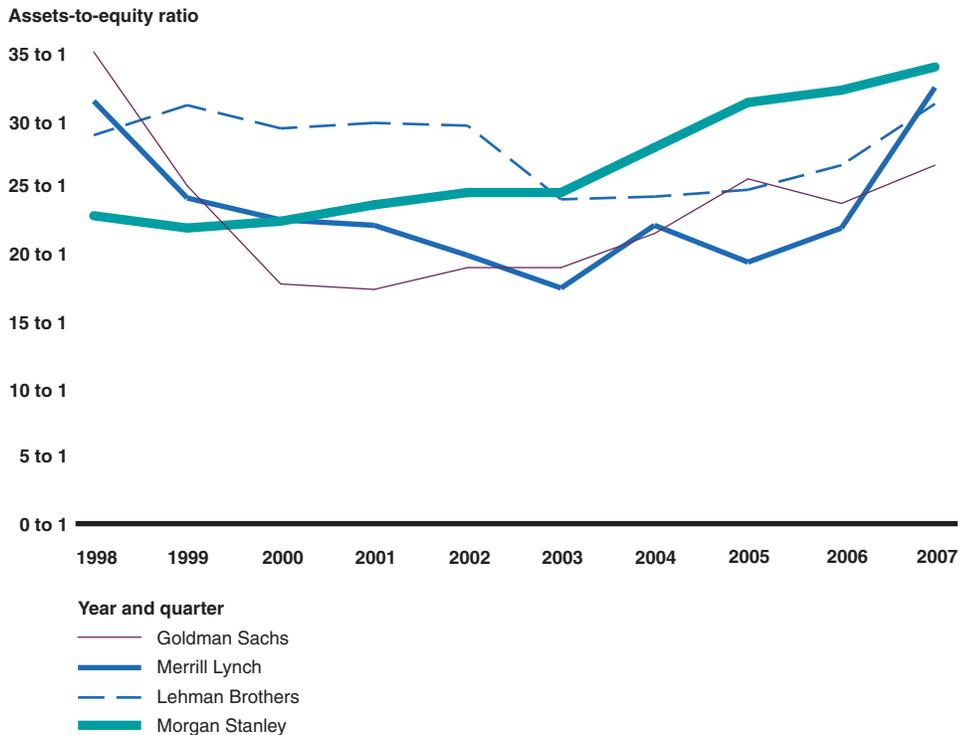
---

and increase their leverage. However, SEC staff told us that the broker-dealers generally did not take such action after joining the CSE program. The staff said that the primary sources of leverage for the broker-dealers were customer margin loans, repurchase agreements, and stock lending. According to the staff, these transactions were driven by customers and counterparties, marked daily, and secured by collateral—exposing the broker-dealers to little, if any, market risk. In addition, SEC did not seek to impose a non-risk based leverage limit on CSE holding companies, in part because such a leverage ratio treated all on-balance sheet assets as equally risky and created an incentive for firms to move exposures off-balance sheet. Officials at a former CSE told us that their firm’s decision to become a CSE was to provide the firm with another way to measure its capital adequacy. They said the firm did not view the CSE program as a strategy to increase its leverage, although it was able to reduce its broker-dealer’s haircuts. According to the officials, the firm’s increase in leverage after becoming a CSE likely was driven by market factors and business opportunities. In our prior work on Long-Term Capital Management (a hedge fund), we analyzed the assets-to-equity ratios of four of the five broker-dealer holding companies that later became CSEs and found that three had ratios equal to or greater than 28-to-1 at fiscal year-end 1998, which was higher than their ratios at fiscal year-end 2006 before the crisis began (see fig. 6).<sup>68</sup>

---

<sup>68</sup>GAO, *Long-Term Capital Management: Regulators Need to Focus Greater Attention on Systemic Risk*, GAO/GGD-00-3 (Washington, D.C.: Oct. 29, 1999). The report did not present the assets-to-equity ratio for Bear Stearns, but its ratio also was above 28 to 1 in 1998.

**Figure 6: Ratio of Total Assets to Equity for Four Broker-Dealer Holding Companies, 1998 to 2007**



Source: GAO analysis of the firms' annual report data.

SEC's Division of Trading and Markets had responsibility for administering the CSE program. According to SEC staff, the CSE program was modeled on the Federal Reserve's holding company supervision program. SEC staff said that continuous supervision was usually conducted through regular monthly meetings on-site with CSE firm risk managers to monitor liquidity and funding and to review how market and credit risks are identified, quantified, and communicated to senior management and whether senior managers have approved of the risk exposures. Quarterly meetings were held with senior managers from treasury and internal audit. According to SEC staff, these regularly scheduled risk meetings were frequently supplemented by additional on-site meetings and off-site discussions throughout the month. SEC did not rate risk-management systems or use a detailed risk assessment processes to determine areas of highest risk. During the CSE program, SEC staff concentrated their efforts on market, credit, and liquidity risks, because the alternative net capital rule focused on these risks, and on operational risk because of the need to protect investors. Because only five broker-dealer holding companies were subject

---

to SEC's consolidated supervision, SEC staff tailored certain reporting requirements and reviews to focus on activities that posed material risks for that firm. According to SEC staff, the CSE program allowed SEC to conduct reviews across the five firms to gain insights into business areas that were material by risk or balance sheet measures, rapidly growing, posed particular challenges in implementing the Basel regulatory risk-based capital regime, or had some combination of these characteristics. Such reviews resulted in four firms modifying their capital computations.

In September 2008, the former SEC Chairman announced that the agency ended the CSE program. According to the SEC Chairman, the three investment banks formerly designated as CSEs are now part of a bank holding company structure and subject to supervision by the Federal Reserve. The chairman noted that SEC will continue to work closely with the Federal Reserve under a memorandum of understanding between the two agencies but will focus on its statutory obligation to regulate the broker-dealer subsidiaries of the bank holding companies, including the implementation of the alternative net capital computation by certain broker-dealers. While no institutions are subject to SEC oversight at the consolidated level under the CSE program, several broker-dealers within bank holding companies are still subject to the alternative net capital rule on a voluntary basis.<sup>69</sup>

---

## Hedge Funds Generally Are Not Subject to Direct Regulations That Restrict Their Use of Leverage but Face Limitations through Market Discipline

Hedge funds have become important participants in the financial markets and many use leverage, such as borrowed funds and derivatives, in their trading strategies. They generally are structured and operated in a manner that enables them to qualify for exemptions from certain federal securities laws and regulations.<sup>70</sup> Because their investors are presumed to be sophisticated and therefore not require the full protection offered by the securities laws, hedge funds generally have not been subject to direct regulation. As a result, hedge funds typically are not subject to regulatory

---

<sup>69</sup>Bear Stearns was acquired by JPMorgan Chase, Lehman Brothers failed, Merrill Lynch was acquired by Bank of America, and Goldman Sachs and Morgan Stanley have become bank holding companies.

<sup>70</sup>Although there is no statutory definition of "hedge fund," the term commonly is used to describe pooled investment vehicles directed by professional managers that often engage in active trading of various types of assets, such as securities and derivatives and are structured and operated in a manner that enables the fund and its advisers to qualify for exemptions from certain federal securities laws and regulations that apply to other investment pools, such as mutual funds.

---

capital requirements or limited by regulation in their use of leverage. Instead, market discipline has the primary role, supplemented by indirect regulatory oversight of commercial banks and securities and futures firms, in constraining risk taking and leveraging by hedge fund managers (advisers).

Market participants (for example, investors, creditors, and counterparties) can impose market discipline by rewarding well-managed hedge funds and reducing their exposure to risky, poorly managed hedge funds. Hedge fund advisers use leverage, in addition to money invested into the fund by investors, to employ sophisticated investment strategies and techniques to generate returns. A number of large commercial banks and prime brokers bear and manage the credit and counterparty risks that hedge fund leverage creates. Typically, hedge funds seeking direct leverage can obtain funding either through margin financing from a prime broker or through the repurchase agreement markets. Exercising counterparty risk-management is the primary mechanism by which these types of financial institutions impose market discipline on hedge funds' use of leverage. The credit risk exposures between hedge funds and their creditors and counterparties arise primarily from trading and lending relationships, including various types of derivatives and securities transactions. Creditors and counterparties of large hedge funds use their own internal rating and credit or counterparty risk management processes and may require additional collateral from hedge funds as a buffer against increased risk exposure. As part of their due diligence, they typically request from hedge funds information such as capital and risk measures; periodic net asset valuation calculations; fees and redemption policy; and annual audited statements along with hedge fund managers' background and track record. Creditors and counterparties can establish credit terms partly based on the scope and depth of information that hedge funds are willing to provide, the willingness of the fund managers to answer questions during on-site visits, and the assessment of the hedge fund's risk exposure and capacity to manage risk. If approved, the hedge fund receives a credit rating and a line of credit. Some creditors and counterparties also can measure counterparty credit exposure on an ongoing basis through a credit system that is updated each day to determine current and potential exposures. As we reported in our earlier work, for market discipline to be effective, (1) investors, creditors, and counterparties must have access to, and act upon, sufficient and timely information to assess a fund's risk profile; (2) investors, creditors, and counterparties must have sound risk-management policies, procedures, and systems to evaluate and limit their credit risk exposures to hedge funds; and (3) creditors and counterparties must increase the costs or

---

decrease the availability of credit to their hedge fund clients as the creditworthiness of the latter deteriorates.<sup>71</sup> Similar to other financial institutions, hedge funds also have had to deleverage. According to the 2008 Global Financial Stability Report by the International Monetary Fund, due to the current financial crisis, margin financing from prime brokers has been cut, and haircuts and fees on repurchase agreements have increased. The combination of these factors has caused average hedge fund leverage to fall to 1.4 times capital (from 1.7 times last year) according to market estimates.

Although hedge funds generally are not directly regulated, many advisers to hedge funds are subject to federal oversight. Under the existing regulatory structure, SEC and CFTC regulate those hedge fund advisers that are registered with them, and SEC, CFTC, as well as the federal bank regulators monitor hedge fund-related activities of other regulated entities, such as broker-dealers and commercial banks. As registered investment advisers, hedge fund advisers are subject to SEC examinations and reporting, record keeping, and disclosure requirements. Similarly, CFTC regulates those hedge fund advisers registered as commodity pool operators or commodity trading advisors.<sup>72</sup> CFTC has authorized the National Futures Association, an SRO, to conduct day-to-day monitoring of such registered entities. In addition, SEC, CFTC, and bank regulators use their existing authorities—to establish capital standards and reporting requirements, conduct risk-based examinations, and take enforcement actions—to oversee activities, including those involving hedge funds, of broker-dealers, futures commission merchants, and banks, respectively. As we recently reported, although none of the regulators we interviewed specifically monitored hedge fund activities on an ongoing basis,

---

<sup>71</sup>See GAO, *Hedge Funds: Regulators and Market Participants Are Taking Steps to Strengthen Market Discipline, but Continued Attention Is Needed*, [GAO-08-200](#) (Washington, D.C.: Jan. 24, 2008).

<sup>72</sup>Except as may otherwise be provided by law, a commodity pool operator (CPO) is an individual or organization that operates an enterprise, and, in connection therewith, solicits or receives funds, securities or property from third parties, for the purpose of trading in any commodity for future delivery on a contract market or derivatives execution facility. 7 U.S.C. § 1a(5). A commodity trading advisor (CTA) is, except as otherwise provided by law, any person who, for compensation or profit, (1) directly or indirectly advises others on the advisability of buying or selling any contract of sale of a commodity for future delivery, commodity options or certain leverage transactions contracts, or (2) as part of a regular business, issues analyses or reports concerning the activities in clause (1). 7 U.S.C. § 1a(6). In addition to statutory exclusions to the definition of CPO and CTA, CFTC has promulgated regulations setting forth additional criteria under which a person may be excluded from the definition of CPO or CTA. See 17 C.F.R. §§ 4.5 and 4.6 (2007).

---

regulators generally have increased reviews—by such means as targeted examinations—of systems and policies to mitigate counterparty credit risk at the large regulated entities.<sup>73</sup>

Federal banking and securities regulators have established regulatory and supervisory structures to limit and oversee the use of leverage by financial institutions. However, as the financial crisis has unfolded and the regulatory oversight of troubled institutions has been scrutinized, concerns have been raised about the adequacy of such oversight in some areas. For example, in its material loss review on IndyMac Bank, the Treasury Inspector General (IG) found that OTS failed to take PCA action in a timely manner when IndyMac’s capital adequacy classification first appeared to have fallen below minimum standards.<sup>74</sup> In addition, the Treasury IG noted that OTS had given IndyMac satisfactory CAMELS ratings despite a number of concerns about IndyMac’s capital levels, asset quality, management and liquidity during 2001 through 2007. Separately, a Federal Reserve official testified in March 2009 that the Federal Reserve has recognized that it needs to improve its communication of supervisory and regulatory policies, guidance, and expectations to those banks it regulates by frequently updating their rules and regulations and more quickly issuing guidance as new risks and concerns are identified.<sup>75</sup> As another example, in its audit of SEC’s oversight of CSEs, the SEC IG found that the CSE program failed to effectively oversee these institutions for several reasons, including the lack of an effective mechanism for ensuring that these entities maintained sufficient capital.<sup>76</sup> The SEC IG made a number of recommendations to improve the CSE program. In commenting on the SEC IG report, management of SEC’s Division of Trading and Markets stated that the report is fundamentally flawed in its processes, premises, analysis, and key findings and reaches inaccurate, unrealistic, and impracticable conclusions. Although the CSE program has ended, the former SEC Chairman stated in response to the IG report that the agency

---

<sup>73</sup>See [GAO-08-200](#).

<sup>74</sup>Office of Inspector General, Department of the Treasury, *Safety and Soundness: Material Loss Review of IndyMac Bank, FSB*, OIG-09-032 (Washington, D.C.: Feb. 26, 2009).

<sup>75</sup>Roger T. Cole, Director, Division of Banking Supervision and Regulation, before the Subcommittee on Securities, Insurance, and Investment, Committee on Banking, Housing, and Urban Affairs, U.S. Senate (Washington, D.C.: Mar. 18, 2009).

<sup>76</sup>Office of Inspector General, U.S. Securities and Exchange Commission, *SEC’s Oversight of Bear Stearns and Related Entities: The Consolidated Supervised Entity Program*, 446-A (Washington, D.C.: Sept. 25, 2008).

---

will look closely at the applicability of the recommendations to other areas of SEC's work.

---

### The Federal Reserve Regulates the Use of Credit to Purchase Securities under Regulation T and U, but Regulators Said That Such Credit Did Not Play a Significant Role in the Buildup of Leverage

To increase their leverage, investors can post securities as collateral with broker-dealers, banks, and other lenders to obtain loans to finance security purchases. Historically, such lending has raised concerns that it diverted credit away from productive uses to speculation in the stock market and caused excessive fluctuations in stock prices. But the preponderance of academic evidence is that margin lending does not divert credit from productive uses and its regulation is not an effective tool for preventing stock market volatility. To prevent the excessive use of credit to purchase or trade securities, Section 7 of the Securities and Exchange Act of 1934 authorized the Federal Reserve System to regulate such loans.<sup>77</sup> Pursuant to that authority, the Federal Reserve has promulgated Regulations T, U, and X, which set the minimum amount of margin that customers must initially post when engaging in securities transactions on credit.<sup>78</sup> Regulation T applies to margin loans made by broker-dealers, Regulation U applies to margin loans made by banks and other lenders, and Regulation X applies to margin loans obtained by U.S. persons and certain related persons who obtain securities credit outside the United States to purchase U.S. securities, whose transactions are not explicitly covered by the other two regulations.<sup>79</sup> In effect, these regulations limit the extent to which customers can increase their leverage by using debt to finance their securities positions.

The Federal Reserve has raised and lowered the initial margin requirements for equity securities many times since enactment of the Securities Exchange Act of 1934. The highest margin requirement was 100 percent, adopted for about a year after the end of World War II. The lowest margin requirement was 40 percent and was in effect during the late 1930s and early 1940s. Otherwise, the initial margin requirement for equity

---

<sup>77</sup>Ch. 404, § 7, 48 Stat. 881 (June 6, 1934) *codified at* 15 U.S.C. § 78g.

<sup>78</sup>Margin rules also have been established by U.S. securities self-regulatory organizations, such as NYSE Rule 431 and NASD Rule 2520, which limit the extension of credit by member broker-dealers. While FINRA is establishing new FINRA rules, the old rules continue to be effective until replaced by an applicable new FINRA rule.

<sup>79</sup>Regulation X, 12 C.F.R. pt. 224, generally applies to U.S. citizens borrowing from non-U.S. lenders. Regulation X extends to borrowers the provisions of Regulations T and U for the purpose of purchasing or carrying securities. In that regard, our discussion focuses on Regulations T and U, 12 C.F.R. pts. 220 and 221.

---

securities has varied between 50 and 75 percent. The Federal Reserve has left the initial margin requirement at 50 percent since 1974.<sup>80</sup>

Federal Reserve, OCC, and SEC staff told us that credit extended under Regulation T and U generally did not play a significant role in the buildup of leverage before the current crisis. According to Federal Reserve staff, Regulation T and U cover only one of many sources of credit and market participants have many ways to obtain leverage not covered by the regulations. For example, the credit markets are international, and market participants can obtain credit overseas where Regulation T and U do not apply. Similarly, OCC staff said that the margin regulations largely have been made obsolete by market developments. Under Regulation T and U, margins are set at 50 percent for the initial purchase of equities, but large investors can obtain greater leverage using non-equity securities (such as government securities) as collateral and various types of derivatives.<sup>81</sup> Finally, SEC staff told us that hedge funds and other investors do not widely use equities for margin and, in turn, leverage purposes because of Regulation T's restrictions. The staff said that hedge funds and other market participants can use other financial instruments to increase their leverage, such as exchange-traded futures contracts. As shown in figure 7, the total margin debt (dollar value of securities purchased on margin) consistently increased from year-end 2002 to year-end 2007, but the

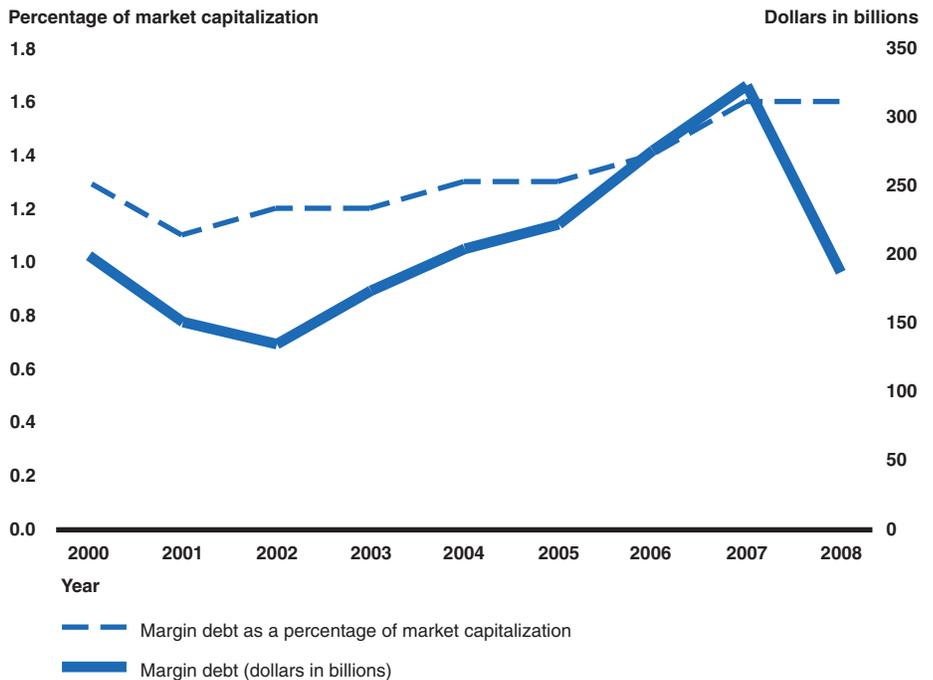
---

<sup>80</sup>Although section 7 of the Securities Exchange Act gives the Federal Reserve the authority to adopt initial and maintenance margins, the Federal Reserve has chosen to adopt only initial margin requirements. Broker-dealers, however, are required to join the Financial Industry Regulatory Authority and are therefore subject to its maintenance margin requirements. See New York Stock Exchange Rule 431 and National Association of Securities Dealers Rule 2520.

<sup>81</sup>Under regulation T, broker-dealers may accept exempted and margin securities as collateral for loans used to purchase securities. Exempted securities include government and municipal securities. Margin securities comprise a broad range of equity and non-equity, or debt, securities. The Federal Reserve has set the initial margin requirement for equity securities at 50 percent of their market value. In contrast, non-equity securities (e.g., corporate bonds, mortgage-related securities, and repurchase agreements on non-equity securities) and exempt securities are subject to a "good faith" margin requirement. Good faith margin means that a broker-dealer may extend credit on a particular security in any amount consistent with sound credit judgment.

amount of margin debt as a percentage of the total capitalization of NYSE and NASDAQ stock markets was less than 2 percent.<sup>82</sup>

**Figure 7: Margin Debt and Margin Debt as a Percentage of the Total Capitalization of the NYSE and NASDAQ Stock Markets, 2000 through 2008**



Source: GAO analysis of NYSE's margin debt data and the World Federation of Exchanges' market capitalization data.

Note: Margin debt as a percentage of the total stock market capitalization is overstated in the figure because the margin debt data include equity and non-equity securities but the market capitalization data include only equity securities.

<sup>82</sup>Even though the total amount of margin debt decreased significantly from December 2007 to December 2008, the total margin debt as a percentage of total market capitalization did not decline, because the total market capitalization also declined significantly during this period.

---

## Regulators Are Considering Reforms to Address Limitations the Crisis Revealed in Regulatory Framework for Restricting Leverage, but Have Not Reevaluated Basel II Implementation

The financial crisis has revealed limitations in existing regulatory approaches that restrict leverage, and although regulators have proposed changes to improve the risk coverage of the regulatory capital framework, limit cyclical leverage trends and better address sources of systemic risk, they have not yet formally reevaluated U.S. Basel II implementation in considering needed reforms. First, regulatory capital measures did not always fully capture certain risks, particularly those associated with some mortgage-related securities held on and off balance sheets. As a result, a number of financial institutions did not hold capital commensurate with their risks and some lacked adequate capital or liquidity to withstand the crisis. Federal financial regulators are considering reforms to better align capital requirements with risk, but have not formally assessed the extent to which these reforms may address risk-evaluation concerns the crisis highlighted with respect to Basel II approaches. Such an assessment is critical to ensure that Basel II changes that would increase reliance on complex risk models and banks' own risk estimates do not exacerbate regulatory limitations revealed by the crisis. Second, the crisis illustrated how the existing regulatory framework might have contributed to cyclical leverage trends that potentially exacerbated the current crisis. For example, according to regulators, minimum regulatory capital requirements may not provide adequate incentives for banks to build loss-absorbing capital buffers in benign markets when it would be less expensive to do so. Finally, the financial crisis has illustrated the potential for financial market disruptions, not just firm failures, to be a source of systemic risk. With multiple regulators primarily responsible for individual markets or institutions, none of the financial regulators has clear responsibility to assess the potential effects of the buildup of systemwide leverage or the collective activities of the industry for the financial system. As a result, regulators may be limited in their ability to prevent or mitigate future financial crises.

---

## Regulatory Capital Measures Did Not Fully Capture Certain Risks

While a key goal of the regulatory capital framework is to align capital requirements with risks, the financial crisis revealed that a number of large financial institutions did not hold capital commensurate with the full range of risks they faced. U.S. federal financial regulators and market observers have noted that the accuracy of risk-based regulatory capital measures depends on proper evaluation of firms' on and off-balance sheet risk exposures. However, according to regulators, before the crisis many large financial institutions and their regulators underestimated the actual and contingent risks associated with certain risk exposures. As a result, capital regulations permitted institutions to hold insufficient capital against those exposures, some of which became sources of large losses or liquidity

---

## Credit Risks

---

pressures as market conditions deteriorated in 2007 and 2008. When severe stresses appeared, many large banks did not have sufficient capital to absorb losses and faced pressures to deleverage suddenly and in ways that collectively may have exacerbated market stresses.

The limited risk-sensitivity of the Basel I framework allowed U.S. banks to increase certain credit risk exposures without making commensurate increases in their capital requirements.<sup>83</sup> Under the Basel I framework, banks apply one of five risk-weightings in calculating their risk-based capital requirements for loans, securities, certain off-balance sheet exposures, and other assets held in their banking books.<sup>84</sup> Because Basel I does not recognize differences in credit quality among assets in the same risk-weighted category, some banks may have faced incentives to take on high-risk, low-quality assets within each broad risk category.

U.S. regulators have noted that the risks associated with a variety of loan types increased in the years before the crisis due to a number of factors, including declining underwriting standards and weakening market discipline. For example, subprime and Alt-A mortgages originated in recent years have exhibited progressively higher rates of delinquency (see fig. 8). However, as the risks of these loans increased, capital requirements did not increase accordingly. For example, under Basel I risk-weighting, a riskier loan reflecting declining underwriting standards could have received the same 50 percent risk-weighting as a higher quality mortgage loan. In particular, before the crisis, alternative mortgage products, such as interest-only and payment-option adjustable-rate mortgages, represented a growing share of mortgage originations as home prices increased nationally between 2003 and 2005.<sup>85</sup> Although mortgage

---

<sup>83</sup>With the exception of broker-dealer holding companies participating in the SEC's CSE program, U.S. banks operated under the Basel I regulatory capital framework prior to the crisis.

<sup>84</sup>Assets held in the banking book generally include assets that are not actively traded and intended to be held for longer periods than trading portfolio assets. See appendix III for information about how assets are assigned to risk-weighting categories under Basel I.

<sup>85</sup>Before the crisis, to purchase homes borrowers might not be able to afford with a conventional fixed-rate mortgage, an increasing number of borrowers turned to alternative mortgage products, which offer comparatively lower and more flexible monthly mortgage payments for an initial period. Interest-only and payment option adjustable rate mortgages allow borrowers to defer repayment of principal and possibly part of the interest for the first few years of the mortgage. For more about the risks associated with alternative mortgage products, see GAO, *Alternative Mortgage Products: Impact on Defaults Remains Unclear, but Disclosure of Risks to Borrowers Could Be Improved*, GAO-06-1021 (Washington, D.C.: Sept. 19, 2006).

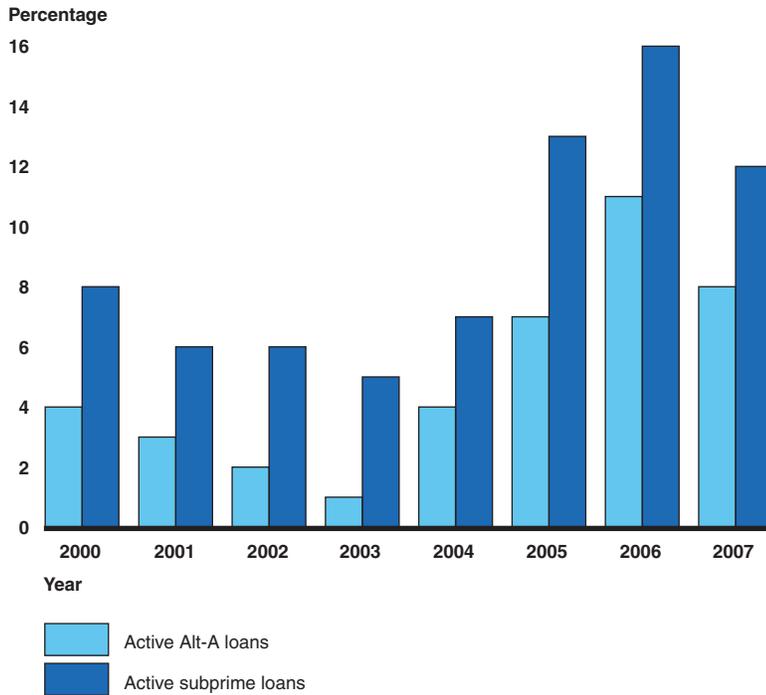
---

statistics for these products reflected declining underwriting standards, Basel I rules did not require banks to hold additional capital for these loans relative to lower-risk, traditional mortgage loans in the same risk-weighting category. Larger-than-expected losses on loan portfolios depleted the regulatory capital of some large financial institutions, including two large thrift holding companies that ultimately failed. Through efforts to move certain large banks to the Basel II framework, U.S. federal financial regulators have sought to improve the risk-sensitivity of the risk-based capital framework.<sup>86</sup> However, FDIC officials told us that they are concerned that the advanced approaches of Basel II could require substantially less capital than Basel I. (For more detailed information about the Basel II framework, see app. IV.)

---

<sup>86</sup>For more about the U.S. efforts to transition large banks to the Basel II framework, see GAO, *Risk-Based Capital: Bank Regulators Need to Improve Transparency and Overcome Impediments to Finalizing the Proposed Basel II Framework*, [GAO-07-253](#) (Washington, D.C.: Feb. 15, 2007).

**Figure 8: Foreclosures by Year of Origination—Alt-A and Subprime Loans for the Period 2000 to 2007**



Source: GAO analysis of LoanPerformance data.

Note: Analysis excludes investor loans.

## Trading Book Risks

The financial crisis has highlighted limitations associated with the use of internal models by financial institutions to calculate capital requirements for their trading book assets.<sup>87</sup> Under the Market Risk Amendment adopted in 1996, banks with significant trading assets used internal risk models to determine how much capital to hold against the market risk of their trading book assets. Banks widely use Value-at-Risk (VaR) models to

<sup>87</sup>Trading book assets generally include securities that the bank holds in its trading portfolio and trades frequently. Trading book assets also can include securities that institutions intend to hold until maturity. For example, a security may be booked in the trading book because the derivative position used to hedge its return is in the trading book.

---

help measure their market risk.<sup>88</sup> The capital rules require the use of VaR models as well as an additional capital requirement for specific risk. According to a report published by the Financial Services Authority, banks generally attributed low risk to their trading book positions based on the use of their models before the crisis and, thus, were subjected to relatively low regulatory capital charges for their trading positions.<sup>89</sup> However, since the onset of the crisis, several large banks have suffered, among other losses on trading book assets, billions of dollars in writedowns on “super senior,” or highly rated CDOs. According to some regulators, losses on these financial instruments have been significantly higher than minimum capital charges implied by the institutions’ internal risk models. That is, the risk models underestimated the institutions’ risk exposures to CDOs. For some leveraged institutions, the size of these CDO positions were small relative to total assets, but the writedowns constituted a significant portion of total capital and led to a significant erosion of the institutions’ regulatory capital. As discussed earlier, all else equal, a small decline in assets will result in a larger percentage decrease in capital for a leveraged institution.

U.S. and international regulators have identified problems in the way that some financial institutions applied internal risk models to determine capital requirements and noted that the crisis has raised fundamental questions about the inherent limitations of such models and the assumptions and inputs employed by some users. For example, banks’ VaR models often relied on recent historical observation periods, rather than observations during periods of financial stress. An institution’s reliance on short-term data from a period of high liquidity and low market volatility generally would have suggested that certain trading book assets carried low risks and required little capital. According to one international regulator, in the years leading up to the crisis, VaR measures may have suggested declining risk when, in fact, risks associated with certain mortgage-related securities and other trading book positions—and capital

---

<sup>88</sup>VaR is a statistical measure of the potential loss in the fair value of a portfolio due to adverse movements in underlying risk factors. The measure is an estimate of the expected loss that an institution is unlikely to exceed in a given period with a particular degree of confidence. 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.

<sup>89</sup>See the Financial Services Authority, *The Turner Review: A Regulatory Response to the Global Banking Crisis* (London: March 2009). The Financial Services Authority is the United Kingdom’s financial regulator.

---

needs—were growing. However, even if longer time periods had been used, VaR models may not have identified the scale of risks associated with certain exposures because VaR measures do not fully capture risks associated with low-probability, high-stress events. Moreover, as the crisis illustrated, VaR primarily measures the price volatility of assets but does not capture other risks associated with certain trading assets, including default risk. Although the Basel market risk framework directed institutions to hold capital against specific risks such as default risk, according to regulatory officials we spoke with, capital charges for specific risk did not adequately capture the default risk associated with certain exposures. Because of the inherent limitations of VaR models, financial institutions also are required to use stress tests to determine how much capital and liquidity might be needed to absorb losses in the event of a large shock to the system or a significant underestimation of the probability of large losses. According to the Basel Committee on Banking Supervision, institutions should test not only for events that could lower their profitability but also for rare but extreme scenarios that could threaten their solvency. However, according to regulatory officials, many firms did not test for sufficiently extreme scenarios, including scenarios that would render them insolvent.

The crisis also revealed challenges with modeling the risks associated with relatively recent financial innovations. According to regulators, many market participants entered into new product lines without having sufficient data to properly measure the associated risks for determining capital needs. For example, the lack of historical performance data for CDOs presented challenges in estimating the potential value of these securities. In a March 2008 report, the Senior Supervisors Group—a body comprising senior financial supervisors from France, Germany, Switzerland, the United Kingdom, and the United States—reported that some financial institutions substituted price and other data associated with traditional corporate debt in their loss estimation models for similarly rated CDO debt, which did not have sufficient historical data.<sup>90</sup> Furthermore, CDOs may lack an active and liquid market, as in the recent market turmoil, forcing participants to look for other sources of valuation information when market prices are not readily available. For instance, market participants often turned to internal models and other methods to

---

<sup>90</sup>See Senior Supervisors Group, *Observations on Risk Management Practices during the Recent Market Turbulence* (New York: Mar. 6, 2008).

---

value these products, which raised concerns about the consistency and accuracy of the resulting valuation information.

## Liquidity risks

In addition to capital required for credit and market risks, regulators direct financial institutions to consider whether additional capital should be held against risks that are not explicitly covered by minimum regulatory capital requirements.<sup>91</sup> Liquidity risk—the risk that a bank will be unable to meet its obligations when they come due, because of an inability to liquidate assets or obtain adequate funding—is one such risk. Prior to the crisis, most large financial institutions qualified as “well-capitalized,” holding capital levels considered by regulators to exceed minimum requirements and provide some protection against risks such as liquidity risk. Regulators have noted that although strong capital positions can reduce the likelihood of liquidity pressures, capital alone is not a solution to inadequate liquidity. Many such “well-capitalized” institutions faced severe liquidity problems, underscoring the importance of liquidity risk management.

In particular, Bear Stearns, formerly a CSE, reported that it was in compliance with applicable rules with respect to capital and liquidity pools shortly before its failure, but SEC and Bear Stearns did not anticipate that certain sources of liquidity could rapidly disappear. According to SEC officials, Bear Stearns’ failure was due to a run on liquidity, not capital. Shortly after Bear Stearns’ failure, the then SEC Chairman noted that Bear Stearns failed in part when many lenders, concerned that the firm would suffer greater losses in the future, stopped providing funding to the firm, even on a fully-secured basis with high quality assets provided as collateral. SEC officials told us that neither they nor the broader regulatory community anticipated this development and that SEC had not directed CSEs to plan for the unavailability of secured funding in their contingent funding plans. SEC officials stated that no financial institution could survive without secured funding. Rumors about clients moving cash and security balances elsewhere and, more importantly, counterparties not transacting with Bear Stearns also placed strains on the firm’s ability to obtain secured financing. Prior to these liquidity pressures, Bear Stearns reported that it held a pool of liquid assets well in excess of the SEC’s required liquidity buffer, but this buffer

---

<sup>91</sup>Risk-based regulatory capital ratios measure credit risk, market risk, and (under Basel II) operational risk. Risks not measured under pillar I include liquidity risk, concentration risk, reputational risk, and strategic risk.

---

quickly eroded as a growing number of lenders refused to rollover short-term funding. Bear Stearns faced the prospect of bankruptcy as it could not continue to meet its funding obligations. Although SEC officials have attributed Bear Stearns' failure to a liquidity crisis rather than capital inadequacy, these officials and market observers also stated that concerns about the strength of Bear Stearns' capital position—particularly given uncertainty about the potential for additional losses on its mortgage-backed securities—may have contributed to a crisis of confidence among its lenders, counterparties, and customers.

Before Bear Stearns' collapse in March 2008, the Senior Supervisors Group noted that many financial institutions underestimated their vulnerability to the prolonged disruption in market liquidity that began in the summer of 2007. In a March 2008 report, the group noted that many firms were forced to fund exposures that had not been anticipated in their contingency funding plans. Notably, the sudden sharp drop-off in demand for securitizations forced some firms to retain loans that they had “warehoused” to package as securitized products, intending to transfer their credit risk to another entity. As a result, many banks retained credit exposure to certain assets over a far longer time horizon than expected, increasing the risk that they would suffer losses on these assets. In a strained funding environment, many banks also had to provide larger amounts of funding than expected against certain unfunded lending commitments made prior to the crisis.

## Off-Balance Sheet Risks

The financial crisis also has raised concerns about the management of and capital treatment for risks associated with certain off-balance sheet assets, including contingent liquidity and reputation risks. Many large financial institutions created SPEs to buy and hold mortgage-related securities and other assets that were previously on their balance sheets. For example, after new capital requirements were adopted in the late 1980s, some large banks began creating SPEs to hold assets against which they would have been required to hold more capital if the assets had been held in their institutions. SPEs also are known as off-balance sheet entities, because they generally are structured in such a way that their assets and liabilities are not required to be consolidated and reported as part of the overall balance sheet of the financial institution that created them. According to federal banking regulators, when a bank committed to provide contingent funding support to an SPE, it generally would have been required to hold a

---

small amount of capital against such a commitment.<sup>92</sup> For some types of SPEs, such as structured investment vehicles, banks provided no such contingent commitments and were subject to no capital charge. Nevertheless, some institutions retained significant reputation risk associated with their structured investment vehicles, even if they were under no legal obligation to provide financial support.<sup>93</sup>

The market turmoil in 2007 revealed that many institutions and regulators underestimated the contingent liquidity risks and reputation risks associated with their SPEs.<sup>94</sup> In a 2008 report, the Senior Supervisors Group noted that some firms failed to price properly the risk that exposures to certain off-balance sheet vehicles might need to be funded on the balance sheet precisely when it became difficult or expensive to raise such funds externally. Some off-balance sheet entities were structured in a way that left them vulnerable to market disruptions. For example, some SPEs held long-term assets (for example, financial institution debt and CDOs) financed with short-term liabilities (such as commercial paper), exposing them to the risk that they would find it difficult or costly to renew their debt financing under less-favorable market conditions.

When the turmoil in the markets began in 2007, some banks had to finance the assets held by their SPEs when those SPEs were unable to refinance their expiring debt due to market concerns over the quality of the assets. In some cases, SPEs relied on financing commitments that banks had extended to them. In other cases, financial institutions supported troubled SPEs to protect their reputations with clients even when no legal requirement to do so existed. Some large banks brought SPE assets onto their balance sheets where they became subject to capital requirements (see fig. 9). According to an official at the Federal Reserve, one large institution's decision to bring its structured investment vehicle assets onto the balance sheet did not have a significant, immediate impact on its

---

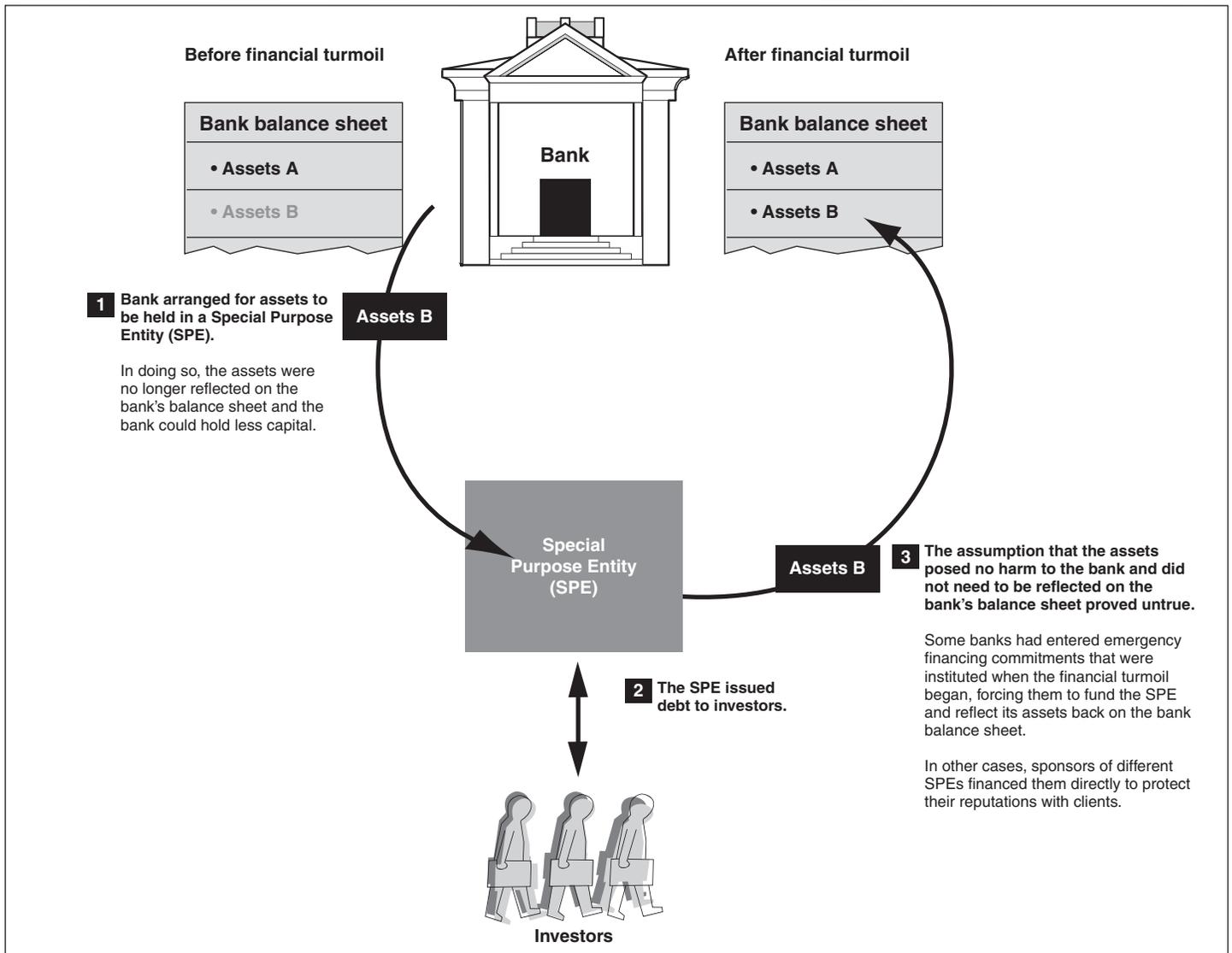
<sup>92</sup>Contingent funding support includes liquidity facilities and credit enhancements. Liquidity facilities are the assurance of a loan or guarantee of financial support to back up an off-balance sheet entity. Credit enhancements are defined as a contractual arrangement in which a bank retains or assumes a securitization exposure and, in substance, provides some degree of added protection to the parties to the transaction.

<sup>93</sup>Reputation risk is the potential for financial loss associated with negative publicity regarding an institution's business practices and subsequent decline in customers, costly litigation, or revenue reductions.

<sup>94</sup>Contingent liquidity risk refers to the risk that a bank would have to satisfy contractual or non-contractual obligations contingent upon certain events taking place.

capital ratio. Nevertheless, taking SPE assets onto their balance sheets required banks to hold capital against risk exposures that they previously had sought to transfer outside their institutions.

**Figure 9: Example of an Off-Balance Sheet Entity**



Source: GAO.

---

## Market Developments Have Challenged the Regulatory System's Ability to Oversee the Capital Adequacy of Financial Institutions

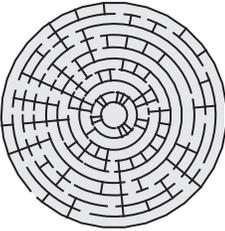
While regulators have the authority to require banks to hold capital in excess of minimum capital requirements, the crisis highlighted challenges they face in identifying and responding to capital adequacy problems before market stresses appear.<sup>95</sup> In prior work on the financial regulatory structure, we have noted that the current U.S. financial regulatory system has relied on a fragmented and complex arrangement of federal and state regulators that has not kept pace with the major developments that have occurred in financial markets and products in recent decades (see fig. 10).<sup>96</sup> The current system was not designed to adequately oversee today's large and interconnected financial institutions, the activities of which pose new risks to the institutions themselves as well as the risk that an event could affect the broader financial system (systemic risk). In addition, the increasingly critical role played by less-regulated entities, such as hedge funds, has further hindered the effectiveness of the financial regulatory system. Although many hedge fund advisors are now subject to some SEC oversight, some financial regulators and market participants remain concerned that hedge funds' activities can create systemic risk by threatening the soundness of other regulated entities and asset markets.

---

<sup>95</sup> 12 U.S.C. §1831o(c)(1)(B)(i).

<sup>96</sup> See [GAO-09-216](#).

**Figure 10: Key Developments and Resulting Challenges That Have Hindered the Effectiveness of the Financial Regulatory System**

Developments in financial markets and products	Examples of how developments have challenged the regulatory system
 <p><b>Emergence of large, complex, globally active, interconnected financial conglomerates</b></p>	<p>Regulators sometimes lack sufficient authority, tools, or capabilities to oversee and mitigate risks.</p> <p>Identifying, preventing, mitigating, and resolving systemic crises has become more difficult.</p>
 <p><b>Less-regulated entities have come to play increasingly critical roles in financial system</b></p>	<p>Nonbank lenders and a new private-label securitization market played significant roles in subprime mortgage crisis that led to broader market turmoil.</p> <p>Activities of hedge funds have posed systemic risks.</p> <p>Overreliance on credit ratings of mortgage-backed products contributed to the recent turmoil in financial markets.</p> <p>Financial institutions' use of off-balance sheet entities led to ineffective risk disclosure and exacerbated recent market instability.</p>
 <p><b>New and complex products that pose challenges to financial stability and investor and consumer understanding of risks.</b></p>	<p>Complex structured finance products have made it difficult for institutions and their regulators to manage associated risks.</p> <p>Growth in complex and less-regulated over-the-counter derivatives markets have created systemic risks and revealed market infrastructure weaknesses.</p> <p>Investors have faced difficulty understanding complex investment products, either because they failed to seek out necessary information or were misled by improper sales practices.</p> <p>Consumers have faced difficulty understanding mortgages and credit cards with new and increasingly complicated features, due in part to limitations in consumer disclosures and financial literacy efforts.</p> <p>Accounting and auditing entities have faced challenges in trying to ensure that accounting and financial reporting requirements appropriately meet the needs of investors and other financial market participants.</p>
 <p><b>Financial markets have become increasingly global in nature, and regulators have had to coordinate their efforts internationally.</b></p>	<p>Standard setters and regulators also face new challenges in dealing with global convergence of accounting and auditing standards.</p> <p>Fragmented U.S. regulatory structure has complicated some efforts to coordinate internationally with other regulators, such as negotiations on Basel II and certain insurance matters.</p>

Sources: GAO (analysis); Art Explosion (images).

In prior work on regulatory oversight of risk management at selected large institutions, we found that oversight of institutions' risk-management

---

systems before the crisis illustrated some limitations of the current regulatory system.<sup>97</sup> For example, regulators were not looking across groups of institutions to effectively identify risks to overall financial stability. In addition, primary, functional, and holding company regulators faced challenges aggregating certain risk exposures within large, complex financial institutions. According to one regulatory official, regulators faced difficulties understanding one large bank's subprime-related exposures, in part because these exposures were held in both the national bank and broker-dealer subsidiaries, each of which was overseen by a different primary or functional regulator. We found that regulators identified weaknesses in risk-management systems at the selected large, complex institutions before the crisis, but did not fully recognize the threats they posed and did not take forceful actions to address them until the crisis began.

---

### Regulators Have Proposed Revisions to the Regulatory Capital Framework, but Have Not Yet Reevaluated Basel II Implementation in Light of Risk-Evaluation Concerns

Since the crisis began, U.S. federal financial regulators have worked together and with international regulators, such as through the Group of Twenty and the Basel Committee on Banking Supervision, in considering reforms that could increase the risk coverage of the regulatory capital framework.<sup>98</sup> U.S. and international regulators have proposed revisions to the Basel market risk framework to better ensure that institutions hold adequate levels of capital against trading book exposures.<sup>99</sup> Proposed revisions include applying higher capital requirements to resecuritizations such as CDOs and applying the same capital treatment to these securitizations whether on the bank's trading or banking book.<sup>100</sup> Regulators also have suggested raising the capital requirements that apply to certain off-balance sheet commitments. In June 2009, the Financial Accounting Standards Board published new accounting standards related

---

<sup>97</sup>GAO, *Financial Regulation: Review of Regulators' Oversight of Risk Management Systems at a Limited Number of Large, Complex Financial Institutions*, GAO-09-499T (Washington, D.C.: Mar. 18, 2009).

<sup>98</sup>In April 2009, the Group of Twenty, which represents the world's leading and largest emerging economies, met in London to discuss the international response to the global financial crisis.

<sup>99</sup>In January 2009, the Basel Committee on Banking Supervision proposed revisions to the Basel II market risk framework.

<sup>100</sup>The Basel Committee on Banking Supervision has defined a resecuritization exposure as a securitization exposure where one or more of the underlying exposures is a securitization exposure.

---

to off-balance sheet entities, including a new rule that will require financial institutions to consolidate assets from certain SPEs.<sup>101</sup> In addition, regulators have issued recommendations related to improving risk management at institutions, including strengthening supervision of their VaR models and stress testing. As many institutions failed to anticipate the impact that liquidity pressures could have on their regulatory capital, regulators also have recommended ways to improve coordination of capital and liquidity planning. The current crisis demonstrated that risks such as liquidity and asset quality risks were increasing at institutions long before firms experienced losses that eroded capital. However, because capital can be a lagging indicator of problems that may threaten a firm's solvency, regulators have recommended that they and other market participants assess a broader range of risk indicators when assessing capital adequacy.

Although federal financial regulators have taken a number of steps to strengthen supervision of capital adequacy since the crisis began, they have not yet implemented proposals to increase the risk coverage of regulatory capital requirements. Among other actions, SEC staff are reviewing the liquidity of assets held by broker-dealers and considering whether capital charges for less liquid positions are appropriate, and the Federal Reserve has conducted stress tests to assess the capital adequacy of 19 banks under the Supervisory Capital Assessment Program and required 10 of the banks to raise capital to be better prepared to withstand a more adverse economic scenario. Federal financial regulators are continuing to work with international regulators in forums such as the Basel Committee on Banking Supervision, but have not formally revised capital requirements to address limitations revealed by the crisis or fully evaluated how some proposals would be implemented. For example, U.S. and international regulators have acknowledged the need to provide greater weight in determining capital adequacy to low-probability, high-loss events and are continuing to develop reforms to accomplish this goal. In its financial regulatory reform proposal released in June 2009, Treasury announced its intention to lead a working group of regulators and outside experts in conducting a reassessment of the existing regulatory capital framework for banks and bank holding companies and expressed support

---

<sup>101</sup>Statement 166 eliminates the exemption from consolidation for certain SPEs. A second new standard, Statement 167, requires ongoing reassessments of whether consolidation is appropriate for assets held by certain off-balance sheet entities. These new standards will impact financial institution balance sheets beginning in 2010.

---

for the Basel Committee's ongoing efforts to reform the Basel II framework.<sup>102</sup>

### Nonrisk-based Capital Requirements

In light of the risk-evaluation challenges revealed by the crisis, U.S. and international financial regulators and market observers have commented on the potential benefits of supplementing risk-based capital measures with a nonrisk-based capital requirement. While U.S. banks and bank holding companies were and continue to be subject to a minimum leverage ratio (Tier 1 Capital/Total Assets) and risk-based capital requirements, international banks based in industrialized countries generally were not subject to a minimum leverage requirement before and during the crisis. U.S. and international regulators have noted that the minimum leverage requirement can serve as an important backstop in the event that financial institutions quantify risks incorrectly, as many appear to have done in the years prior to the crisis. Moreover, the leverage ratio is easy to calculate and can be considered to cover areas that risk-based requirements do not currently address, such as interest rate risk and concentration risk. By limiting the total size of a firm's assets regardless of their associated risks, a minimum leverage requirement may serve to restrict the aggregate size of positions that might need to be simultaneously unwound during a crisis, thereby limiting the build-up of systemic risk. According to one regulatory official, subjecting institutions to both risk-based and minimum leverage requirements may reduce opportunities for regulatory arbitrage. However, the current crisis also illustrated limitations of the leverage ratio. For example, the U.S. leverage ratio requirement, as currently formulated, does not capture off-balance sheet exposures and, as a result, did not capture increasing risks associated with certain off-balance sheet vehicles. Furthermore, having a minimum leverage ratio in place did not safeguard against the failures and near-failures of some large financial institutions. Officials at some banks we spoke with noted that imposing a leverage ratio requirement conflicts with the purpose of moving to a conceptually more risk-sensitive capital allocation framework. Some bank officials expressed concern that the leverage ratio may, in some cases, provide disincentives for banks to hold low-risk assets on the balance sheet. However, according to the Federal Reserve, this disincentive does not present a regulatory capital problem from a prudential perspective so long as appropriate risk-based capital charges are levied against all assets and risk exposures that are retained by a bank. In a March 12, 2009, press release, the Basel Committee announced, among other things, its plan to improve the risk coverage of the capital framework and introduce a non-risk based supplementary measure.

In addition, the crisis highlighted some important concerns raised about the Basel II framework prior to the crisis, but federal financial regulators have not taken steps to formally reevaluate current U.S. plans to transition certain large financial institutions to Basel II. In our prior work on the U.S. Basel II transition, we noted that some regulators and market observers expressed concern about the ability of banks' models to adequately measure risks for regulatory capital purposes and the regulators' ability to oversee them. Although most U.S. banks have not yet implemented advanced risk-based approaches for credit risk, internal risk models applied by many U.S. firms before the crisis significantly underestimated risks and capital needs for trading book assets. Moreover, FDIC officials have indicated that capital requirements for most forms of credit risk under Basel II's advanced approaches will be substantially less than the Basel I requirements. Regulators already face resource constraints in hiring and retaining talent that are more binding than the resource constraints faced by the banks they regulate and this issue is likely to become more significant under Basel II. These resource constraints are a critical point because under Basel II regulators' judgment will likely play an increasingly important role in determining capital adequacy. In 2007, we recommended that regulators, at the end of the last transition period, reevaluate whether the advanced approaches of Basel II can and should be relied on to set appropriate capital requirements for the long term.<sup>103</sup> Federal financial regulators have proposed a study of banks' implementation of the advanced approaches after the second transitional year, but as a result of delays attributable in part to the financial crisis, it is unclear when this study will be completed. In 2008, we further recommended that regulators take steps jointly to plan for a study to determine if major changes need to be made to the advanced approaches or whether banks will be able to fully implement the current rule. We recommended that in their planning they consider, among other issues, the timing needs for the future evaluation of Basel II. Given the challenges regulators faced overseeing capital adequacy under Basel I, if regulators move forward with full implementation of Basel II before conducting such a reevaluation, changes to the regulatory capital framework may not

---

<sup>102</sup>Department of the Treasury, *Financial Regulatory Reform: A New Foundation* (Washington, D.C.: June 2009).

<sup>103</sup>[GAO-07-253](#).

---

address, and in some cases, possibly exacerbate limitations the crisis revealed in the regulatory framework. Federal Reserve officials with whom we spoke said that federal financial regulators are continuing to participate in international efforts to reevaluate the Basel II framework and expect the outcome of this work to influence U.S. Basel II implementation.

---

### Regulatory Capital Framework May Not Have Provided Adequate Incentives to Counteract Cyclical Leverage Trends and Regulators Are Considering Reforms to Limit Procyclicality

According to U.S. and international financial regulators, the tendency for leverage to move procyclically—increasing in strong markets and decreasing when market conditions deteriorate—can amplify business cycle fluctuations and exacerbate financial instability. As discussed earlier in this report, heightened systemwide leverage can increase the vulnerability of the financial system to a crisis, and when stresses appear, simultaneous efforts by institutions to deleverage may have adverse impacts on the markets and real economy. U.S. and international regulators, through forums such as the Financial Stability Forum and the Basel Committee on Banking Supervision, have expressed concern that the financial regulatory framework did not provide adequate incentives for firms to mitigate their procyclical use of leverage. For example, according to regulators, many financial institutions did not increase regulatory capital and other loss-absorbing buffers during the market upswing, when it would have been easier and less costly to do so.<sup>104</sup> Moreover, when the crisis began, rather than drawing down capital buffers in a controlled manner, these institutions faced regulatory requirements and market pressures to increase them. Although procyclicality may be inherent in banking to some extent, regulators have noted that elements of the regulatory framework may act as contributing factors.

Several interacting factors, including risk-measurement limitations, accounting rules, and market discipline can cause capital buffers to fall

---

<sup>104</sup>Other regulatory loss-absorbing buffers include loan loss provisions and margin and collateral requirements. Provisions for loan losses allow banks to recognize income statement losses for expected loan portfolio losses before they occur. Current accounting rules require recognition of a loan loss provision only when a loan impairment event takes place or events occur that are likely to result in future non-payment of a loan. Some observers have commented that earlier provisioning for loan losses may help to reduce the magnitude of financial losses that hit the income statement and deplete regulatory capital when market conditions deteriorate. To address the potential contribution of these other buffers to procyclicality, domestic and international regulators have proposed changes in a Financial Stability Forum report: *Report of the Financial Stability Forum on Addressing Procyclicality in the Financial System* (Basel, Switzerland: April 2009).

---

during a market expansion and rise during a contraction. With respect to risk-measurement limitations, the more procyclical the measurements of risk used to calculate regulatory capital requirements are, the more likely that these requirements will contribute to procyclical leverage trends. For example, U.S. and international regulators have noted that VaR measures of market risk tended to move procyclically before and during the crisis, particularly to the extent that banks relied on near-horizon estimates of quantitative inputs such as short-term volatility. In the years preceding the crisis, the internal risk models relying on such near-horizon estimates generally indicated that market risks were low, allowing banks to hold relatively small amounts of capital against trading book assets. Conversely, when measured risk spiked during the crisis, firms' models directed them to increase capital, when it was significantly more costly and difficult to do so. To the extent that risk measures are procyclical, the use of fair value accounting, which requires banks to periodically revalue trading book positions, also may contribute to procyclical leverage trends.<sup>105</sup> For example, when the fair value of super senior CDOs decreased suddenly, the associated writedowns taken in accordance with fair value accounting resulted in significant deductions to regulatory capital at some firms. Conversely, FDIC officials told us that attention should be given to whether regulatory rules motivated financial institutions to overvalue these illiquid instruments during the years leading up to the crisis. Finally, independent of regulatory requirements, market forces can influence the size of regulatory capital buffers through the market cycle. For example, banks consider the expectations of counterparties and credit rating agencies when deciding how much capital to hold.

U.S. and international financial regulators have acknowledged that limiting procyclical leverage trends is critical to improving the systemwide focus of the regulatory framework and have taken steps to assess possible reforms.<sup>106</sup> In addition to changes proposed to expand coverage of trading

---

<sup>105</sup>The financial crisis has highlighted challenges associated with balancing the goals of providing sufficient financial disclosures for investors and maintaining financial stability. The Financial Accounting Standards Board recently revised fair value accounting rules to allow firms to distinguish between losses arising from the underlying creditworthiness of assets and losses arising from market conditions.

<sup>106</sup>See [GAO-09-216](#). GAO included systemwide focus as one of nine elements in a proposed framework for evaluating financial regulatory reforms. Systemwide focus refers to having mechanisms to identify, monitor, and manage risks to the financial system regardless of the source of the risk or the institutions in which it is created.

---

book risks, U.S. and international regulators have suggested revising the Basel market risk framework to reduce reliance on cyclical VaR-based capital estimates. For example, the Basel Committee has proposed requiring banks to calculate a stressed VaR (in addition to the existing VaR requirement) based on historical data from a period of financial distress relevant to the firm's portfolio. While most U.S. banks have not fully implemented Basel II approaches for modeling capital needs for credit risks, U.S. financial regulators noted before the crisis that elements of the U.S. implementation of Basel II, including use of through-the-cycle measures of risk and stress testing practices, would help to moderate the cyclical nature of capital requirements.<sup>107</sup> However, federal financial regulators identified weaknesses with the stress testing practices of some large banks. In prior work, we recommended that federal financial regulators clarify the criteria that would be used for determining an appropriate average level of required capital and appropriate cyclical variation in minimum capital.<sup>108</sup> Although U.S. and international regulators have made progress in developing proposals to limit procyclical leverage trends, federal financial regulators have not formally incorporated such criteria into the regulatory framework.

Beyond limiting procyclicality arising from risk-measurement practices, U.S. and international regulators have acknowledged that additional measures may be needed to ensure that firms build adequate buffers during strong economic conditions and that they can draw down these buffers during periods of stress. Regulators have proposed implementing countercyclical buffers, such as through explicit adjustments to increase minimum capital requirements during a market expansion and reduce them in a contraction, but have acknowledged some challenges in designing and implementing such measures. For example, regulators would need to assess the appropriate balance of discretionary and non-discretionary measures in achieving adjustment of capital requirements throughout the cycle. One regulatory official told us that regulators face challenges identifying market troughs and, as a result, may find it difficult to adjust minimum capital requirements appropriately throughout the cycle. For example, uncertainty about the timing of an economic recovery may make it difficult in practice to reduce minimum capital requirements in a downturn. Furthermore, even if minimum regulatory capital requirements adjust appropriately, some procyclicality in buffers may be

---

<sup>107</sup>72 Fed. Reg. 69288, 69393 (Dec. 7, 2007).

<sup>108</sup>[GAO-07-253](#).

---

unavoidable as institutions respond to market expectations. As an example, an institution might face pressures from credit rating agencies and other market participants to reduce leverage as market strains appear, despite facing a lower minimum regulatory capital requirement. Finally, any such changes will need to incorporate ways to promote greater international consistency while reflecting differences in national economic cycles.

---

### Financial Regulatory System Does Not Provide Sufficient Attention to Systemic Risk

In our prior work, we have noted that a regulatory system should focus on risk to the financial system, not just institutions.<sup>109</sup> The financial crisis has highlighted the potential for financial market disruptions, not just firm failures, to be a source of systemic risk. Ensuring the solvency of individual institutions may not be sufficient to protect the stability of the financial system, in part because deleveraging by institutions could have negative spillover effects. During economic weakness or market stress, an individual institution's efforts to protect its own safety and soundness (by reducing lending, selling assets, or raising collateral requirements) can cause stress for other market participants and contribute to a financial crisis. With multiple regulators primarily responsible for individual markets or institutions, none of the financial regulators is tasked with assessing the risks posed by the systemwide buildup of leverage and sudden deleveraging that may result from the collective activities of many institutions. Without a single entity responsible for assessing threats to the overall financial system, regulators may be limited in their ability to prevent or mitigate future crises.

U.S. regulators have recognized that regulators often focus on the financial condition of individual institutions and not on the financial stability of the financial system. In an August 2008 speech, the Federal Reserve Chairman stated that U.S. regulation and supervision focuses, at least informally, on some systemwide elements but outlined some more ambitious approaches to systemwide regulation.<sup>110</sup> Examples included (1) developing a more fully integrated overview of the entire financial system, partly because the system has become less-bank centered; and (2) conducting stress tests for a range of firms and markets, in part to provide insight into how a sharp

---

<sup>109</sup>GAO-09-216.

<sup>110</sup>Federal Reserve Chairman Ben S. Bernanke, Opening Remarks at Kansas City Federal Reserve's Bank 2008 Symposium on Maintaining Stability in a Changing Financial System (August 2008).

change in asset prices might affect not only a particular institution but also impair liquidity in key markets. Regulators also have recommended that financial regulators monitor systemwide measures of leverage and measures of liquidity to enhance supervision of risks through the cycle. However, as the Federal Reserve Chairman has noted, the more comprehensive the regulatory approach, the more technically demanding and costly it would be for regulators and affected institutions.

Finally, creating a new body or designating one or more existing regulators with the responsibility to oversee systemic risk could serve to address a significant gap in the current U.S. regulatory system. Various groups, such as the Department of the Treasury, the Group of Thirty, and the Congressional Oversight Panel have put forth proposals for addressing systemic risk. Our analysis of these proposals found that each generally addresses systemic risk issues similarly by calling for a specific organization to be tasked with the responsibility of overseeing systemic risk in the financial system, but not all provided detail on which entity should perform this role or how it would interact with other existing regulators (see table 1).

**Table 1: Comparison of Various Regulatory Reform Proposals to Address Systemic Risk**

Proposal	How proposal addresses systemic risk
Treasury Financial Regulatory Reform Proposal (2009)	<ul style="list-style-type: none"> <li>• Calls for creation of a Financial Services Oversight Council (FSOC) to oversee systemic risk across institutions, products, and markets. FSOC would have eight members, including the Treasury Secretary and the Chairmen of the Federal Reserve, CFTC, FDIC, and SEC. FSOC would replace the President’s Working Group on Financial Markets and have a permanent, full-time staff.</li> <li>• Calls for stricter and more conservative regulatory capital, liquidity, and risk management requirements for all financial firms that are found to pose a threat to the U.S. economy’s financial stability based on their size, leverage, and interconnectedness.</li> <li>• FSOC would identify such financial firms as Tier 1 Financial Holding Companies and these firms all would be subject to consolidated supervision by the Federal Reserve.</li> </ul>
FDIC Chairman	<ul style="list-style-type: none"> <li>• Suggests creation of a systemic risk council (SRC) to oversee systemic risk across institutions, products, and markets. Treasury, FDIC, and the Federal Reserve, among others, would hold positions on SRC.</li> <li>• SRC would be responsible for setting capital and other standards designed to provide incentives to reduce or eliminate potential systemic risks.</li> <li>• SRC could have authority to overrule or force actions on behalf of other regulatory entities and would have authority to demand better information from systemically important entities.</li> </ul>

Proposal	How proposal addresses systemic risk
Federal Reserve Chairman	<ul style="list-style-type: none"> <li>• Calls for designation of an organization to oversee systemic risk across institutions, products, and markets.</li> <li>• Calls for strengthening regulatory standards for governance, risk management, capital, and liquidity.</li> <li>• Authority would look broadly at systemic risks, beyond the institution level to connections between institutions and other gaps in the current system.</li> </ul>
SEC Chairman	<ul style="list-style-type: none"> <li>• Calls for maintaining an independent capital markets regulator that focuses on investor protection and complements the role of any systemic risk regulator, in order to provide a more effective financial oversight regime.</li> <li>• Favors concept of a new “systemic risk council” comprised of the Treasury Department, Federal Reserve, FDIC, and SEC to monitor large institutions against financial threats and ensure sufficient capital levels and risk management.</li> <li>• Calls for bringing all OTC derivatives and hedge funds within a regulatory framework.</li> </ul>
Group of Thirty	<ul style="list-style-type: none"> <li>• Advocates consolidated supervision of all systemically important financial institutions.</li> <li>• Strengthens regulatory standards for risk management, capital, and liquidity.</li> <li>• Increases regulation and transparency of OTC derivatives markets.</li> </ul>
Congressional Oversight Panel	<ul style="list-style-type: none"> <li>• Calls for designation of an organization to oversee systemic risk across institutions, products, and markets.</li> <li>• Acknowledges the need for regulatory improvements regarding financial institution capital and liquidity.</li> <li>• Increases regulation and transparency of OTC derivatives markets.</li> </ul>
Treasury Blueprint (2008)	<ul style="list-style-type: none"> <li>• Designates an organization—the Federal Reserve—to have broad authority to oversee systemic risk across institutions, products, and markets.</li> <li>• Regulator would collect, analyze, and disclose information on systemically important issues and could examine institutions and generally take corrective actions to address problems.</li> <li>• Regulator could provide liquidity in systemic situations.</li> </ul>

Source: GAO analysis of regulatory reform proposals.

For such an entity to be effective, it would likely need to have the independent ability to collect information, conduct examinations, and compel corrective actions across all institutions, products, and markets that could be a source of systemic risk. Such a regulator could assess the systemic risks that arise within and across financial institutions, within specific financial markets, across the nation, and globally. However, policymakers should consider that a potential disadvantage of providing an agency or agencies with such broad responsibility for overseeing financial entities could be that it may imply new or increased official government support or endorsement, such as a government guarantee, of such activities, and thus encourage greater risk taking by these financial institutions and investors. To address such concerns, some have proposed that entities designated as systemically important could correspondingly have increased requirements for capital adequacy or leverage limitations to offset the advantages that they may gain from implied government

---

support. For example, in its recent proposal for financial regulatory reform, Treasury called for higher regulatory capital and other requirements for all financial firms found to pose a threat to financial stability based on their size, leverage, and interconnectedness to the financial system.

---

## Conclusions

The causes of the current financial crisis remain subject to debate and additional research. Nevertheless, some researchers and regulators have suggested that the buildup of leverage before the financial crisis and subsequent disorderly deleveraging have compounded the current financial crisis. In particular, some studies suggested that the efforts taken by financial institutions to deleverage by selling financial assets could lead to a downward price spiral in times of market stress and exacerbate a financial crisis. However, alternative theories provide possible explanations; for example, the drop in asset prices may reflect prices reverting to more reasonable levels after a period of overvaluation or it may reflect uncertainty surrounding the true value of the assets. In addition, deleveraging by restricting new lending could slow economic growth and thereby contribute to a financial crisis.

The federal regulatory capital framework can serve an important role in restricting the buildup of leverage at individual institutions and across the financial system and thereby reduce the potential for a disorderly deleveraging process. However, the crisis has revealed limitations in the framework's ability to restrict leverage and to mitigate crises. Federal financial regulators have proposed a number of changes to improve the risk coverage of the regulatory capital framework, but they continue to face challenges in identifying and responding to capital adequacy problems before unexpected losses are incurred. These challenges will take on greater significance as regulators consider changes under Basel II that would increase reliance on complex risk models for determining capital needs, placing even greater demands on regulators' judgment in assessing capital adequacy. Although advanced modeling approaches offer the potential to align capital requirements more closely with risks, the crisis has underscored the potential for uncritical application of these models to miss or understate significant risks, especially when underlying data are limited. Indeed, concerns that advanced approaches could result in unsafe reductions in risk-based capital requirements influenced decisions by U.S. regulators to retain the leverage ratio requirement and to slowly phase in Basel II over several years. In prior work on the U.S. transition to Basel II for certain large financial institutions, we recommended that regulators, at the end of the last transition period,

---

reevaluate whether the advanced approaches of Basel II can and should be relied on to set appropriate regulatory capital requirements in the long term. U.S. regulators plan to conduct an evaluation of the advanced approaches at the end of the second transitional year, but the timing of the completion of this study is uncertain. Without a timely reevaluation, regulators may not have the information needed to ensure that reforms to the regulatory capital framework adequately address the lessons learned from the crisis.

A principal lesson of the crisis is that an approach to supervision that focuses narrowly on individual institutions can miss broader problems that are accumulating in the financial system. In that regard, regulators need to focus on systemwide risks to and weaknesses in the financial system—not just on individual institutions. Although federal regulators have taken steps to focus on systemwide issues, no regulator has clear responsibility for monitoring and assessing the potential effects of a buildup in leverage in the financial system or a sudden deleveraging when financial market conditions deteriorate. However, leverage has been a source of problems in past financial market crises, such as the 1998 market disruptions involving Long-Term Capital Management. After that crisis, regulators recognized not only the need for better measures of leverage but also the difficulties in measuring leverage. Given the potential role leverage played in the current crisis, regulators clearly need to identify ways in which to measure and monitor systemwide leverage to determine whether their existing framework is adequately limiting the use of leverage and resulting in unacceptably high levels of systemic risk. In addition, research and experience have helped to provide insights on market, regulatory, and other factors that can reinforce the tendency for leverage to move procyclically and amplify business cycle fluctuations and exacerbate financial instability. Although regulators are taking action to address elements of the regulatory framework that may act as contributing factors, each regulator’s authority to address the issue is limited to the institutions it supervises. To that end, without a systemwide focus, regulators may be limited in their ability to prevent or mitigate future crises.

---

## Matter for Congressional Consideration

As Congress considers assigning a single regulator, a group of regulators, or a newly created entity with responsibility for overseeing systemically important firms, products, or activities to enhance the systemwide focus of the financial regulatory system, Congress may wish to consider the merits of tasking this systemic regulator with:

- 
- identifying ways to measure and monitor systemwide leverage and
  - evaluating options to limit procyclical leverage trends.

---

## Recommendation for Executive Action

The current financial crisis has shown that risk models, as applied by many financial institutions and overseen by their regulators, could significantly underestimate the capital needed to absorb potential losses. Given that the Basel II approach would increase reliance on complex risk models for determining a financial institution's capital needs and place greater demands on regulators' judgment in assessing capital adequacy, we recommend that the heads of the Federal Reserve, FDIC, OCC, and OTS apply lessons learned from the current crisis and assess the extent to which Basel II reforms proposed by U.S. and international regulators may address risk evaluation and regulatory oversight concerns associated with advanced modeling approaches. As part of this assessment, the regulators should determine whether consideration of more fundamental changes under a new Basel regime is warranted.

---

## Agency Comments and Our Evaluation

We provided the heads of the Federal Reserve, FDIC, OCC, OTS, SEC, and Treasury with a draft of this report for their review and comment. We received written comments from the Federal Reserve, FDIC, OCC, and SEC. These comments are summarized below and reprinted in appendixes V through VIII. We did not receive written comments from OTS and Treasury. Except for Treasury, the agencies also provided technical comments that we incorporated in the report where appropriate.

The Federal Reserve commented that high levels of leverage throughout the global financial system contributed significantly to the current financial crisis. It agreed that the recent crisis has uncovered opportunities to improve the risk sensitivity of the Basel I- and Basel II-based risk-based capital standards and noted that its staff is involved in current international efforts to strengthen minimum capital requirements. The Federal Reserve concurred with our recommendation for a more fundamental review of the Basel II capital framework, including risk evaluation and regulatory oversight concerns associated with the advanced approaches.

FDIC commented that the excessive use of leverage during the buildup to the crisis made individual firms and the financial system more vulnerable to shocks and reduced the regulators' ability to intervene before problems cascaded. FDIC also agreed with our recommendation and noted that it,

---

along with other U.S. banking agencies, is working with the Basel Committee to develop proposals to address regulatory concerns discussed in our report. To the extent such proposals do not address the concerns, FDIC noted that it will consider the matter as part of the interagency review of Basel II that the agencies committed by regulation to undertake and will propose suitable remedies, if needed.

OCC agreed that recent events have highlighted certain weaknesses in its regulatory capital framework (both Basel I-based and Basel II) and noted that it is in the process of making modifications to address such weaknesses. It commented that Basel II lays a strong foundation for addressing supervisory challenges and remains committed to scrutinizing and improving the framework. With respect to our recommendation, OCC reiterated that it, along with the other banking agencies, will develop more formal plans to study the implementation of Basel II after a firmer picture of banks' implementation progress develops.

Finally, SEC staff commented that our recommendation is a valuable contribution and will take it into consideration in its recommendations to the SEC Commission. The staff also commented that SEC rules, including the broker-dealer net capital rule, largely conform to our conclusion that regulators need to identify ways in which to monitor and measure systemwide leverage to determine whether their existing framework is adequately limiting the use of leverage. Finally, the staff noted that SEC, along with other financial regulators, should build on and strengthen approaches that have worked, while taking lessons from what has not worked in order to be better prepared for future crises.

---

We are sending copies of this report to the Congressional Oversight Panel and interested congressional parties, the Chairman of the Board of Governors of the Federal Reserve System, the Chairman of FDIC, the Comptroller of the Currency, the Director of OTS, the Chairman of SEC, and the Secretary of the Treasury. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

---

If you or your staff have any questions regarding this report, please contact me at (202) 512-5837 or [williamso@gao.gov](mailto:williamso@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix X.



Orice Williams Brown  
Director, Financial Markets  
and Community Investment

---

*List of Congressional Committees*

The Honorable Christopher J. Dodd  
Chairman

The Honorable Richard C. Shelby  
Ranking Member  
Committee on Banking, Housing, and Urban Affairs  
United States Senate

The Honorable Barney Frank  
Chairman

The Honorable Spencer Bachus  
Ranking Member  
Committee on Financial Services  
House of Representatives

---

# Appendix I: Scope and Methodology

---

To assess the way in which the leveraging and deleveraging by financial institutions has contributed to the current financial crisis, we reviewed and summarized academic and other studies that included analysis of deleveraging as a potential mechanism for propagating a market disruption. Based on our searches of research databases (EconLit, Google Scholar, and the Social Science Research Network), we identified 15 studies, which included published and working papers that were released between 2008 and 2009. (See the bibliography for the studies included in our literature review.) Given our mandate, our literature search and review focused narrowly on deleveraging by financial institutions, although other economic mechanisms might have played a role in propagating the disruptions in the subprime mortgage markets to other financial markets. Based on our selection criteria, we determined that the 15 studies were sufficient for our purposes. Nonetheless, these studies do not provide definitive findings about the role of deleveraging relative to other mechanisms, and we relied on our interpretation and reasoning to develop insights from the studies reviewed. To obtain information on the ways that financial institutions increased their leverage before the crisis and deleveraged during the crisis and effects such activities had, we interviewed officials from two securities firms that used to participate in SEC's now defunct Consolidated Supervised Entity Program (CSE), a large bank, and a credit rating agency. We also interviewed staff from the Board of Governors of the Federal Reserve System (Federal Reserve), Federal Reserve Bank of New York, Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), Office of Thrift Supervision (OTS), and Securities and Exchange Commission (SEC) for the same purposes.

To describe regulations that federal financial regulators have adopted to try to limit the use of leverage by financial institutions and federal oversight of the institutions' compliance with the regulations, we reviewed and analyzed relevant laws and regulations, and other regulatory guidance and materials, related to the federal oversight of the use of leverage by financial institutions. For example, we reviewed examination manuals and capital adequacy guidelines for banks and bank holding companies used by their respective federal bank regulators. In addition, we reviewed SEC's net capital guidelines for broker-dealers. We also reviewed the extensive body of work that GAO has completed on the regulation of banks, securities firms, hedge funds, and other financial institutions. In addition, we interviewed staff from the Federal Reserve, FDIC, OCC, OTS, and SEC about the primary regulations their agencies have adopted to limit the use of leverage by their regulated financial institutions and their regulatory framework for overseeing the capital adequacy of their institutions. To

obtain more detailed information, we interviewed Federal Reserve Bank of New York and OCC examiners responsible for supervising a bank holding company and two national banks, respectively. We also interviewed officials from two securities firms and one bank to obtain information on the effect federal regulations had on their use of leverage. Finally, to gain insights on the extent to which federal financial regulators used their regulatory tools to limit the use of leverage, we also reviewed testimonies provided by officials of federal financial regulatory agencies as well as reports by the offices of inspector general at the Department of the Treasury and SEC.

To identify and analyze limitations in the regulatory framework used to restrict leverage and changes that regulators and others have proposed to address such limitations, we reviewed and analyzed relevant reports, studies, and public statements issued by U.S. and international financial regulators. Specifically, to identify potential limitations in the regulatory capital framework, we reviewed analyses and recommendations published by regulators through working groups such as the President's Working Group on Financial Markets,<sup>1</sup> the Basel Committee on Banking Supervision,<sup>2</sup> the Financial Stability Forum,<sup>3</sup> and the Senior Supervisors'

---

<sup>1</sup>The President's Working Group on Financial Markets was established by Executive Order No. 12631, 53 Fed. Reg. 9421 (Mar. 18, 1988). The Secretary of the Treasury chairs the group, the other members of which are the chairpersons of the Federal Reserve, SEC, and Commodity Futures Trading Commission. The group was formed to enhance the integrity, efficiency, orderliness, and competitiveness of the U.S. financial markets and maintain investor confidence in those markets.

<sup>2</sup>The Basel Committee on Banking Supervision (Basel Committee) seeks to improve the quality of banking supervision worldwide, in part by developing broad supervisory standards. The Basel Committee consists of central bank and regulatory officials from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong SAR, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. The Basel Committee's supervisory standards are also often adopted by nonmember countries.

<sup>3</sup>The Financial Stability Forum comprises national financial authorities (central banks, supervisory authorities, and finance ministries) from the G7 countries, Australia, Hong Kong, Netherlands, Singapore, and Switzerland, as well as international financial institutions, international regulatory and supervisory groupings, committees of central bank experts and the European Central Bank. In April 2009, the Financial Stability Forum was re-established as the Financial Stability Board, with a broadened mandate to promote financial stability.

Group.<sup>4</sup> To obtain perspectives on limitations revealed by the crisis and regulatory efforts to address these limitations, we also spoke with officials from the federal financial regulators and market participants (two securities firms, a large bank, and a credit rating agency) discussed above. Finally, we reviewed prior GAO work on the need to modernize the financial regulatory system and the U.S. transition to Basel II for certain large financial institutions.

For our three objectives, we collected and analyzed data for descriptive purposes. For example, to identify leverage trends, we collected and analyzed publicly available financial data on selected financial institutions, including large broker-dealer and bank holding companies, and industrywide data, including the Federal Reserve's Flow of Funds data and Bureau of Economic Analysis's gross domestic product data. To illustrate trends in margin debt, we used margin debt data from the New York Stock Exchange and market capitalization data from the World Federation of Exchanges. To describe foreclosure trends, we collected and analyzed LoanPerformance's foreclosure data on certain types of mortgages. We assessed the reliability of the data and found they were sufficiently reliable for our purposes.

We conducted this performance audit from February 2009 and July 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

---

<sup>4</sup>The Senior Supervisors Group is composed of eight supervisory agencies: France's Banking Commission, Germany's Federal Financial Supervisory Authority, the Swiss Federal Banking Commission, the Financial Services Authority, the Federal Reserve, the Federal Reserve Bank of New York, OCC, and SEC.

---

# Appendix II: Briefing to Congressional Staff

---



DRAFT

---

## Briefing to Staff of the Senate Committee on Banking, Housing and Urban Affairs

---

Mandated Report on Leveraging and Deleveraging by  
Financial Institutions and the Current Financial Crisis  
Preliminary Findings

May 27, 2009

---



DRAFT

---

# Briefing to Staff of the House Committee on Financial Services

---

Mandated Report on Leveraging and Deleveraging by  
Financial Institutions and the Current Financial Crisis  
Preliminary Findings

May 27, 2009

---



DRAFT

---

## Briefing to Staff of the Congressional Oversight Panel

---

### Mandated Report on Leveraging and Deleveraging by Financial Institutions and the Current Financial Crisis Preliminary Findings

May 27, 2009

---



Briefing Outline

- Objectives
- Scope and Methodology
- Background
- Summary
- Leverage Increased before the Crisis, and Research Suggests That Subsequent Deleveraging Could Have Contributed to the Crisis
- Financial Regulators Seek to Limit Financial Institutions' Use of Leverage Primarily through Varied Regulatory Capital Requirements
- Crisis Revealed Limitations in Regulatory Framework for Restricting Leverage, and Regulators Are Considering Reforms to Improve Rules and Oversight

DRAFT – Preliminary Findings



Objectives

- Objectives
  - How have the leveraging and deleveraging by financial institutions contributed to the current financial crisis, according to primarily academic and other studies?
  - What regulations have federal financial regulators adopted to try to limit the use of leverage by financial institutions, and how do the regulators oversee the institutions' compliance with the regulations?
  - What, if any, limitations has the current financial crisis revealed about the regulatory framework used to restrict leverage, and what changes have regulators and others proposed to address these limitations?

DRAFT – Preliminary Findings



## Scope and Methodology

- To accomplish our objectives, we
  - reviewed and analyzed academic and other studies assessing the economic mechanisms that possibly helped the mortgage-related losses spread to other markets and expand into the current financial crisis;
  - analyzed publicly available financial data for selected financial institutions and industrywide data, including the Board of Governors of the Federal Reserve System's (Federal Reserve) Flow of Funds data, to identify leverage trends;
  - reviewed and analyzed relevant laws and regulations, and other regulatory guidance and materials, related to the federal oversight of the use of leverage by financial institutions;
  - interviewed federal financial regulators and market participants, including officials from a bank, two securities firms, and a credit rating agency;
  - reviewed and analyzed studies identifying challenges associated with the regulation and oversight of the use leverage by financial institutions and proposals to address such challenges; and
  - reviewed prior GAO work on the financial regulatory system.

DRAFT – Preliminary Findings



Background

- The financial services industry comprises a broad range of financial institutions.
- In the United States, large parts of the financial services industry are regulated under a complex system of multiple federal and state regulators and self-regulatory organizations that operate largely along functional lines.
  - Bank supervisors include the Federal Reserve, Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC), and Office of Thrift Supervision (OTS).
  - Other functional supervisors include the Securities and Exchange Commission (SEC), self-regulatory organizations, and state insurance regulators.
  - Consolidated supervisors are the Federal Reserve and OTS.

DRAFT – Preliminary Findings



- Leverage can be defined and measured in numerous ways.
  - One broad definition is the ratio between some measure of risk and capital.
  - A simple measure of balance sheet leverage is the ratio of total assets to equity, but this measure treats all assets as equally risky.
  - A risk-based leverage measure, as used by regulators, is the ratio of capital to risk-weighted assets.
- Many financial institutions use leverage to expand their ability to invest or trade in financial assets and to increase their return on equity.
- Financial institutions can increase their leverage, or their risk exposure relative to capital, in a number of ways. For example, they can use borrowed funds, rather than capital, to finance an asset or enter into derivatives contracts.

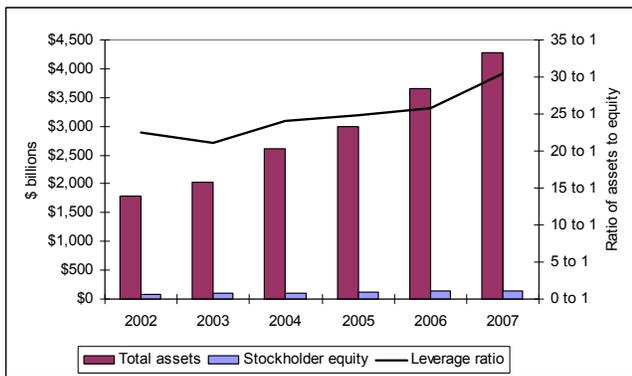
DRAFT – Preliminary Findings



Background

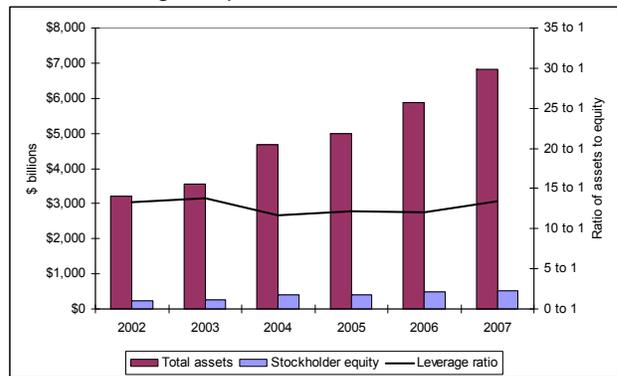
- Figures 1 and 2 show the changes in balance sheet leverage in aggregate for five large broker-dealer and bank holding companies, respectively, from 2002 to 2007.

Figure 1: Assets-to-Equity Ratio for Five Large U.S. Broker-Dealer Holding Companies, 2002 to 2007



Source: GAO analysis of annual report data for Bear Stearns, Goldman Sachs, Lehman Brothers, Morgan Stanley, and Merrill Lynch.

Figure 2: Assets-to-Equity Ratio for Five Large U.S. Bank Holding Companies, 2002 to 2007



Source: GAO analysis of annual report and Federal Reserve Y-9C data for Bank of America, Citigroup, JP Morgan Chase, Wachovia, and Wells Fargo.

DRAFT – Preliminary Findings



Summary

- Studies we reviewed suggested that leverage increased before the current crisis and deleveraging by financial institutions could have contributed to the current crisis in two ways. Specifically, deleveraging through (1) sales of financial assets during times of market stress could lead to downward price spirals for such assets and (2) the restriction of new lending could slow economic growth. However, these studies do not provide definitive findings.
- For financial institutions subject to regulation, federal financial regulators primarily limit the use of leverage by such institutions through varied regulatory capital requirements. In addition, regulators can oversee the capital adequacy of their regulated institutions through ongoing monitoring, which includes on-site examinations and off-site tools. However, other entities such as hedge funds generally are not subject to regulation that directly restricts their leverage; instead, market discipline plays the primary role in constraining risk taking and leveraging by hedge funds.

DRAFT – Preliminary Findings



Summary

- The financial crisis has revealed limitations in existing regulatory approaches used to restrict leverage. According to regulators, the regulatory capital framework did not ensure that institutions held capital commensurate with their risks and did not provide adequate incentives for institutions to build prudential buffers during the market upswing. When the crisis began, many institutions lacked the capital needed to absorb losses and faced pressure to deleverage. Regulators have called for reforms to improve the risk coverage of the regulatory capital framework and the systemwide focus of the financial regulatory system.

DRAFT – Preliminary Findings



## Leveraging and Deleveraging Could Have Contributed to the Crisis

- Leverage within the financial sector increased before the financial crisis began around mid-2007, and financial institutions have attempted to deleverage since the crisis began.
  - Since no single measure of leverage exists, the studies we reviewed generally identified sources that aided in the build up of leverage before the crisis. These sources included the use of repurchase agreements, special purpose entities, and over-the-counter derivatives, such as credit default swaps.
  - Studies we reviewed found that banks have tended to manage their leverage in a procyclical manner—increasing their leverage when prices rise and decreasing their leverage when prices fall.
  - Despite generally reducing their exposure to subprime mortgages through securitization, some banks ended up with large exposures to such mortgages relative to their capital. For example, some banks held mortgage-related securities for trading or investment purpose; some were holding mortgages or mortgage-related securities that they planned to securitize but could not do so after the crisis began, and some brought onto their balance sheets mortgage-related securities held by structured investment vehicles.
  - Following the onset of the financial crisis, banks and financial institutions have attempted to deleverage in a number of ways, including raising equity and selling assets.

DRAFT – Preliminary Findings



## Leveraging and Deleveraging Could Have Contributed to the Crisis

- Some studies suggested that deleveraging through asset sales could lead to downward spirals in asset prices under certain circumstances and contribute to a crisis.
  - In theory, a sharp decline in an asset's price can become self-sustaining and lead to a financial market crisis, because financial intermediation has moved into markets and away from institutions. But not all academics subscribe to this theory.
  - Studies we reviewed suggested that deleveraging through asset sales can lead to a downward asset spiral during times of market stress when market liquidity is low.
  - Studies we reviewed also suggested that deleveraging through asset sales could lead to a downward asset spiral when funding liquidity, or the ease with which firms can obtain funding, is low.
- Alternative theories also may help to explain the recent decline in asset prices.

DRAFT – Preliminary Findings



Leveraging and Deleveraging Could Have Contributed to the Crisis

- Studies suggested that deleveraging by restricting new lending could have a negative effect on economic growth.
  - The concern is that banks will need to cut back their lending to restore their balance sheets, leading to a decline in consumption and investment spending, which reduces business and household incomes and negatively affects the real economy.
  - A former Federal Reserve official noted that banks are important providers of credit, but a key factor in the current crisis is the sharp decline in securities issuance, which has to be an important part of why the current financial market turmoil is affecting economic activity. The official said that the mortgage credit losses are a problem because they are hitting bank balance sheets at the same time that the securitization market is experiencing difficulties.

DRAFT – Preliminary Findings



## Leveraging and Deleveraging Could Have Contributed to the Crisis

- Regulators and market participants that we interviewed had mixed views about the effects of deleveraging in the current crisis.
  - Some regulators and market participants said that asset sales generally have not led to downward price spirals, but others said that asset sales of a broad range of debt instruments have led to such spirals.
  - Regulators and market participants told us that some banks have tightened their lending standards for some types of loans, such as ones that have less favorable risk-adjusted returns or have been performing poorly. Federal bank examiners told us that the tightening of lending standards corresponded with a decline in loan demand.
  - Federal bank examiners told us that large banks rely on their ability to securitize loans to facilitate their ability to make such loans and, thus the inability to securitize loans has impaired their ability to make loans.
  - Since the crisis began, federal regulators and other authorities have facilitated financial intermediation by banks and the securities markets.

DRAFT – Preliminary Findings



## Federal Financial Regulatory Oversight of Use of Leverage by Financial Institutions

- Federal banking and thrift regulators (Federal Reserve, FDIC, OCC and OTS) try to restrict the use of leverage by their regulated financial institutions primarily through minimum risk-based capital and leverage requirements.
  - Banks and thrifts are required to meet two minimum risk-based capital ratios. However, regulators told us that they can require an institution to meet more than the minimum requirements if, for example, the institution has concentrated positions or a high risk profile.
  - Regulators impose minimum leverage ratios on banks and thrifts to provide a cushion against risks not explicitly covered in the risk-based capital requirements (such as for operational weaknesses in internal policies, systems, and controls).
  - Regulators are required to classify institutions based on their level of capital and take increasingly severe actions, known as prompt corrective action, as an institution's capital deteriorates.
- Federal bank and thrift regulators oversee the capital adequacy of their regulated institutions through ongoing monitoring, which includes on-site examinations and off-site tools.
  - Examiners evaluate the institution's overall risk exposure with particular emphasis on what is known as 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.

DRAFT – Preliminary Findings



## Federal Financial Regulatory Oversight of Use of Leverage by Financial Institutions

- Regulators can also use off-site tools to monitor the capital adequacy of institutions such as by remotely assessing the financial condition of their regulated institutions and plan the scope of on-site examinations.
- Regulators also can conduct targeted reviews, such as those related to capital adequacy of their regulated entities.
- Although bank holding companies are subject to similar capital and leverage ratio requirements as banks, thrift holding companies are not subject to such requirements.
  - Bank holding companies are subject to risk-based capital and leverage ratio requirements, which are similar to those applied to banks.
  - In contrast, OTS requires that thrift holding companies hold a “prudential” level of capital on a consolidated basis to support the risk profile of the company.
  - To supervise the capital adequacy of bank and thrift holding companies, the Federal Reserve and OTS, respectively, focus on those business activities posing the greatest risk to holding companies and managements’ processes for identifying, measuring, monitoring, and controlling those risks.
  - The Federal Reserve and OTS have a range of formal and informal actions they can take to enforce their regulations for holding companies and they also monitor the capital adequacy of their respective regulated holding companies by obtaining uniform information from their holding companies and conducting peer analysis.

DRAFT – Preliminary Findings



Federal Financial Regulatory Oversight of  
Use of Leverage by Financial Institutions

- SEC regulated the use of leverage by broker-dealers participating in SEC's Consolidated Supervised Entity (CSE) program under an alternative net capital rule from 2005 to 2008.
  - Under the alternative net capital rule, CSE broker-dealers were required to hold minimum levels of net capital (i.e., net liquid assets) but permitted to use their own internal models to calculate their haircuts for the credit and market risk associated with their trading and investment positions. SEC required as a safeguard that they maintain at least \$500 million in net capital and at least \$1 billion in tentative net capital (equity before haircut deductions). SEC staff said that CSE broker-dealers, in effect, had to maintain a minimum of \$5 billion in tentative net capital or face remedial action.
  - The CSE holding companies calculated their risk-based capital ratio consistent with the method banks used, were expected to maintain a risk-based capital ratio of no less than 10 percent, and had to notify SEC if they breached or were likely to breach this ratio.
  - SEC also expected each CSE holding company to maintain a liquid portfolio of cash and highly liquid and highly rated debt instruments in an amount based on its liquidity risk management analysis.
  - SEC's Division of Trading and Markets had responsibility for administering the CSE program, and SEC's continuous supervision of CSEs usually was conducted off site.

DRAFT – Preliminary Findings



## Federal Financial Regulatory Oversight of Use of Leverage by Financial Institutions

- Other entities, such as hedge funds, have become important financial market participants, and many use leverage. However, they generally are not subject to regulation that directly restricts their use of leverage but may face limitations through market discipline.
  - Although hedge funds generally are not subject to regulatory capital requirements, SEC and the Commodity Futures Trading Commission (CFTC) regulate some hedge fund advisers and subject them to disclosure requirements.
  - Large banks and prime brokers bear the credit and counterparty risks that hedge fund leverage creates. They may seek to impose market discipline on hedge funds primarily by exercising counterparty risk management through due diligence, monitoring, and requiring additional collateral to secure existing exposures and provide a buffer against future exposures.
  - SEC, CFTC, and bank regulators also use their authority to establish capital standards and reporting requirements, conduct risk-based examinations, and take enforcement actions to oversee activities of their regulated institutions acting as creditors and counterparties to hedge funds.
- The Federal Reserve limits investors' use of credit to purchase securities under Regulation T and U, but regulators told us such credit did not play a significant role in the buildup of leverage because market participants can obtain credit elsewhere where these regulations do not apply.

DRAFT – Preliminary Findings



## Crisis Revealed Limitations in Regulatory Framework for Restricting Leverage

The existing regulatory capital framework did not fully capture certain risks.

- A key goal of the regulatory capital framework is to align capital requirements with risks.
- However, according to regulators, many large financial institutions and their regulators underestimated capital needs for certain risk exposures.
  - **Credit risks** – The limited risk-sensitivity of the Basel I framework allowed banks to increase certain credit risk exposures without making commensurate increases in their capital requirements.
  - **Trading book risks** – Internal risk models, as applied by some large banks, underestimated the market risk and capital needs for certain trading assets.
  - **Liquidity risks** – Many institutions underestimated their vulnerability to a prolonged disruption in market liquidity.
  - **Off-balance sheet exposures** – Some large banks held no capital against the risk that certain special purpose entity (SPE) assets could have to be brought back on the bank's balance sheet if these entities experienced difficulties.
- The crisis illustrated challenges with increasing reliance on internal risk models for calculating capital requirements.
- Through forums such as the President's Working Group on Financial Markets and the Financial Stability Forum, U.S. and foreign regulators have called for changes to better align capital requirements with risks.

DRAFT – Preliminary Findings



## Crisis Revealed Limitations in Regulatory Framework for Restricting Leverage

The regulatory framework may contribute to procyclical leverage trends.

- According to regulators, the tendency for leverage to move procyclically—increasing in strong markets and decreasing when market conditions deteriorate—can amplify business cycle fluctuations and exacerbate financial instability.
- U.S. regulators have expressed concern that capital requirements did not provide adequate incentives to increase loss-absorbing capital buffers during the market upswing, when it would have been less costly to do so.
- According to regulators, several interacting factors can cause capital buffers to fall during a market expansion and rise during a contraction. These factors include:
  - limitations in risk measurement,
  - accounting rules, and
  - market discipline.

DRAFT – Preliminary Findings



## Crisis Revealed Limitations in Regulatory Framework for Restricting Leverage

The current regulatory framework does not adequately address systemic risk.

- The regulatory system focuses on the solvency of individual institutions, but more attention to other sources of systemic risk is needed.
- For example, during a period of market stress, an individual institution's efforts to protect its safety and soundness can cause stress for other market participants and heighten systemic risk.
- Regulatory officials have acknowledged the need to improve the systemwide focus of the financial regulatory system and suggested changes include:
  - taking steps to limit the contribution of the regulatory framework to procyclicality;
  - use of sector-level leverage ratios and systemwide stress tests; and
  - creation of a systemic regulator.

DRAFT – Preliminary Findings

---

# Appendix III: Transition to Basel II Has Been Driven by Limitations of Basel I and Advances in Risk Management at Large

---

(Information in this appendix is based solely on a GAO report issued in early 2007.<sup>1</sup> Thus, the information does not capture any of the events that have transpired since the current financial crisis began.)

When established internationally in 1988, Basel I represented a major step forward in linking capital to risks taken by banking organizations, strengthening banks' capital positions, and reducing competitive inequality among international banks. Regulatory officials have noted that Basel I continues to be an adequate capital framework for most banks, but its limitations make it increasingly inadequate for the largest and most internationally active banks. As implemented in the United States, Basel I consists of five broad credit risk categories, or risk weights (table 2).<sup>2</sup> Banks must hold total capital equal to at least 8 percent of the total value of their risk-weighted assets and tier 1 capital of at least 4 percent. All assets are assigned a risk weight according to the credit risk of the obligor and the nature of any qualifying collateral or guarantee, where relevant. Off-balance sheet items, such as credit derivatives and loan commitments, are converted into credit equivalent amounts and also assigned risk weights. The risk categories are broadly intended to assign higher risk weights to—and require banks to hold more capital for—higher risk assets.

---

<sup>1</sup>See GAO, *Risk Based Capital: Bank Regulators Need to Improve Transparency and Overcome Impediments to Finalizing Basel II Framework*, [GAO-07-253](#) (Washington, D.C.: Feb. 15, 2007).

<sup>2</sup>In addition to the risk weights in table 2, a dollar-for-dollar capital charge applies for certain recourse obligations. See 66 Fed. Reg. 59614, 59620 (Nov. 29, 2001).

**Appendix III: Transition to Basel II Has Been Driven by Limitations of Basel I and Advances in Risk Management at Large**

**Table 2: U.S. Basel I Credit risk Categories**

<b>Major assets</b>	<b>Risk weight</b>
Cash: claims on or guaranteed by central banks of Organization for Economic Cooperation and Development countries; claims on or guaranteed by Organization for Economic Cooperation and Development central governments and U.S. government agencies. The zero weight reflects the lack of credit risk associated with such positions.	0%
Claims on banks in Organization for Economic Cooperation and Development countries, obligations of government-sponsored enterprises, or cash items in the process of collection.	20%
Most one-to-four family residential mortgages; certain privately issued mortgage-backed securities and municipal revenue bonds.	50%
Represents the presumed bulk of the assets of commercial banks. It includes commercial loans, claims on non-Organization for Economic Cooperation and Development central governments, real assets, certain one-to-four family residential mortgages not meeting prudent underwriting standards, and some multifamily residential mortgages.	100%
Asset-backed and mortgage-backed securities and other on-balance sheet positions in asset securitizations that are rated one category below investment grade.	200%

Source: GAO analysis of federal regulations. See, e.g., 12 C.F.R. Part 3, App. A (OCC).

However, Basel I's risk-weighting approach does not measure an asset's level of risk with a high degree of accuracy, and the few broad categories available do not adequately distinguish among assets within a category that have varying levels of risk. For example, although commercial loans can vary widely in their levels of credit risk, Basel I assigns the same 100 percent risk weight to all these loans. Such limitations create incentives for banks to engage in regulatory capital arbitrage—behavior in which banks structure their activities to take advantage of limitations in the regulatory capital framework. By doing so, banks may be able to increase their risk exposure without making a commensurate increase in their capital requirements.

In addition, Basel I recognizes the important role of credit risk mitigation activities only to a limited extent. By reducing the credit risk of banks' exposures, techniques such as the use of collateral, guarantees, and credit derivatives play a significant role in sound risk management. However, many of these techniques are not recognized for regulatory capital purposes. For example, the U.S. Basel I framework recognizes collateral

and guarantees in only a limited range of cases.<sup>3</sup> It does not recognize many other forms of collateral and guarantees, such as investment grade corporate debt securities as collateral or guarantees by externally rated corporate entities. As a result, regulators have indicated that Basel II should provide for a better recognition of credit risk mitigation techniques than Basel I.

Furthermore, Basel I does not address all major risks faced by banking organizations, resulting in required capital that may not fully address the entirety of banks' risk profiles. Basel I originally focused on credit risk, a major source of risk for most banks, and was amended in 1996 to include market risk from trading activity. However, banks face many other significant risks—including interest rate, operational, liquidity, reputational, and strategic risks—which could cause unexpected losses for which banks should hold capital. For example, many banks have assumed increased operational risk profiles in recent years, and at some banks operational risk is the dominant risk.<sup>4</sup> Because minimum required capital under Basel I does not depend directly on these other types of risks, U.S. regulators use the supervisory review process to ensure that each bank holds capital above these minimums, at a level that is commensurate with its entire risk profile. In recognition of Basel I's limited risk focus, Basel II aims for a more comprehensive approach by adding an explicit capital charge for operational risk and by using supervisory review (already a part of U.S. regulators' practices) to address all other risks.

Banks are developing new types of financial transactions that do not fit well into the risk weights and credit conversion factors in the current standards. For example, there has been significant growth in securitization activity, which banks engaged in partly as regulatory arbitrage

---

<sup>3</sup>As implemented in the United States, Basel I assigns reduced risk weights to exposures collateralized by cash on deposit; securities issued or guaranteed by central governments of Organization for Economic Cooperation and Development countries, U.S. government agencies, and U.S. government-sponsored enterprises; and securities issued by multilateral lending institutions. Basel I also has limited recognition of guarantees, such as those made by Organization for Economic Cooperation and Development countries, central governments, and certain other entities. See 12 C.F.R. Part 3 (OCC); 12 C.F.R. Parts 208 and 225 (Federal Reserve); 12 C.F.R. Part 325 (FDIC); and 12 C.F.R. Part 567 (OTS).

<sup>4</sup>The Basel Committee defines operational risk as the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events, including legal risks, but excluding strategic and reputational risk. Examples of operational risks include fraud, legal settlements, systems failures, and business disruptions.

opportunities.<sup>5</sup> To respond to emerging risks associated with the growth in derivatives, securitization, and other off-balance sheet transactions, federal regulators have amended the risk-based capital framework numerous times since implementing Basel I in 1992. Some of these revisions have been international efforts, while others are specific to the United States. For example, in 1996, the United States and other Basel Committee members adopted the Market Risk Amendment, which requires capital for market risk exposures arising from banks' trading activities.<sup>6</sup> By contrast, federal regulators amended the U.S. framework in 2001 to better address risk for asset securitizations.<sup>7</sup> These changes, while consistent with early proposals of Basel II, were not adopted by other countries at the time. The finalized international Basel II accord, which other countries are now adopting, incorporates many of these changes.

Despite these amendments to the current framework, the simple risk-weighting approach of Basel I has not kept pace with more advanced risk measurement approaches at large banking organizations. By the late 1990s, some large banking organizations had begun developing economic capital models, which use quantitative methods to estimate the amount of capital required to support various elements of an organization's risks. Banks use economic capital models as tools to inform their management activities, including measuring risk-adjusted performance, setting pricing and limits on loans and other products, and allocating capital among various business lines and risks. Economic capital models measure risks by estimating the probability of potential losses over a specified period and up to a defined confidence level using historical loss data. This method has the potential for more meaningful risk measurement than the current regulatory framework, which differentiates risk only to a limited extent, mostly based on asset type rather than on an asset's underlying risk characteristics. Recognizing the potential of such advanced risk measurement techniques to inform the regulatory capital framework, Basel II introduces "advanced approaches" that share a conceptual

---

<sup>5</sup>Securitization is the process of pooling debt obligations and dividing that pool into portions (called tranches) that can be sold as securities in the secondary market. Banks can use securitization for regulatory arbitrage purposes by, for example, selling high-quality tranches of pooled credit exposures to third-party investors, while retaining a disproportionate amount of the lower-quality tranches and therefore, the underlying credit risk.

<sup>6</sup>61 Fed. Reg. 47358 (Sept. 6, 1996).

<sup>7</sup>66 Fed. Reg. 59614 (Nov. 29, 2001).

framework that is similar to banks' economic capital models. With these advanced approaches, regulators aim not only to increase the risk sensitivity of regulatory measures of risk but also to encourage the advancement of banks' internal risk management practices.

Although the advanced approaches of Basel II aim to more closely align regulatory and economic capital, the two differ in significant ways, including in their fundamental purpose, scope, and consideration of certain assumptions. Given these differences, regulatory and economic capital are not intended to be equivalent. Instead, some regulators expect that the systems and processes that a bank uses for regulatory capital purposes should be consistent with those used for internal risk management purposes. Regulatory and economic capital approaches both share a similar objective: to relate potential losses to a bank's capital in order to ensure it can continue to operate. However, economic capital is defined by bank management for internal business purposes, without regard for the external risks the bank's performance poses on the banking system or broader economy. By contrast, regulatory capital requirements must set standards for solvency that support the safety and soundness of the overall banking system. In addition, while the precise definition and measurement of economic capital can differ across banks, regulatory capital is designed to apply consistent standards and definitions to all banks. Economic capital also typically includes a benefit from portfolio diversification, while the calculation of credit risk in Basel II fails to reflect differences in diversification benefits across banks and over time. Also, certain key assumptions may differ, such as the time horizon, confidence level or solvency standard, and data definitions. For example, the probability of default can be measured at a point in time (for economic capital) or as a long-run average measured through the economic cycle (for Basel II). Moreover, economic capital models may explicitly measure a broader range of risks, while regulatory capital as proposed in Basel II will explicitly measure only credit, operational, and where relevant, market risks.

---

# Appendix IV: Three Pillars of Basel II

---

Basel II aims for a more comprehensive approach to addressing risks, based on three pillars: (1) minimum capital requirements, (2) supervisory review, and (3) market discipline in the form of increased public disclosure.

---

## Pillar 1: Minimum Capital Requirements

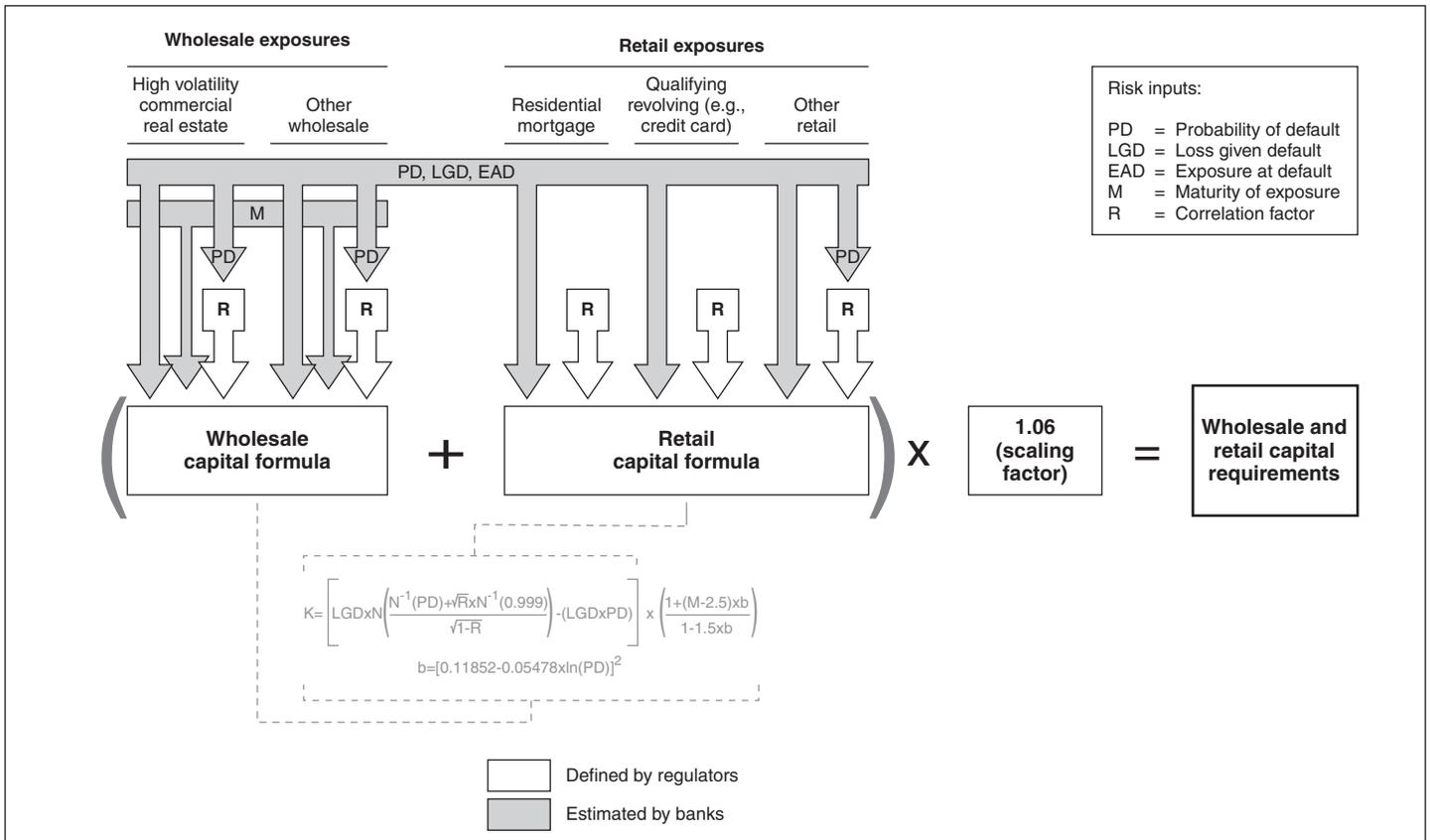
Pillar 1 of the advanced approaches rule features explicit minimum capital requirements, designed to ensure bank solvency by providing a prudent level of capital against unexpected losses for credit, operational, and market risk. The advanced approaches, which are the only measurement approaches available to and required for core banks in the United States, will make capital requirements depend in part on a bank's own assessment, based on historical data, of the risks to which it is exposed.

### Credit Risk

Under the advanced internal ratings-based approach, banks must establish risk rating and segmentation systems to distinguish risk levels of their wholesale (most exposures to companies and governments) and retail (most exposures to individuals and small businesses) exposures, respectively. Banks use the results of these rating systems to estimate several risk parameters that are inputs to supervisory formulas. Figure 11 illustrates how credit risk will be calculated under the Basel II advanced internal ratings-based approach. Banks must first classify their assets into exposure categories and subcategories defined by regulators: for wholesale exposures those subcategories are high-volatility commercial real estate and other wholesale; for retail exposures those subcategories are residential mortgages, qualifying revolving exposures (e.g., credit cards), and other retail. Banks then estimate the following risk parameters, or inputs: the probability a credit exposure will default (probability of default or PD), the expected size of the exposure at the time of default (exposure at default or EAD), economic losses in the event of default (loss given default or LGD) in "downturn" (recession) conditions, and, for wholesale exposures, the maturity of the exposure (M). In order to estimate these inputs, banks must have systems for classifying and rating their exposures as well as a data management and maintenance system. The conceptual foundation of this process is that a statistical approach, based on historical data, will provide a more appropriate measure of risk and capital than a simple categorization of asset types, which does not differentiate precisely between risks. Regulators provide a formula for each exposure category that determines the required capital on the basis of these inputs. If all the assumptions in the supervisory formula were correct, the resulting capital requirement would exceed a bank's credit losses in a given year with 99.9 percent probability. That is, credit losses at the bank would exceed the capital

requirement with a 1 in 1,000 chance in a given year, which could result in insolvency if the bank only held capital equal to the minimum requirement.

**Figure 11: Computation of Wholesale and Retail Capital Requirements under the Advanced Internal Ratings-based Approach for Credit Risk**



Source: GAO analysis of information from the advanced approaches rule.

Notes: This figure focuses on wholesale and retail nondefaulted exposures, an important component of the total credit risk calculation. The total credit risk capital requirement also covers defaulted wholesale and retail exposures, as well as risk from securitizations and equity exposures. A bank's qualifying capital is also adjusted, depending on whether its eligible credit reserves exceed or fall below its expected credit losses.

Banks may incorporate some credit risk mitigation, including guarantees, collateral, or derivatives, into their estimates of PD or LGD to reflect their efforts to hedge against unexpected losses.

### Operational Risk

To determine minimum required capital for operational risk, banks will use their own quantitative models of operational risk that incorporate

elements required in the advanced approaches rule. To qualify to use the advanced measurement approaches for operational risk, a bank must have operational risk management processes, data and assessment systems, and quantification systems. The elements that banks must incorporate into their operational risk data and assessment system are internal operational loss event data, external operational loss event data, results of scenario analysis, and assessments of the bank's business environment and internal controls. Banks meeting the advanced measurement approaches' qualifying criteria would use their internal operational risk quantification system to calculate the risk-based capital requirement for operational risk, subject to a solvency standard specified by regulators, to produce a capital buffer for operational risk designed to be exceeded only once in a thousand years.

## Market Risk

Regulators have allowed certain banks to use their internal models to determine required capital for market risk since 1996 (known as the market risk amendment or MRA). Under the MRA, a bank's internal models are used to estimate the 99th percentile of the bank's market risk loss distribution over a 10-business-day horizon, in other words a solvency standard designed to exceed trading losses for 99 out of 100 10-business-day intervals. The bank's market risk capital requirement is based on this estimate, generally multiplied by a factor of three. The agencies implemented this multiplication factor to provide a prudential buffer for market volatility and modeling error. The OCC, Federal Reserve, and FDIC are proposing modifications to the market risk rules, to include modifications to the MRA developed by the Basel Committee, in a separate notice of proposed rulemaking issued concurrently with the proposal for credit and operational risk. OTS is proposing its own market risk rule, including the proposed modifications, as a part of that separate notice of proposed rulemaking.

In previous work, regulatory officials generally said that changes to the rules for determining capital adequacy for market risk were relatively modest and not a significant overhaul. The regulators have described the objectives of the new market risk rule as including enhancing the sensitivity of required capital to risks not adequately captured in the current methodologies of the rule and enhancing the modeling requirements consistent with advances in risk management since the implementation of the MRA. In particular, the rule contains an incremental default risk capital requirement to reflect the growth in traded credit products, such as credit default swaps, that carry some default risk as well as market risk. The Basel Committee currently is in the process of

---

finalizing more far-reaching modifications to the MRA to address issues highlighted by the financial crisis.

---

## Pillar 2: Supervisory Review

The Pillar 2 framework for supervisory review is intended to ensure that banks have adequate capital to support all risks, including those not addressed in Pillar 1, and to encourage banks to develop and use better risk management practices. Banks adopting Basel II must have a rigorous process of assessing capital adequacy that includes strong board and senior management oversight, comprehensive assessment of risks, rigorous stress testing and validation programs, and independent review and oversight. In addition, Pillar 2 requires supervisors to review and evaluate banks' internal capital adequacy assessments and monitor compliance with regulatory capital requirements. Under Pillar 2, supervisors must conduct initial and ongoing qualification of banks for compliance with minimum capital calculations and disclosure requirements. Regulators must evaluate banks against established criteria for their (1) risk rating and segmentation system, (2) quantification process, (3) ongoing validation, (4) data management and maintenance, and (5) oversight and control mechanisms. Regulators are to assess a bank's implementation plan, planning and governance process, and parallel run, and ongoing performance. Under Pillar 2, regulators should also assess and address risks not captured by Pillar 1 such as credit concentration risk, interest rate risk, and liquidity risk.

---

## Pillar 3: Market Discipline in the Form of Increased Disclosure

Pillar 3 is designed to encourage market discipline by requiring banks to disclose additional information and allowing market participants to more fully evaluate the institutions' risk profiles and capital adequacy. Such disclosure is particularly appropriate given that Pillar I allows banks more discretion in determining capital requirements through greater reliance on internal methodologies. Banks would be required to publicly disclose both quantitative and qualitative information on a quarterly and annual basis, respectively. For example, such information would include a bank's risk-based capital ratios and their capital components, aggregated information underlying the calculation of their risk-weighted assets, and the bank's risk assessment processes. In addition, federal regulators will collect, on a confidential basis, more detailed data supporting the capital calculations. Federal regulators would use this additional data, among other purposes, to assess the reasonableness and accuracy of a bank's minimum capital requirements and to understand the causes behind changes in a bank's risk-based capital requirements. Federal regulators have developed

---

detailed reporting schedules to collect both public and confidential disclosure information.

# Appendix V: Comments from the Board of Governors of the Federal Reserve System



BOARD OF GOVERNORS  
OF THE  
FEDERAL RESERVE SYSTEM  
WASHINGTON, D. C. 20551

DANIEL K. TARULLO  
MEMBER OF THE BOARD

July 13, 2009

Ms. Orice Williams  
Director, Financial Markets and Community Investment  
U.S. General Accountability Office  
Washington, DC 20548

Dear Ms. Williams,

The Federal Reserve appreciates the opportunity to review and comment on the GAO's report entitled "Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and Across the System" (GAO-09-739) (Report). High levels of leverage throughout the global financial system ranging from consumer and homeowner indebtedness, to the leverage embedded in various types of financial products, to the capital structures of many financial institutions, along with a number of other factors, contributed significantly to the current financial crisis. The Report provides a thorough review of the academic literature and other studies in its endeavor to isolate the role of leverage and de-leveraging in the crisis. It also provides an important view into the various regulatory capital regimes underlying the trends in leverage at both commercial and investment banking organizations and an assessment of those regimes moving forward.

The Federal Reserve supports the Report's analysis of the limits of the Basel I-based risk-based capital standards to appropriately measure and allocate capital against the risks undertaken by banking organizations. The Federal Reserve also agrees that the recent crisis has revealed problems in both the U.S. Basel I- and Basel II-based risk-based capital standards. Federal Reserve staff is significantly involved in current international efforts to strengthen minimum capital requirements in areas where many banks have experienced losses including those related to securitizations, counterparty credit risk exposures, and trading book exposures. Changes to the trading book framework include proposals to better capture the credit risk of trading activities and incorporate a new stressed value-at-risk (VaR) requirement that is expected to help dampen the cyclical nature of risk-based capital requirements. The Federal Reserve concurs with the Report's recommendation for a more fundamental review of the Basel II capital framework.

The Federal Reserve supports the Report's observation that the current regulatory capital framework may not have provided adequate incentives to counteract

E-mail: [Daniel.Tarullo@frb.gov](mailto:Daniel.Tarullo@frb.gov) • Telephone: (202) 452-3735 • Facsimile: (202) 736-1960

Ms. Orice Williams  
Page 2

cyclical leverage trends. As the Report notes, international and U.S. supervisors have efforts currently underway to explore countercyclical capital buffers, strengthen loan loss provisioning practices, and undertake concrete steps to dampen excessive capital volatility over the cycle. The Federal Reserve believes the financial system would benefit from a more explicitly macroprudential approach to financial regulation in addition to the current microprudential approach. Such an approach should include monitoring of system-wide leverage and identifying options to limit procyclical leverage trends.

The Federal Reserve believes that, as part of a broad agenda to address systemic risks, Congress should consider establishing a robust framework for consolidated supervision of all systemically important financial firms. Firms whose failure would pose a systemic risk must be subject to especially close supervisory oversight of risk-taking, risk management, and financial condition, and be held to high capital and liquidity standards.

Federal Reserve staff has separately provided GAO staff with technical and correcting comments on the draft report. We hope these comments were helpful.

Thank you for your efforts on this important matter. The Federal Reserve appreciates the professionalism of, and the careful analysis performed by, the GAO review team.

Sincerely,

*Daniel K. Jewell*

# Appendix VI: Comments from the Federal Deposit Insurance Corporation



**Federal Deposit Insurance Corporation**  
550 17th Street NW, Washington, D.C. 20429-9990

Office of the Chairman

July 9, 2009

Ms. Orice M. Williams  
Director, Financial Markets and Community Investment  
United States Government Accountability Office  
441 G Street, NW  
Washington, D.C. 20548

Dear Ms. Williams:

The Federal Deposit Insurance Corporation (FDIC) appreciates the opportunity to comment on the draft report *Financial Markets Regulation: Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and Across System* (GAO-09-739) (Report) that the Government Accountability Office (GAO) submitted to the FDIC on June 22, 2009. The Report addresses how leverage and de-leveraging may have contributed to the financial crisis, existing regulations and supervisory approaches to limit leverage, and limitations the crisis has revealed in these regulatory approaches. This letter represents our overall reaction to the Report; additional technical comments have been provided by our staff.

Excessive use of leverage during the buildup to the crisis made individual firms and our financial system more vulnerable to shocks, and reduced the regulators' ability to intervene before problems cascaded. The Report's emphasis on the importance of regulatory mechanisms to constrain leverage in the financial system is entirely appropriate.

We strongly endorse the Report's recommendation that the regulators undertake a fundamental review of Basel II to assess whether that new framework would adequately address concerns about the use of banks' internal models for determining regulatory capital requirements. In addition to requiring insufficient capital as revealed by the crisis, the advanced approaches of Basel II embody a degree of regulatory deference to banks that is concerning. Accordingly, while the Report cites the locus of regulatory capital authority over systemically important financial firms as a matter for Congressional consideration, attention also needs to be given to ensuring that regulatory authorities are used strongly and as intended.

The FDIC and the other U.S. banking agencies are working with the Basel Committee to develop proposals to increase the level and quality of capital in the banking system, reduce the pro-cyclicality of capital regulation, improve the risk-capture of the Basel framework, and introduce a non-risk based (leverage) capital ratio internationally to supplement the risk-based capital requirements. It is anticipated these proposals would be developed by the end of this year for subsequent comment and implementation. Whether these Basel Committee proposals and their ultimate form of implementation will address the fundamental concerns about Basel II raised in the Report remains to be seen. The FDIC will consider this matter as part of the interagency review of Basel II that the agencies committed by regulation to undertake, and will propose suitable remedies if needed.

---

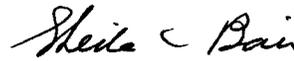
**Appendix VI: Comments from the Federal  
Deposit Insurance Corporation**

---

July 9, 2009

In conclusion, we would like to commend the GAO's review team for producing a thoughtful and comprehensive report.

Sincerely,



Sheila C. Bair  
Chairman

# Appendix VII: Comments from the Office of the Comptroller of the Currency



---

Comptroller of the Currency  
Administrator of National Banks

---

Washington, DC 20219

July 10, 2009

Ms. Orice M. Williams Brown  
Director, Financial Markets and Community Investment  
United States Government Accountability Office  
Washington, DC 20548

Dear Ms. Brown:

We have received and reviewed your draft report titled “Financial Markets Regulation: Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and Across System.” Your report responds to a Congressional mandate to study the role of leverage in the current financial crisis and federal oversight of leverage. The report examines the extent to which leverage and the sudden deleveraging of financial institutions was a factor driving the current financial crisis.

The study considers the effectiveness of the regulatory capital framework during the crisis and finds:

The financial crisis has revealed limitations in existing regulatory approaches that serve to restrict leverage. . . . Furthermore, the crisis highlighted past concerns about the approach to be taken under Basel II, a new risk-based capital framework based on an international accord, such as the ability of banks’ models to adequately measure risks for regulatory capital purposes and the regulators’ ability to oversee them.<sup>1</sup>

To address this issue, the study recommends that “regulators should assess the extent to which Basel II reforms may address risk evaluation and regulatory oversight concerns associated with advanced modeling approaches used for capital adequacy purposes.”<sup>2</sup>

The OCC agrees that recent events have highlighted certain weaknesses in our regulatory capital framework – both Basel I-based and Basel II – and we are in the process of making modifications to address them. During the course of the development of the Basel II framework, and consistent with the evolution of our current Basel I-based regulatory capital regime, we have consistently maintained that the Basel II framework will need refinement and adjustment over time. To this end, in January 2009, the Basel Committee on Banking Supervision (BCBS)

---

<sup>1</sup> GAO Report to Congressional Committees *Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and Across System (GAO-09-739)*, July 2009, Pages 6-7.

<sup>2</sup> GAO Report, Page 8.

---

**Appendix VII: Comments from the Office of  
the Comptroller of the Currency**

---

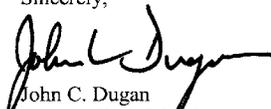
proposed amendments to strengthen the Basel II framework.<sup>3</sup> The proposals primarily target the framework's ability to measure and assess appropriate capital for the risks in banks' trading books and complex securitization exposures. To prevent a recurrence of the dramatic increase in leverage that contributed to the recent losses from trading activities, the proposals include an incremental capital charge to augment the existing Value at Risk (VaR) capital charge. Supervisory enhancements to the securitization framework include additional guidance for complex derivative structures known as ReRemics. This guidance will facilitate the continuance of healthy secondary market activity, while dampening the growth in more risky segments. Prior to finalizing these revisions and enhancements, the Basel Committee expects to undertake a detailed impact analysis to ensure a better understanding of the level of minimum required capital generated by the Basel II framework.

We continue to believe that Basel II lays a strong foundation for addressing the supervisory challenges posed by an increasingly complex, sophisticated, and global financial environment. However, we remain committed to scrutinizing and improving the framework. As stated in our previous response to the GAO's study<sup>4</sup> on Basel II implementation:

To ensure the effectiveness of Basel II in meeting supervisory needs, the banking agencies are committed to conducting a study of the advanced approaches implementation to determine if there are any material deficiencies in the framework. The banking agencies will develop more formal plans for the interagency study after a firmer picture of banks' implementation progress develops.<sup>5</sup>

We appreciate the opportunity to comment on the draft report.

Sincerely,



John C. Dugan  
Comptroller of the Currency

---

<sup>3</sup> The Basel Committee on Banking Supervision Consultative Document *Proposed enhancements to the Basel II framework (January 2009)*, The Basel Committee on Banking Supervision Consultative Document *Guidelines for computing capital for incremental risk in the trading book (January 2009)*, and The Basel Committee on Banking Supervision Consultative Document *Revisions to the Basel II market risk framework (January 2009)*.

<sup>4</sup> *Risk-Based Capital: New Basel II Rules Reduced Certain Competitive Concerns, but Bank Regulators Should Address Remaining Uncertainties (GAO-08-953, September 2008)*.

<sup>5</sup> Interagency response to GAO-08-953, December 2008.

# Appendix VIII: Comments from the Securities and Exchange Commission



DIVISION OF  
TRADING AND MARKETS

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

July 17, 2009

Ms. Orice M. Williams Brown  
Director, Financial Markets and Community Investment  
United States Government Accountability Office  
Washington, DC 20548

Dear Ms. Williams Brown:

We have received and reviewed the draft GAO report "Financial Markets Regulation: Financial Crisis Highlights Need to Improve Oversight of Leverage at Financial Institutions and Across System" (GAO-09-739) (the "GAO Report"). We are pleased to have this opportunity to comment on the report as well as the issue of leverage in financial institutions.

The GAO Report has recommended that federal financial regulators need to assess the extent to which Basel II's reforms proposed by U.S. and international regulators may address risk evaluation and regulatory oversight concerns associated with advanced modeling approaches. As part of this assessment, the GAO Report states that regulators should determine whether consideration of more fundamental changes under a new Basel regime is warranted. We believe these are valuable contributions to the regulatory framework and will take them into consideration in our recommendations to the Commission. The GAO Report also states that regulators "clearly need to identify ways in which to measure and monitor systemwide leverage to determine whether their existing framework is adequately limiting the use of leverage and resulting in unacceptably high levels of systemic risk." We believe our rules, which are described in more detail below, conform in large measure to your suggestions.

#### Broker-dealer Net Capital Rule

The importance of maintaining high levels of liquidity has been the underlying premise of the Commission's net capital rule since it was adopted in 1975, and the Commission continued to emphasize liquidity when creating the Consolidated Supervised Entity or "CSE" program. Whereas commercial banks may use insured deposits to fund their businesses and have access to the Federal Reserve as a backstop liquidity provider, the CSE broker-dealers were prohibited under Commission rules from financing their investment bank activities with customer funds or securities held in a broker-dealer. The Commission was not authorized to provide a liquidity backstop to CSE broker-dealers or CSE holding companies.

The Commission action in 2004 to adopt rules establishing the CSE Program that permitted a broker-dealer to use an alternate method to compute net capital has been mischaracterized by some commenters as being a major contributor to the current crisis, or

Ms. Orice M. Williams Brown  
Page 2

alternately, as having allowed broker-dealers to increase their leverage. Since August 2008, these commenters have suggested that the 2004 amendments removed a “12-to-1” leverage restriction that had prevented broker-dealers from taking on debt that exceeded more than twelve times their capital and, as a consequence, the Commission allowed these firms to increase their debt-to-capital ratios. These commenters point to the 2004 amendments as a significant factor leading to the demise of Bear Stearns. However, in fact, the 2004 amendments did not alter the leverage limits in the broker-dealer net capital rule.

The net capital rule requires a broker-dealer to undertake two calculations: (1) a computation of the minimum amount of net capital the broker-dealer must maintain; and (2) a computation of the actual amount of net capital held by the broker-dealer. The “12-to-1” restriction is part of the first computation, and it was not changed by the 2004 amendments. The greatest changes effected by the 2004 amendments were to the second computation of actual net capital.

Under the net capital rule, a broker-dealer calculates its actual net capital amount by starting with net worth computed according to generally accepted accounting principles and then adding to that amount qualifying subordinated loans. Next, the broker-dealer deducts from that amount illiquid assets such as fixed assets, goodwill, real estate, most unsecured receivables, and certain other assets. This leaves the broker-dealer with what is known as “tentative net capital,” which generally consists of liquid securities positions and cash. A broker-dealer’s tentative net capital represents the amount of liquid assets that exceed all liabilities of the broker-dealer. The final step in calculating net capital is to take percentage deductions (haircuts) from the securities positions. The percentage deductions are prescribed in the rule and are based on, among other things, the type of security, *e.g.*, debt or equity, the type of issuer, *e.g.*, US government or public company, the availability of a ready market to trade the security, and, if a debt security, the time to maturity and credit rating. The amount left after deducting the haircuts from the securities positions is the broker-dealer’s net capital. This actual amount of net capital needs to be equal to or greater than the required minimum.

The 2004 amendments permitted the CSE broker-dealers to reduce the value of the securities positions (the last step in computing actual net capital) using statistical value-at-risk (VaR) models rather than the prescribed percentage deductions in the net capital rule. This is how commercial banks — under the Basel Accord — had been computing market risk charges for trading positions since 1997.

Because the CSE broker-dealers were permitted to use modeling techniques to compute market and credit risk deductions, the Commission imposed a requirement that they file an early warning notice if their tentative net capital fell below \$5 billion. This became their effective minimum tentative net capital requirement. The \$5 billion minimum amount was comparable to the amount of tentative net capital the broker dealers maintained prior to the 2004 amendments. The early warning requirement was designed to ensure that the use of models to compute haircuts would not substantially change the amount of tentative net capital actually maintained by the broker-dealers. The levels of tentative net capital in the broker-dealer subsidiaries remained relatively stable after they began operating under the 2004 amendments, and, in some cases, increased significantly.

Ms. Orice M. Williams Brown  
Page 3

CSE Program

In 2004, the Commission adopted two regimes to fill a statutory gap—there is no provision in the law that requires investment bank holding companies to be supervised on a consolidated basis at the holding company level. One regime, the Supervised Investment Bank Holding Company (“SIBHC”) program, provided group-wide supervision of holding companies that include broker-dealers based on the specific statutory authority in the Gramm-Leach-Bliley Act concerning voluntary consolidated supervision of investment bank holding companies. However, the Commission’s authority under the SIBHC program is severely limited because holding companies that owned a subsidiary that was an insured depository institution were ineligible under the statute for this program. The other regime, the CSE program, provided for voluntary consolidated supervision based on the Commission’s authority over the regulated broker-dealer. The CSE program permitted certain broker-dealers to utilize an alternate net capital computation provided the broker-dealer’s holding company submitted to consolidated oversight.

Each CSE holding company was required, among other things, to compute on a monthly basis its group-wide capital in accordance with the Basel standards, and was expected to maintain an overall Basel capital ratio at the consolidated level of not less than the Federal Reserve Bank’s 10% “well-capitalized” standard for bank holding companies. CSEs were also required to file an “early warning” notice with the Commission in the event that certain minimum thresholds, including the 10% capital ratio, were breached or were likely to be breached.

Each CSE holding company was required to provide the Commission, on a periodic basis, with extensive information regarding its capital and risk exposures, including market risk, credit risk, and liquidity risk. For the first time, the Commission had the ability to examine the activities of a CSE holding company that took place outside the U.S. registered broker-dealer subsidiary. This allowed Commission staff to get a direct view of the risk taking (and corresponding risk management controls) of the entire enterprise.

Thus, the Commission did not eliminate or relax any requirements at the holding company level because previously there had been no requirements. In fact, through the creation and implementation of the CSE program, the Commission increased regulatory standards applicable to the CSE holding companies.

Importance of Liquidity Risk

CSE holding companies relied on the ongoing secured and unsecured credit markets for funding, rather than broker-dealer customer deposits; therefore liquidity and liquidity risk management were of critical importance. In particular, the Commission’s rules required CSE holding companies to maintain funding procedures designed to ensure that the holding company had sufficient stand-alone liquidity to withstand the complete loss of all short term sources of unsecured funding for at least one year. In addition, with respect to secured funding, these procedures incorporated a stress test that estimated what a prudent lender would lend on an asset under stressed market conditions, e.g., a haircut. Another premise of this liquidity risk

---

**Appendix VIII: Comments from the Securities  
and Exchange Commission**

---

Ms. Orice M. Williams Brown  
Page 4

management planning was that assets held in a regulated entity could not be used to resolve financial weaknesses elsewhere in the holding company structure. The assumption was that during a stress event, including a tightening of market liquidity, regulators in the U.S. and relevant foreign jurisdictions would not permit a withdrawal of capital from regulated entities. Therefore, each CSE holding company was required to maintain a substantial "liquidity pool" comprised of unencumbered highly liquid assets, such as U.S. Treasuries, that could be moved to any subsidiary experiencing financial stress.

The CSE program required stress testing and substantial liquidity pools at the holding company to allow firms to continue to operate normally in stressed market environments. But what neither the CSE regulatory approach nor most existing regulatory models had taken into account was the possibility that secured funding could become unavailable, even for high-quality collateral such as U.S. Treasury and agency securities. The existing models for both commercial and investment banks are premised on the expectation that secured funding would be available in any market environment, albeit perhaps on less favorable terms than normal. Thus, one lesson from the Commission's oversight of CSEs — Bear Stearns in particular — is that no parent company liquidity pool can withstand a "run on the bank." Supervisors simply did not anticipate that a run-on-the-bank was indeed a real possibility for a well-capitalized securities firm with high quality assets to fund.

Recent events in the capital markets and the broader economy have presented significant challenges that are rightly the subject of review, notwithstanding the financial regulatory system's long record of accomplishment. The Commission, along with other financial regulators, should build on and strengthen approaches that have worked, while taking lessons from what has not worked in order to be better prepared for future crises.

Thank you again for the opportunity to provide comments to the GAO as it prepares its final draft of the report.

Sincerely,



Michael A. Macchiaroli  
Associate Director  
Division of Trading and Markets

# Appendix IX: Letter from the Federal Reserve regarding Its Authority to Regulate Leverage and Set Margin Requirements



BOARD OF GOVERNORS  
OF THE  
FEDERAL RESERVE SYSTEM  
WASHINGTON, D. C. 20551

SCOTT G. ALVAREZ  
GENERAL COUNSEL

May 26, 2009

Susan D. Sawtelle, Esq.  
Managing Associate General Counsel  
United States Government Accountability Office  
441 G Street, NW  
Washington, DC 20548

Dear Ms. Sawtelle:

This is in response to your letter dated April 2, 2009, requesting information about the Board's authority to monitor and regulate leverage among financial institutions and to set margin requirements.

#### Limiting leverage of financial institutions supervised by the Board

The Board has general statutory authority to limit leverage among institutions that it supervises, including state member banks and bank holding companies, under the Federal Reserve Act, the Federal Deposit Insurance Act, the Bank Holding Company Act, and the International Lending Standards Act.<sup>1</sup> The Board also has specific statutory authority to evaluate and regulate the capital adequacy of supervised institutions.<sup>2</sup>

Through its capital adequacy guidelines, the Board has limited the leverage of state member banks and bank holding companies by requiring them to meet a minimum "leverage ratio" and two minimum risk-based capital ratios, the "tier 1 risk-based capital ratio" and the "total risk-based capital ratio."<sup>3</sup>

<sup>1</sup> See 12 U.S.C. 329; 12 U.S.C. 1831o; 12 U.S.C. 1844(b); 12 U.S.C. 3907, 3909.

<sup>2</sup> 12 U.S.C. 1844(b); 12 U.S.C. 3907, 3909.

<sup>3</sup> See 12 CFR part 208, subpart D and Appendices A and B; 12 CFR part 225, Appendices A and D.

**Appendix IX: Letter from the Federal Reserve  
regarding Its Authority to Regulate Leverage  
and Set Margin Requirements**

- 2 -

Leverage ratio. The leverage ratio is a ratio of an institution's core capital ("tier 1 capital")<sup>4</sup> to average total consolidated assets.<sup>5</sup> The purpose of the leverage ratio is to provide a simple measure of an institution's tangible capital to assets. State member banks generally must meet a minimum leverage ratio of 4 percent.<sup>6</sup> Bank holding companies with consolidated assets of \$500 million or more generally also must meet a minimum leverage ratio of 4 percent.<sup>7</sup>

Risk-based capital ratios. The tier 1 risk-based capital ratio is a ratio of an institution's tier 1 capital to its risk-weighted assets<sup>8</sup> (including certain off-balance sheet exposures). The total risk-based capital ratio is a ratio of total capital (tier 1 capital plus tier 2 capital)<sup>9</sup> to risk-weighted assets.<sup>10</sup> The purpose of the

<sup>4</sup> Tier 1 capital is defined in the Board's capital adequacy guidelines. Generally, it consists of voting common stock, certain types of preferred stock, limited amounts of trust preferred securities, and certain minority interests. 12 CFR parts 208 and 225, Appendix A, section II.A.1.

<sup>5</sup> See 12 CFR part 208, Appendix B; 12 CFR part 225, Appendix D.

<sup>6</sup> 12 CFR 208.43; 12 CFR part 208, Appendix B, section II.a. The Board has established a minimum leverage ratio of 3 percent for state member banks with a composite rating of "1."

<sup>7</sup> 12 CFR part 225, Appendix D, section II.a. The Board has established a minimum leverage ratio of 3 percent for bank holding companies with a composite rating of "1," and for bank holding companies that have implemented the Board's market risk rule. See *infra*, n. 8. In addition, bank holding companies with consolidated assets of less than \$500 million are subject to similar restrictions on leverage under the Board's Small Bank Holding Company Policy Statement. See 12 CFR part 225, Appendix C.

<sup>8</sup> Risk-weighted assets are calculated under the Board's capital adequacy guidelines. See 12 CFR part 208, Appendices A and F (state member banks); 12 CFR part 225, Appendices A and G (bank holding companies). State member banks and bank holding companies whose trading activity equals or exceeds 10 percent or more of total assets or \$1 billion also must calculate their exposure to market risk under the Board's market risk rule. See 12 CFR parts 208 and 225, Appendix E.

<sup>9</sup> Tier 2 capital is defined in the Board's capital adequacy guidelines and generally consists of allowances for loan and leases losses, subordinated debt, perpetual preferred stock and trust preferred securities that cannot be included in tier 1 capital. 12 CFR parts 208 and 225, Appendix A, section II.A.2.

---

**Appendix IX: Letter from the Federal Reserve  
regarding Its Authority to Regulate Leverage  
and Set Margin Requirements**

---

- 3 -

risk-based capital ratios is to provide risk-sensitive measures of state member banks and bank holding companies' capital adequacy. All state member banks and bank holding companies with consolidated assets of \$500 million or more generally must meet a minimum tier 1 risk-based capital ratio of 4 percent and a minimum total risk-based capital ratio of 8 percent.<sup>11</sup>

While the leverage and risk-based ratios establish minimum capital requirements for state member banks and bank holding companies, the Board generally expects such institutions to operate well above these minimum ratios and in all cases, hold capital commensurate with the level and nature of the risks to which they are exposed.<sup>12</sup> Where an institution's capital is deemed inadequate in light of its risk profile, the Board has the authority to issue a capital directive against it to require it to improve its capital position.<sup>13</sup> Through these requirements and its authority over capital levels of supervised institutions, the Board is able to monitor and limit the leverage of state member banks and bank holding companies.

Limiting leverage through securities margin authority

The Board also has authority to establish some limits on the leverage of market participants where the credit is used for the purpose of purchasing securities. The Board's securities margin authority is found in section 7 of the Securities Exchange Act of 1934 ("SEA").<sup>14</sup> Section 7(a) authorizes the Board to limit the amount of credit that may be extended and maintained on securities (other than exempted securities and security futures products). It also contains a statutory initial margin requirement. Section 7(b) authorizes the Board to raise or lower the margin requirements contained in section 7(a). The Board has adopted three margin regulations pursuant to section 7 of the SEA, each described below. These regulations apply to specific types of credits and specific types of transactions.

---

<sup>10</sup> See 12 CFR part 208, Appendices, A, E, and F; 12 CFR part 225, Appendices A, E, and G.

<sup>11</sup> 12 CFR parts 208 and 225, Appendix A, section IV.A. See *supra*, n. 7.

<sup>12</sup> 12 CFR parts 208 and 225, Appendix A, section I.

<sup>13</sup> 12 U.S.C. 1818(i); 12 U.S.C. 1831o; 12 U.S.C. 1844(b); 12 U.S.C. 3907(b)(2); 12 CFR part 263, subpart E.

<sup>14</sup> 15 U.S.C. 78g. Section 7 of the SEA only covers financial products that are "securities" under the SEA. Other financial products and derivatives are not within the Board's SEA authority.

---

**Appendix IX: Letter from the Federal Reserve  
regarding Its Authority to Regulate Leverage  
and Set Margin Requirements**

---

- 4 -

Regulation T, “Credit by Brokers and Dealers,” regulates extensions of credit by brokers and dealers for the purpose of purchasing securities.<sup>15</sup> In addition to establishing initial margin requirements for purchases and short sales of securities, it establishes payment periods for margin and cash transactions. It also contains exceptions for credit to certain broker-dealers, arbitrage transactions and loans to employee stock option plans. Specific authority for Regulation T is found in section 7(c) of the SEA.

Regulation U, “Credit by Banks or Persons Other Than Brokers or Dealers for the Purpose of Purchasing or Carrying Margin Stock,” applies the Board’s margin requirements to United States lenders other than those covered by Regulation T.<sup>16</sup> Nonbank lenders who extend securities credit above certain dollar thresholds must register with the Federal Reserve and file annual reports on this activity. Bank and nonbank lenders are generally subject to the same requirements. Specific authority for this regulation is found in section 7(d) of the SEA. Regulation U covers equity securities only, as section 7(d) exempts loans by a bank on a security other than an equity security.

Regulation X, “Borrowers of Securities Credit,” applies margin requirements to United States persons and certain related persons who obtain securities credit outside the United States to purchase United States securities.<sup>17</sup> It also imposes liability on borrowers who obtain credit within the United States by willfully causing a violation of Regulation T or Regulation U. Regulation X implements section 7(f) of the SEA.

The Board has raised and lowered the initial margin requirements many times since enactment of the SEA. The highest margin requirement was 100 percent, adopted for about a year after the end of World War II. The lowest margin requirement was 40 percent and was in effect during the late 1930s and early 1940s. Otherwise, the initial margin requirement has varied between 50 and 75 percent. The Board has left the initial margin requirement at 50 percent since 1974.

Although section 7 of the SEA gives the Board the authority to adopt initial and maintenance margins, the Board has chosen to adopt only initial margin requirements. Broker-dealers, however, are required to join the Financial Industry

---

<sup>15</sup> 12 CFR part 220.

<sup>16</sup> 12 CFR part 221.

<sup>17</sup> 12 CFR part 224.

**Appendix IX: Letter from the Federal Reserve  
regarding Its Authority to Regulate Leverage  
and Set Margin Requirements**

- 5 -

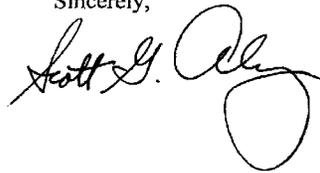
Regulatory Authority and are therefore subject to its maintenance margin requirements.<sup>18</sup>

Limiting leverage through monetary policy

The Federal Reserve, acting through the Federal Open Market Committee, also can use monetary policy to affect indirectly the amount of leverage in the financial system.<sup>19</sup> By raising interest rates, the Federal Reserve reduces the money supply and raises the cost of credit, thereby reducing the amount of leverage available in the U.S. financial system. Similarly, by lowering interest rates, the Federal Reserve increases the money supply and reduces the cost of credit, thereby allowing the amount of leverage available in the U.S. financial system to increase.

We hope this information is helpful. If you have additional questions regarding the Board's authority to establish capital requirements, please contact April C. Snyder, Counsel, at (202) 452-3099, and Benjamin W. McDonough, Senior Attorney, at (202) 452-2036. If you have any questions regarding the Board's margin rules (Regulations T, U, and X), please contact Scott Holz, Senior Counsel, at (202) 452-2966.

Sincerely,



<sup>18</sup> See New York Stock Exchange Rule 431 and National Association of Securities Dealers Rule 2520.

<sup>19</sup> 12 U.S.C. 263.

---

# Appendix X: GAO Contact and Staff Acknowledgments

---

## GAO Contact

Orice Williams Brown (202) 512-8678 or [williamso@gao.gov](mailto:williamso@gao.gov)

---

## Staff Acknowledgments

In addition to the contacts named above, Karen Tremba (Assistant Director); Lawrence Evans, Jr.; John Fisher; Marc Molino; Timothy Mooney; Akiko Ohnuma; Linda Rego; Barbara Roesmann; John Treanor; and Richard Tsuhara made significant contributions to this report.

---

# Bibliography

---

Acharya, V. and P. Schnabl. How Banks Played the Leverage “Game?” in Acharya, V. and Richardson, M. (Eds.). *Restoring Financial Stability: How to Repair a Failed System*. John Wiley and Sons. Chapter 2. 2009.

Adrian, Tobias, and Hyun Song Shin. “Liquidity, Financial Cycles and Monetary Policy.” *Current Issues in Economics and Finance*. Federal Reserve Bank of New York. Vol. 14, No. 1, January/February 2008.

Tobias Adrian and Hyun Song Shin. “Liquidity and Financial Contagion.” Banque de France. *Financial Stability Review*. Special issue on liquidity. No. 11. February 2008.

Baily, Martin N., Robert E. Litan, and Matthew S. Johnson. “The Origins of the Financial Crisis.” *Fixing Finance Series-Paper 3*. Washington, D.C.: The Brookings Institution. November 2008.

Blundell-Wignall. “The Subprime Crisis: Size, Deleveraging and Some Policy Options.” *Financial Market Trends*. Organization for Economic Cooperation and Development. 2008.

Brunnermeier, Markus K. “Deciphering the 2007-08 Liquidity and Credit Crunch.” *Journal of Economic Perspectives* 23, No. 1. 2009. 77-100.

Buiter, Willem H. “Lessons from the North Atlantic Financial Crisis.” Paper prepared for presentation at the conference “The Role of Money Markets” jointly organized by Columbia Business School and the Federal Reserve Bank of New York on May 29-30, 2008 (May 2008).

Cohen, Ben, and Eli Remolona. “The Unfolding Turmoil of 2007–2008: Lessons and Responses.” Proceedings of a Conference, Sydney, Australia, Reserve Bank of Australia, Sydney.

Devlin, Will, and Huw McKay. “The Macroeconomic Implications of Financial ‘Deleveraging’.” *Economic Roundup*. Issue 4. 2008.

Frank, Nathaniel, Brenda Gonzalez-Hermosillo, and Heiko Hesse. “Transmission of Liquidity Shocks: Evidence from the 2007 Subprime Crisis.” *International Monetary Fund Working Paper WP/08/200*. August 2008.

Gorton, Gary B. “The Panic of 2007.” Paper prepared for Federal Reserve Bank of Kansas City, Jackson Hole Conference, August 2008. October 4, 2008.

Greenlaw, David, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin. "Leveraged Losses: Lessons from the Mortgage Meltdown." U.S. Monetary Policy Forum Report No. 2. Rosenberg Institute, Brandeis International Business School and Initiative on Global Markets, University of Chicago Graduate School of Business. 2008.

International Monetary Fund. "Financial Stress and Deleveraging: Macroeconomic Implications and Policy." Global Financial Stability Report. Washington, D.C.: October 2008.

Kashyap, Anil K., Raghuram G. Rajan, and Jeremy C. Stein. "Rethinking Capital Regulation." Paper prepared for Federal Reserve Bank of Kansas City symposium on "Maintaining Stability in a Changing Financial System." Jackson Hole, Wyoming. August 21-23, 2008. September 2008.

Khandani, Amir E., and Andrew W. Lo. "What Happened to the Quants in August 2007?: Evidence from Factors and Transactions Data. Working paper. October 23, 2008.

---

# Related GAO Products

---

*Troubled Asset Relief Program: March 2009 Status of Efforts to Address Transparency and Accountability Issues.* [GAO-09-504](#). Washington, D.C.: March 31, 2009.

*Financial Regulation: Review of Regulators' Oversight of Risk Management Systems at a Limited Number of Large, Complex Financial Institutions.* [GAO-09-499T](#). Washington, DC.: March 18, 2009.

*Financial Regulation: A Framework for Crafting and Assessing Proposals to Modernize the Outdated U.S. Financial Regulatory System.* [GAO-09-216](#). Washington, D.C.: January 8, 2009.

*Risk-Based Capital: New Basel II Rules Reduce Certain Competitive Concerns, but Bank Regulators Should Address Remaining Uncertainties.* [GAO-08-953](#). Washington, D.C.: September 12, 2008.

*Hedge Funds: Regulators and Market Participants Are Taking Steps to Strengthen Market Discipline, but Continued Attention Is Needed.* [GAO-08-200](#). Washington, D.C.: January 24, 2008.

*Financial Market Regulation: Agencies Engaged in Consolidated Supervision Can Strengthen Performance Measurement and Collaboration.* [GAO-07-154](#). Washington, D.C.: March 15, 2007.

*Deposit Insurance: Assessment of Regulators' Use of Prompt Corrective Action Provisions and FDIC's New Deposit Insurance Program.* [GAO-07-242](#). Washington, D.C.: February 15, 2007.

*Risk-Based Capital: Bank Regulators Need to Improve Transparency and Overcome Impediments to Finalizing the Proposed Basel II Framework.* [GAO-07-253](#). Washington, D.C.: February 15, 2007.

*Long-Term Capital Management: Regulators Need to Focus Greater Attention on Systemic Risk.* [GAO/GGD-00-3](#). Washington, D.C.: October 29, 1999.

---

## GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

---

## Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site ([www.gao.gov](http://www.gao.gov)). Each weekday afternoon, GAO posts on its Web site newly released reports, testimony, and correspondence. To have GAO e-mail you a list of newly posted products, go to [www.gao.gov](http://www.gao.gov) and select "E-mail Updates."

---

## Order by Phone

The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's Web site, <http://www.gao.gov/ordering.htm>.

Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.

Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information.

---

## To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: [www.gao.gov/fraudnet/fraudnet.htm](http://www.gao.gov/fraudnet/fraudnet.htm)

E-mail: [fraudnet@gao.gov](mailto:fraudnet@gao.gov)

Automated answering system: (800) 424-5454 or (202) 512-7470

---

## Congressional Relations

Ralph Dawn, Managing Director, [dawnr@gao.gov](mailto:dawnr@gao.gov), (202) 512-4400  
U.S. Government Accountability Office, 441 G Street NW, Room 7125  
Washington, DC 20548

---

## Public Affairs

Chuck Young, Managing Director, [youngc1@gao.gov](mailto:youngc1@gao.gov), (202) 512-4800  
U.S. Government Accountability Office, 441 G Street NW, Room 7149  
Washington, DC 20548

