More Than Just “New Financial Bingo”: A Risk-Based Approach to Understanding Derivatives

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I. INTRODUCTION ....................................................... 2

II. WHAT IS A DERIVATIVE? ............................................. 6
    A. Forward-based Derivatives .................................... 9
    B. Option-based Derivatives .................................... 11

III. MARKET PARTICIPANTS ........................................... 14
    A. End-users .................................................. 14
    B. Dealers ................................................... 16

IV. IDENTIFYING THE RISKS ........................................... 17
    A. Market Risk ................................................ 17
        1. Market Risk Factors .................................... 18
        2. Managing Market Risk .................................. 20
        3. Market Risk Control Failure ............................ 24
    B. Credit Risk ................................................ 31
        1. Measuring Credit Risk .................................. 31
        2. Managing Credit Risk .................................. 34
    C. Legal Risk .................................................. 35
    D. Operational Risk ........................................... 39
        1. Controlling Operational Risk ........................... 39
        2. Operational Failure .................................... 40
    E. Liquidity Risk .............................................. 45
    F. Systemic Risk ............................................... 47

* "The threat is not from foreign competition, or government deficits or regulation. It is from Wall Street, and a new form of sophisticated financial bingo called derivatives ... [D]erivatives could swamp our economy in a sea of red ink ... A single default ... could ignite a chain reaction that runs rampant through the financial markets. ‘Inevitably, that would put deposit insurance funds, and the taxpayers behind it, at risk.’" 140 CONG. REC. S828-94, S837 (1994) (remarks of Rep. Dorgan, quoting Carol J. Loomis, The Risk that Won’t Go Away, FORTUNE, Mar. 7, 1994, at 40).

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V. RECOMMENDATIONS TO PROTECT THE FINANCIAL SYSTEM .......................... 51
   A. Recommendation 1: Federal regulation should ensure that all OTC derivatives dealers that control sufficient trading volume to implicate systemic concerns are properly controlling market, credit, legal and operational risk ...... 53
      1. Federal regulation of bank derivatives dealers already exists, but must be enforced to be effective ........................................... 53
      2. The major securities firm derivatives dealers are largely unregulated but operate under a voluntary framework. The question remains whether such voluntary oversight is a viable alternative to federal regulation ...... 55
      3. Because insurance company derivatives dealers are unregulated, federal regulators should seek to determine whether this trading is of sufficient volume to implicate systemic concerns ........................................... 57
   B. Recommendation 2: Federal regulators should examine whether the current system of market participant regulation adequately protects against systemic risk or imposes excessive costs on OTC derivatives dealers ....................... 58
   C. Recommendation 3: Federal regulation of end-users and dealers whose activities pose no systemic risk should be limited to ensuring adequate disclosure of market, credit and operational risk exposures ......................... 59
   D. Recommendation 4: Federal regulators should seek to improve accounting standards to provide for accurate disclosure of OTC derivatives exposures 61
   E. Recommendation 5: United States regulators must continue to work with regulators abroad to encourage international cooperation in overseeing the OTC derivatives market .................................................. 62

VI. CONCLUSION ................................................................................. 63

I. INTRODUCTION

On December 6, 1994, Orange County California — one of the United States' most affluent and politically conservative counties — filed for protection under Chapter 9 of the Federal Bankruptcy Code, beginning the largest municipal bankruptcy in this country's history. On February 26, 1995, Barings plc (Barings), the oldest merchant banking firm in Britain and financial adviser to Queen Elizabeth II, was forced into bankruptcy due to a one billion dollar loss caused by twenty-eight year old trader Nicholas Leeson. In September 1994, Community Bankers U.S. Government Money Market Fund liquidated after becoming the first fund to "break the buck" since current money market fund regulations were adopted in 1974. These catastrophes and others

4. Georgette Jasen & Jeffrey Taylor, Derivatives Force First Closure of Money Fund, WALL ST. J., Sept. 28, 1994, at C1. To "break the buck" is to lose investors' principal by falling below the one dollar per
were prompted by huge losses in complex and sophisticated investments known as "derivatives," so named because their value is linked to or "derived" from some underlying asset, reference rate or index.

Although Orange County, Barings and Community Bankers U.S. Government Money Market Fund may have suffered some of the most widely publicized derivatives losses reported so far, they are by no means the only investors to lose money on these sometimes volatile products. By October of 1994, forty-four investors—including corporations, municipalities, investment funds and nonprofit groups—had announced losses due to derivatives trading, pushing these products which had remained relatively unknown except to the most sophisticated industry insiders onto the front pages of major newspapers and into the public conscience for the first time. The losses have also prompted a wave of litigation as well as proposals from Capitol Hill and regulatory agencies for increased monitoring of the derivatives markets.

Many, including some members of Congress and even "industry experts," are uneasy with the growing use of derivatives. They see these products as complex, novel, and confusing—pushed by greedy bankers eager to make a profit from unsuspecting investors who do not understand their risks. They fear that derivatives abuses could lead to the failure of major U.S. corporations or institutions, or even cause a crisis in the financial system as a whole, necessitating that most feared of all solutions—a taxpayer bailout. Yet a majority of market participants and others knowledgeable about

share net asset value that all fund managers strive to maintain.

5. Brett D. Fromson, Rules Sought for Derivative Trading: Nonprofits Ask Congress for Protection from Risky Securities, WASH. POST, Oct. 6, 1994, at D13 [hereinafter Rules Sought for Derivatives Trading]. Other investor losses described by the popular press as derivatives-related include: Florida State Treasury ($175 million), San Diego County ($357 million), Odessa College ($15 million), Proctor & Gamble ($157 million), Askin Capital Management ($600 million), Gibson Greetings ($20 million), Dell Computer ($35 million), Independent Bankcorp ($39 million), German-based Metalgesellschaft ($1 billion), Municipal Electric Authority of Georgia ($49 million), and Charles County, Maryland ($5 to $7 million). See Georgia Unit Discloses Loss, N.Y. TIMES, Dec. 14, 1994, at D6; Funds Tote Up Huge Losses From Sour Investments, ST. LOUIS POST DISPATCH, Dec. 8, 1994, at 8C; Fromson, supra; Brett D. Fromson, The $10 Trillion Loss: Derivatives are Complex, Fast-Growing and, Some Fear, Dangerous, WASH. POST, April 24, 1994, at H1 [hereinafter The $10 Trillion Loss]; see also Brandon Becker & Jennifer Yoon, Derivative Financial Losses, 21 J. CORP. L. 215 (1995) (listing more than 100 examples of financial losses that have been described in the popular press as derivatives-related).


9. Id. Some commentators have made sophisticated and cogent arguments that derivatives trading may
this growing industry insist that derivatives serve an important, and perhaps vital, purpose by allowing investors to better manage the financial risks associated with their business transactions.\textsuperscript{10} Regulation of derivatives markets is not necessary, they argue, because the self-interest of market participants will ensure that the risks of derivatives are adequately controlled.\textsuperscript{11} 

An in-depth look at the derivatives industry shows that both sides are off base. Many proponents of regulation are attempting solutions without understanding the problem.\textsuperscript{12} Such understanding can derive only from a thorough knowledge of the risks inherent in derivative products and what needs to be done and can be done to control those risks. Although it may appear that investors have lost inordinate amounts through derivatives deals, in fact investors still lose money in all the conventional ways. The recent spate of derivatives losses, for example, pales beside the major financial disturbances of the 1980's: the Savings and Loan crisis, the United States bank losses from Latin American debt defaults, and the stock market crash of 1987. In addition, few individual derivatives investor losses can compare to Deutsche Bank's recent $751 million loss from a garden-variety real estate deal\textsuperscript{13} or Daiwa Bank's recently disclosed $1.1 billion loss from unauthorized trades in U.S. Treasury securities during 1983-1995.\textsuperscript{14}

not benefit society as a whole. See, e.g., Henry T.C. Hu, Misunderstood Derivatives: The Causes of Informational Failure and the Promise of Regulatory Incrementalism, 102 YALE L.J. 1457, 1466 (1993) [hereinafter Misunderstood Derivatives] (arguing that, while hedging may benefit the corporate entity itself, because well-diversified investors have already eliminated unsystematic risk, corporate revenues devoted to derivatives hedging may harm such well-diversified shareholders); Henry T.C. Hu, Hedging Expectations: "Derivative Reality" and the Law and Finance of the Corporate Objective, 73 TEX. L. REV. 985 (1995), reprinted in 21 J. CORP. L. 3 (1995) [hereinafter Hedging Expectations] (same argument); Lynn A. Stout, Betting the Bank: How Derivatives Trading Under Conditions of Uncertainty Can Increase Risks and Erode Returns in Financial Markets, 21 J. CORP. L. 53 (1995) (arguing that, even absent a system-wide crisis, derivatives trading reduces net social welfare by reducing the welfare of the average derivatives trader). While recognizing the significance of these arguments, this author is more persuaded by the arguments and evidence that derivatives trading benefits the derivatives traders themselves, their shareholders and other constituencies, and society as a whole. See, e.g., Hedging Expectations, supra, at 34 (arguing that, even in a corporation with well-diversified shareholders, corporate hedging can benefit those shareholders by protecting against systematic risk or through more cost-effective hedging than that available to the shareholders themselves); Jonathan R. Macey, Derivative Instruments: Lessons for the Regulatory State, 21 J. CORP. L. 69, 70-71 (1995) (noting that derivatives have many beneficial uses); Roberta Romano, A Thumbnail Sketch of Derivative Securities and Their Regulation, 55 MD. L. REV. 1, 5 (1996) ("Notwithstanding the spectacular losses borne by certain investors in derivatives, these instruments serve important economic functions that cannot be overemphasized."); Brandon Becker & Francois-Ihor Mazur, Risk Management of Financial Derivative Products: Who's Responsible for What?, 21 J. CORP. L. 177, 178 (1995) (stating that derivatives are "undeniably valuable").

10. See Hedging Expectations, supra note 9; Macey, supra note 9; Romano, supra note 9; Becker & Mazur, supra note 9 (noting many beneficial uses of derivatives).

11. See Macey, supra note 9; GROUP OF THIRTY, DERIVATIVES: PRACTICES AND PRINCIPLES 28, at 1 (1993); COMMODITY FUTURES TRADING COMMISSION, OTC DERIVATIVE MARKETS AND THEIR REGULATION 1 (1993) [hereinafter CFTC].

12. See, e.g., Analyst Calls for Limits on Municipal Derivative Trades (CNN television broadcast, Dec. 8, 1994) (advocating a ban on derivatives use by municipalities); OHIO OFFICIAL PROPOSING A BAN ON DERIVATIVES, ST. LOUIS POST DISPATCH, Feb. 14, 1995, at 11c (discussing a proposal by Ohio Treasurer J. Kenneth Blackwell to ban the purchase of derivatives by local governments).


14. See infra notes 243-261 and accompanying text; see also Becker and Yoon, supra note 5, at 239
On the other hand, those who argue that market participants have adequately controlled risk in the absence of regulation are ignoring the facts: incidents such as Barings and Orange County demonstrate that at least some market participants are not adequately controlling risk.

This does not mean, however, that massive and immediate government intervention is necessary. First, these highly publicized losses have served as a wake-up call to market participants and regulators who may have assumed that prevailing industry practices sufficiently protected against major disasters. Second, because the derivatives market is a zero-sum game, federal regulation is appropriate only to avoid systemic crisis. Actions already taken by regulators and market participants go a long way toward controlling systemic risk. Because the costs of over-regulation are high and sometimes irreversible, government attempts to improve the market should be carefully scrutinized to ensure that such improvement is needed. Nonetheless, federal regulation and international regulatory cooperation could lend certainty and stability to some areas of the derivatives market.

Part II of this Article defines the term derivative, briefly discusses the history and background of derivatives, and provides a broad overview of the various types of derivative products available today. Part III discusses the various derivatives market participants and some of the more common uses of derivatives. Part IV provides an explanation for recent derivatives losses through an analysis of the risks inherent in derivative products and markets (market, credit, legal, operational, liquidity, and systemic risk) and a discussion of how these risks are currently being managed, if at all. It is only through such risk analysis that one can identify weaknesses in the system which may be a proper subject for regulation. Part V concludes that, because the derivatives market is a zero-sum game, regulation is appropriate only with respect to those risks that threaten the financial system as a whole. Regulation, therefore, is not only proper but necessary with respect to systemic risk. However, while some regulation to control market, credit, legal, operational, and liquidity risk could help prevent future derivatives losses, such regulation is appropriate only to the extent that these risks may affect systemic risk.

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(Noting that the Japanese Banking System disclosed an estimated $454 billion loss in June 1995 due to traditional loans and stock investments and that Credit Lyonnais of France reported in February of 1995 a $4.6 billion loss on loans and acquisitions).

15. At least two noted scholars have argued persuasively against the existence of this kind of systemic risk. See Jonathan R. Macey & Geoffrey P. Miller, Bank Failures, Risk Monitoring, and the Market for Bank Control, 88 Colum. L. Rev. 1153, 1172-93 (1988) (arguing that it is only the existence of federal deposit insurance which makes bank failures different from individual firm failures in any other industry). Macey also convincingly asserts that greater regulation of derivatives markets will actually lead to more, rather than less, systemic risk. Macey, supra note 9, at 84. Although resolution of this longstanding debate is beyond the scope of this Article, for reasons discussed infra Part IV.F. this author is unwilling to conclude at this time that systemic risk is not a concern in the derivatives market.

16. See Misunderstood Derivatives, supra note 9, at 1496 (urging incrementalism in the regulation of derivatives); Hedging Expectations, supra note 9, at 10-11 (same argument).
II. WHAT IS A DERIVATIVE?

A derivative is a bilateral contract or payment exchange agreement whose value is linked to, or derived from, an underlying asset (such as a currency, commodity or stock), reference rate (such as the Treasury Rate, the Federal Funds Rate or LIBOR), or index (such as the S&P 500). A derivative is quite simply a contract, albeit a rather complex and highly leveraged one. Those who favor greater federal oversight of the derivatives markets should bear this in mind when advocating regulation. If derivatives are just bilateral contracts, which characteristics of a derivative contract differ sufficiently from the typical contract to justify increased federal regulations? This Article demonstrates that neither the complexity nor leverage of derivatives contracts makes them inherently different from any other contract. In fact, the risks associated with derivatives are the same risks associated with traditional lending activities.

In addition, securities that have been separated or “stripped” into interest only (IO) or principal only (PO) components (strips), mortgage-backed securities, and other structured notes with complex or unusual principal or interest features are often referred to as derivatives, although technically these instruments do not fall within the accepted definition of derivatives and are not recognized as such by most industry experts and participants. At least one scholar has argued that structured notes should be considered derivatives because the cash flows of a structured note are tied to market price variations in the underlying in exactly the same manner as in a true derivative. This Article follows that approach to some extent and includes within Part IV’s analysis of derivatives losses a notable incident (Orange County) involving structured notes.

17. This asset, reference rate, or index is referred to as an “underlying.” See GROUP OF THIRTY, supra note 11, at 28. The Group of Thirty is a world-wide association of financial industry representatives, central bankers and academicians, chaired by Paul Volcker, former Chairman of the Federal Reserve Board of the United States. The Group of Thirty studies various issues of interest to the financial community and issues reports and recommendations with respect thereto. The Steering Committee for the derivatives study was chaired by Dennis Weatherstone, Chairman of J.P. Morgan, and included representatives from North America, Europe, and Asia. Id. at i-iii.

18. Misunderstood Derivatives, supra note 9, at 1464 (“A ‘derivative’ is simply a contract . . . .”); Corrine M. Bronfman & Michael F. Ferguson, Don’t Ask, Don’t Tell and Other Contracting Considerations, 21 J. CORP. L. 155, 156 (noting that, in examining the reasons for derivatives losses, “the operative word is contracts, and the fundamental issue is contracting”) (emphasis in original).

19. See Macey, supra note 9, at 80 (“Risk and leverage have been around for a very long time, and there is certainly nothing new about the use of esoteric trading instruments to achieve leverage.”).

20. Most studies have excluded strips, mortgage-backed securities, and structured notes from their investigations of derivatives. See, e.g., U.S. GENERAL ACCOUNTING OFFICE, NO. 94-133, FINANCIAL DERIVATIVES: ACTIONS NEEDED TO PROTECT THE FINANCIAL SYSTEM 4 (1994) [hereinafter GAO] (listing financial instruments included in study of derivatives as futures, forwards, options, and swaps); Derivative Financial Markets, Hearings Before the Subcomm. on Telecomm. and Fin. of the House Comm. on Energy and Commerce, 103d Cong. 1 (1993) [hereinafter Hearing] (same); see also CFTC, supra note 11, at 29 (same). But see GROUP OF THIRTY, supra note 11, at 29 (including structured notes and strips in study of derivatives).

21. Hedging Expectations, supra note 9, at 14-15. Structured notes are debt securities whose yield is tied to an underlying asset, reference rate, or index in the same manner that a derivative’s payment streams are tied to price movements in the underlying. For an excellent analysis of mortgage-based derivatives and structured notes see Romano, supra note 9, at 68-78.

22. See infra notes 137-143 and accompanying text.
Establishing an accurate definition of "derivatives" is crucial, as the term is being used increasingly loosely to include almost any arcane or unusual investment product—particularly if that product has been the cause of substantial, widely-publicized losses. This is especially true of mortgage-backed securities, which caused sizeable losses in many mutual funds during 1994.

Unlike a share of stock, which represents partial ownership of a company and the right to share in dividends and the distribution of assets upon liquidation, dissolution or winding-up, a derivative is merely a trading instrument whose value depends on the performance of another variable. Derivatives are used primarily to hedge against, or speculate on, price movements in the markets and economic variables upon which they are based, and their value can fluctuate wildly in response to small changes in those markets and variables. The sharp increases in interest rates and the volatility of the currency exchange markets since early 1994, for example, have been largely responsible for the multi-million dollar derivatives losses reported by investors.

Derivatives can be divided into two general categories: those, such as commodity futures and stock options, that are standardized and actively traded on exchanges (exchange-traded derivatives) and those that are customized for the specific needs of a particular investor (over-the-counter (OTC) derivatives). OTC derivatives allow users to custom tailor a risk management tool which meets a specific need more easily than can be done with a standardized derivative. Exchange-traded derivatives represent a rela-

23. See Hedging Expectations, supra note 9, at 13-14. In fact, several of the derivatives losses referred to in footnote 5 of this Article (including Askin Capital Management, Odessa College, and a large part of the losses of Charles County, Maryland) were actually the result of mortgage-backed instruments and not derivatives, as that term has been defined here.

24. Karen Donovan, Derivatives Slump; Losers Go to Court, NAT’l L.J., Nov. 7, 1994, at A24. Mortgage-backed securities are actually shares in a trust that holds a pool of residential mortgages, most of which are guaranteed by a federal agency such as the Government National Mortgage Association (Ginnie Mae) or the Federal Home Loan Mortgage Corporation (Freddie Mac). The interest and principal payments that homeowners make on the mortgages become the actual cash flow distributed to investors in the pool. Because the loans are federally guaranteed, the risk of nonpayment or late payment is very low. Homeowners are able to prepay their mortgages without penalty, however, making the cash flows uncertain. During times of decreasing interest rates (as in 1993 through early 1994, for example), many homeowners refinance their mortgages at lower interest rates. This results in a loss to mortgage-backed security investors who lose the interest income stream on the mortgage and must reinvest at lower interest rates. A mortgage-backed security thus is not a derivative because it is not a bilateral contract or payment exchange agreement and its value does not derive from anything. Instead, it is an actual security representing a share in a pool of receivables. Id.

25. Proctor & Gamble, Gibson Greeting Cards, Orange County (California), Askin Capital Management, Odessa College, Charles County (Maryland), Eastern Shoshone Tribe of the Wind River Reservation (Wyoming), Dell Computer, San Diego County, and Municipal Electric Authority of Georgia, among others, can each trace losses to rising interest rates. See Georgia Unit Discloses Loss, supra note 5 (noting the losses of the Municipal Electric Authority of Georgia); Funds Tote Up Huge Losses From Sour Investments, supra note 7; Fromson, Rules Sought for Derivative Trading, supra note 5 (discussing the losses of Odessa College, Charles County, and the Eastern Shoshone Tribe); Fromson, The $10 Trillion Toss, supra note 7. Showa Shell Sekiyu and Laszlo Tauber each lost millions of dollars on currency-based derivatives. Fromson, Rules Sought for Derivative Trading, supra note 5 (noting Showa Shell Sekiyu’s losses); Jerry Knight, D.C. Developer Comes to Grief on Derivatives; Area Investor Laszlo Tauber’s Loses Loss Tests Courts, Markets, WASH. POST, May 15, 1994, at H1.

26. See also infra notes 158-160 and accompanying text (discussing advantages unique to exchange-traded derivatives). Some scholars have noted that, as both markets have matured, some of the distinctions be-
tively mature market that has been active for decades. These instruments are subject to regulation by the exchanges on which they are traded, as well as by other federal agencies. OTC derivatives, by contrast, are typically said to be unregulated27 and represent a newer market that has experienced phenomenal growth since the 1980s.28 Perhaps because of these differences, the vast majority of derivatives losses experienced by investors thus far have been the result of OTC, rather than exchange-traded, derivatives activity. Consequently, OTC derivatives have been the primary source of controversy and the focus of would-be reformers.29 This Article, therefore, focuses primarily on OTC derivatives, touching on exchange-traded derivatives only for purposes of comparison.

Derivative instruments constitute one of the world's fastest growing financial markets,30 with an outstanding notional amount of approximately $55.7 trillion as of March 31, 1995.31 Contrary to popular belief, however, derivatives are not a new development. In fact, historians have traced derivatives trading as far back as 2000 B.C., and have discovered the use of future delivery commodity contracts in ancient Mesopotamia.32 In the United States, derivatives were issued by the State of Massachusetts Bay in the 1700s and by the Confederacy during the Civil War.33 By the mid-1700s, a
fully operational, modern futures market was underway in Chicago.\textsuperscript{34} By 1994, more than 1,200 types of financial derivatives were in use,\textsuperscript{35} many with exotic names such as digital options, butterfly spreads, condors, straddles, cylinders, and roller-coaster swaps.\textsuperscript{36} Nonetheless, the world of derivatives is not as confusing as it may first appear. Every derivative, even one that appears extraordinarily complex, is based on one of two relatively simple models: the forward or the option.\textsuperscript{37}

\textit{A. Forward-Based Derivatives}

The primary types of forward-based derivatives include forward contracts, futures contracts, and swap transactions. Forwards are OTC derivatives customized to fit the needs of the particular parties. A forward contract requires one party to buy, and the other to sell, a designated quantity of the underlying at a pre-agreed price on some specified future date. The value of the forward contract is conveyed at maturity, through either physical delivery or cash settlement.\textsuperscript{38}

For example, suppose a U.S. automaker imports engine parts from Japan. Because the parts are priced in yen, a rise in the value of yen relative to the dollar will cause the parts to become more expensive. The automaker needs a steady profit margin on each car and cannot raise and lower the price of its cars with every fluctuation in the yen, so it enters into a foreign exchange forward contract with a bank which fixes at the current forward exchange rate the cost of converting dollars to yen at some specified future date. The contract ensures that, even if the currency markets fluctuate, the price the automaker pays for engine parts will remain stable. If the value of the yen relative to the dollar rises, the company earns a profit on the forward contract, thus offsetting the increased price it must pay the Japanese manufacturer for engine parts. If, however, the value of the yen relative to the dollar is lower on the date the contract matures, the U.S. automaker must pay the bank the difference, but this cost is offset by the lower price the company will have to pay for the imported parts. The forward contract thus acts as an insurance policy, limiting both profits and losses, a concept known among economists as reducing variance.\textsuperscript{39}

\textsuperscript{34} J. Henry Schroder & Co. for the Confederate States of America. The contract provided for payment at maturity of 100 pounds sterling, 2500 French francs, or 4000 pounds of cotton, thus allowing the purchaser to speculate on price movements among the three variables. \textit{Id.} at 2.

\textsuperscript{35} \textit{Id.} at 1.

\textsuperscript{36} Albert R. Kau, \textit{Bank Regulator Signals Move on Derivatives}, \textit{Wall St. J.}, April 21, 1994, at A3 (noting that the Comptroller of the Currency has compiled a list of 1200 financial derivatives currently offered).


\textsuperscript{38} \textit{Group of Thirty, supra} note 11, at 29. In addition, some derivatives are based on a combination of the forward and the option. For example, the swap contract purchased by the Procter & Gamble Company from Bankers Trust contained an embedded option feature. \textit{See infra} note 124.

\textsuperscript{39} \textit{Id.} at 29-30. This process is typically referred to as settlement and is no different from the concept of performance associated with any garden-variety contract.

\textsuperscript{39} Variance is "the extent to which possible outcomes depart from the expected return." \textit{Ronald J. Gilson & Bernard S. Black, (Some Of) The Essentials of Finance and Investment} 90 (1993). An
As with any other contract that calls for bilateral future performance, a forward contract entails significant risk of loss for both parties. Because the value of the contract is conveyed only at maturity, extreme price changes can lead to massive gains or losses on the contract by either party. The gain to one counterparty in any forward-based transaction always equals the loss to the other party. This symmetry of risk is the most important feature distinguishing forward-based transactions from option-based transactions.40

A futures contract is a fully standardized, exchange-traded forward-based derivative. Whereas a forward contract is completely customized, including the quantity and quality of the underlying, the time and place of delivery, the method of payment, and the price, a futures contract leaves only the price to be negotiated. This standardization makes futures contracts more fungible than forwards. While forward contracts are rarely traded, the futures markets are highly liquid. This market liquidity, coupled with relatively small contract size, makes futures trading possible among members of the general public, who ordinarily cannot participate in forward and swap activity. Although futures contracts originally developed as forward contracts made with respect to agricultural commodities, today futures contracts involving interest rates, currencies and equity indices predominate in the market.41 The fact that futures are standardized and exchange-traded leads to important risk profile differences between futures and OTC forward contracts. These differences are discussed in the sections on market and credit risk.42

A swap transaction is a series of forward contracts.43 A swap agreement obligates the two parties to the contract to exchange payment streams on periodic payment or settlement dates based on a notional amount. With the exception of currency swaps, the notional amount is generally not exchanged. Instead, the two payment streams are netted, with only the difference being paid by one party to the other. Swaps, like forwards, are individually negotiated and are not exchange-traded.44

To illustrate, suppose that homeowner A is paying a floating rate of interest (assume that interest rates are currently six percent) on his $100,000 mortgage, and fears that interest rates may go up, making his monthly payments unaffordable.45 Homeowner B, on the other hand, is paying a fixed rate of interest (again assume six percent) on her $100,000 mortgage, but thinks that interest rates will soon decline and wants to save money on interest payments by taking advantage of this decline. A and B can enter into an interest rate swap contract. If, at the first settlement date, interest rates have risen to ten percent, A (who has a floating rate home loan) must pay his lender $10,000 (ten

41. Group of Thirty, supra note 11, at 32.
42. See infra Parts IV.A. and IV.B.
43. Each payment or settlement date effectively represents the maturity date of one forward contract and the beginning of a new forward contract that will mature on the next settlement date.
44. Group of Thirty, supra note 11, at 31.
45. For purposes of this hypothetical assume that, unlike real-world mortgages, there is no amortization of interest on these mortgages.
percent of $100,000), but will receive $4,000 from B on the swap contract (the difference between ten percent of the notional amount ($10,000) and six percent of the notional amount ($6,000)), for a net liability of $6,000. B, on the other hand, still owes her lender $6,000 (six percent of the $100,000 mortgage) and must pay A $4,000 on the swap contract for a net liability of $10,000. A and B have, in effect, swapped their respective liabilities.46

B. Option-based Derivatives

An option contract gives the holder the right, but not the obligation, to buy or sell a specified underlying (or settle the value for cash) at a pre-agreed price (the strike price) at either a fixed future date, at a number of fixed future dates, or at a date chosen by the holder up to maturity. Because the owner of the option can choose either to exercise the option or let it expire unexercised, she benefits from favorable price movements in the underlying, but loses only the premium paid for the contract in the event of unfavorable price movements.47

For example, an investor may buy an option that grants her the right to buy ten shares of the common stock of Company X at fifty dollars per share on June 1.48 If common shares of Company X are trading at fifty-three dollars per share on June 1, the investor can exercise the option and purchase ten shares of Company X for fifty dollars per share and immediately resell the shares for fifty-three dollars per share, thus netting a per share profit of three dollars and a total profit of thirty dollars (her actual profit is, of course, reduced by the premium she paid for the option). More likely, however, the investor will settle the contract for cash equivalent to the difference between the market price of the underlying and the exercise price of the option, or thirty dollars (i.e., three dollars per share times ten shares). If, however, common shares of Company X are trading at forty-eight dollars per share on June 1, the investor will let the option expire unexercised, losing only the premium she paid for the option.

Thus, option-based derivatives involve asymmetrical risk: the buyer of an option

46. The example of two homeowners directly entering into a swap contract is used only for simplicity’s sake. In reality, members of the general public rarely engage in swap transactions and nearly all swaps take place through a financial intermediary. Counterparties rarely contract directly with one another and usually do not even know one another. Instead, an intermediary (a swap dealer, such as a commercial or investment bank) enters into a swap with one party and then either offsets the position through a counter transaction or series of transactions with another party or parties, hedges the exposure with financial futures, or assumes the risk of loss. VICTOR BRUDNEY & WILLIAM W. BRATTON, CORPORATE FINANCE 11 (4th ed. Supp. 1996) [hereinafter BRUDNEY & BRATTON SUPPLEMENT].

47. See GROUP OF THIRTY, supra note 11, at 32-33. In contrast, the option seller has committed to a firm obligation with respect to the underlying. See ROBERT W. KOLB, FINANCIAL DERIVATIVES 77-78 (1993). She has no discretion as to exercise of the option and must be ready to sell to or buy from the option buyer if the buyer chooses to exercise the option. Id.

48. This type of option contract, granting the holder the right to buy the underlying, is referred to as a call option or, simply, a call. An option contract granting the holder the right to sell the underlying is referred to as a put option or, simply, a put.
places only the premium at risk, whereas the seller's potential loss is unlimited. This is in contrast to the symmetrical risk profile of a forward-based derivative in which the seller's loss equals the buyer's gain and vice versa.49

Options are used primarily for either speculation or hedging. Many speculators are drawn to the options market due to the greater leverage of options relative to the underlying. This leverage means that a percentage change in the underlying will result in a greater percentage change in the option, all else being equal. Speculating in options can thus be more profitable and more risky than investing directly in the underlying.50

For example, assume that an investor owns a share of stock with a market price of $100 per share and a standard deviation of 10%. Under the Black-Scholes option pricing model, a call option with an exercise price of $100 and a time to expiration of one year would sell for $11.84.51 If the stock price changes by 1%, the option price will change by 7.2% in the same direction. Thus, if the stock price increases by 1% (to $101/share), the option price will increase by 7.2% (to $12.73). Similarly, if the stock price falls by 1% (to $99/share), the option price will decrease by 7.2% (to $10.95).

Options use, however, need not be speculative. In fact, many market participants employ options as a useful hedging device. To illustrate, using the example from the preceding paragraph, assume an investor owns a stock portfolio consisting of 8,944 shares selling at $100 per share. Recall the relationship between the underlying stock price movement and the option price movement. Given such a relationship, a risk-averse investor has the ability to offset market price fluctuations in the underlying stock through the use of stock options. To accomplish this, the investor could sell 100 call contracts (i.e., options to buy 10,000 shares) for $11.84 per option. This "short position" is represented in the table below by an aggregate value of negative $118,400. The investor's entire portfolio thus has a value of $776,000. Now assume a one percent change in stock price. If the stock increases by one percent (to $101/share) the stock will be worth $903,344, but the short position will decrease to a negative $127,300 ($12.73 per option), for a total portfolio value of $776,044. A one percent increase in the stock price, therefore, results in virtually no change in total portfolio value. If, on the other hand, the stock price decreases by one percent (to $99/share) the stock will be worth only $885,456, but the short position will equal negative $109,500 ($10.95 per option), for a total portfolio value of $775,956. Again, there is virtually no change in total portfolio value. In this example, holding .8944 shares of stock for each option sold short will result in a virtually perfect hedge, meaning that the value of the entire portfolio will be nearly insensitive to any change in the stock price.52

49. See BRUDNEY AND BRATTON SUPPLEMENT, supra note 46, at 12-13.
50. See KOLB, supra note 47, at 109; see also the discussion of elasticity, infra notes 85-87 and accompanying text.
51. The examples in this and the following paragraph were taken from KOLB, supra note 47, at 109-11. All call values were calculated by Kolb using the Black-Scholes formula, assuming a risk-free rate of return of 12% and no change in market factors other than the indicated stock price changes. Id. at 109; see also the discussion of the Black-Scholes option pricing formula, infra note 79 and accompanying text.
52. KOLB, supra note 47, at 109-11. The hedge is nearly perfect because portfolio value fluctuates by $.44 in the given example. In the case of more drastic stock price movement, the hedge would become imbalanced and require adjustment. Id. at 111-12.
EXAMPLE OF A "PERFECT" HEDGE
(Event 1) Original Portfolio Value when Stock Price equals $100/share and Option Price equals $11.84:
8,944 shares of stock $894,400
Short position for options on 10,000 shares (i.e., 100 contracts) -$118,400
Total Value equals $776,000

(Event 2) Portfolio Value when Stock Price Rises by 1%: Stock Price = $101/share and Option Price = $12.73:
8,944 shares of stock $903,344
Short position for options on 10,000 shares (i.e., 100 contracts) -$127,300
Total Value equals $776,044

(Event 3) Portfolio Value when Stock Price Falls by 1%: Stock Price = $99/share and Option Price = $10.95:
8,944 shares of stock $885,456
Short position for options on 10,000 shares (i.e., 100 contracts) -$109,500
Total Value equals $775,956

Options are available in both exchange-traded and OTC forms, and can also be structured as a security, such as a warrant, or can be embedded in securities, such as a callable or putable bond (so-called embeddeds). Numerous variations on options exist, including swaptions (options on swaps) and options on futures. Options on futures, like futures themselves, are fully standardized and exchange-traded, leading to important differences in risk profile from OTC options. As with futures, options on futures are traded by members of the general public, an opportunity not generally available with respect to OTC options.

Just as forwards can be combined to create swaps, options can be combined to create caps, floors, and collars. As with swaps, a notional principal is used to calculate periodic cash flows and, as in the typical option, the buyer must pay a premium at inception. A cap is an option that imposes a limit or ceiling on the holder’s exposure to the underlying. An interest rate cap, for example, obligates the seller to pay the buyer on each settlement date the difference (multiplied by the notional amount), if positive, between the strike rate and the reference rate, thus capping the buyer’s interest rate exposure at the strike rate. A floor is the opposite of a cap—payment is made only if the difference is negative, thus establishing a minimum return for the holder. An inter-

53. GROUP OF THIRTY, supra note 11, at 29 (Table 1).
54. Id. at 33.
55. See infra Part IV.
56. GROUP OF THIRTY, supra note 11, at 34.
57. The term “strike rate” rather than “strike price” is commonly used in connection with interest rate options. See, e.g., Citibank, A Glossary of Derivatives Market Terms, in CORPORATE FINANCE RISK MANAGEMENT DERIVATIVES YEARBOOK 8, at 21 (Euromoney Publications 1994) (defining cap and floor).
est rate floor, for example, might be employed by a floating rate investor seeking protection against interest rate declines. A collar is the equivalent of buying a cap and selling a floor.58

III. MARKET PARTICIPANTS

Although many types of investors, including individuals, use derivatives, financial institutions and large corporations are the primary actors in the OTC derivatives market. Participants in the derivatives markets can be divided into two categories: end-users and dealers.59

A. End-users

End-users include corporations, government entities, institutional investors, financial institutions, and, occasionally, individuals, with financial institutions and large corporations dominating the end-user market.60 The end-user market is somewhat concentrated, with a large number of entities holding relatively small market positions and a few large end-users accounting for a sizeable portion of the outstanding notional principal.61 Derivatives have become an indispensable tool in today's volatile, integrated world economy, with the treasury departments of two-thirds of Fortune 500 companies reporting the regular use of derivatives.62

Derivatives end-users can be divided into two general categories: hedgers and speculators.63 Hedgers seek to reduce the risk of a current or anticipated cash position

58. GROUP OF THIRTY, supra note 11, at 33. While a collar provides protection against both increases and decreases in the underlying, investors typically need to hedge only against volatility in one direction. The primary rationale for a collar, therefore, is to reduce the cost of the cap premium. An interest rate collar holder, for example, typically buys a cap at one level and sells a floor at a lower level in order to recoup some or all of the cap's cost. While collars are most often used to hedge interest rate exposure, they can also be used to manage the risk of equity, currency and commodity portfolios. Citibank, supra note 57, at 9 (defining "collar").

59. CFTC, supra note 11, at 23. The distinction is transaction-based and is not related to the nature of the participant itself. For example, many derivatives market participants are both dealers (when satisfying a customer's hedging needs) and end-users (when hedging their own positions or taking positions as part of their proprietary trading program). GROUP OF THIRTY, supra note 11, at 34.

60. At year-end 1992, domestic commercial banks and financial subsidiaries of corporations accounted for 25% of total end-user notional principal in interest rate products (swaps, caps and forward interest rate agreements). Corporations, regional banks, and non-dealer foreign banks accounted for 20%, 18%, and 16%, respectively. With respect to currency products (swaps, forwards, and options), non-dealer foreign banks and corporations had, at year-end 1992, the largest outstanding notional amounts, followed by regional banks and non-depository financial institutions (not including insurance companies). CFTC, supra note 11, at 27-28.

61. Id. at 28.


63. Others add arbitragers and spreaders to the list of derivatives end-users. See ROBERT T. DAIGLER, FINANCIAL FUTURES & OPTIONS MARKETS: CONCEPTS AND STRATEGIES 91 (1994). Arbitragers seek to exploit pricing inefficiencies between assets that are perfect substitutes and should thus trade at the same price. See id. at 98-100 (providing an overview of arbitrage). Spreaders seek to profit by correctly forecasting movements in the spread between two or more underlyings or by simultaneously purchasing and selling options on the same underlying. See id. at 97-98 (explaining the spread transaction); Citibank, supra note 57, at 41 (de-
through the use of an offsetting derivative position. Speculators, by contrast, seek to increase risk (and thus return) and profit from market price fluctuations in the derivative contract itself. Many of the most widely-publicized derivatives losses so far have been suffered by speculators.\(^\text{64}\) Although much controversy has surrounded speculation in derivative products, it should be remembered that, because the derivative markets are a zero-sum game, speculators provide the market liquidity needed to allow others to hedge.\(^\text{65}\) The derivatives market is a zero-sum game because gains to one party equal losses to the other party. This contrasts with other markets, including the stock market. A 14% decline in the Standard & Poors 500, for example, represents an equivalent decline in societal wealth. No one gains the value that shareholders have lost. The billions of dollars lost by derivatives investors, however, represent a gain to the corresponding counterparty. Thus, a $2 billion derivatives loss by Orange County is not a net wealth loss, but merely a wealth transfer to Merrill Lynch and other counterparties who are luckier or wiser. That the derivatives market is a zero-sum game, however, does not mean that no value is created through the use of derivatives. By allowing firms to diversify and hedge against unwanted risk, derivatives end-users can reduce both total risk and the possibility of financial crisis. This benefits the firm’s shareholders, management, employees, creditors, and other constituencies with an interest in the firm.\(^\text{66}\)

fining “spread”). Thus, spreading is just another form of speculating, although the risk of loss (or gain) is reduced through the offsetting position. Derivatives may also be used to reduce agency and transaction costs and avoid taxes and other regulations. See Macey, supra note 9, at 72-81.

\(^{64}\) Romano, supra note 9, at 5.

\(^{65}\) Recall the example of an interest rate swap, supra notes 45-46 and accompanying text. Homeowner A fears an increase in interest rates and seeks to hedge against such an increase. Homeowner B, however, is speculating on an interest rate decline. Notice that A’s losses are limited to six percent of the notional amount. Even in the unlikely event that interest rates decline to zero, A continues to pay a net amount of six percent of the notional principal. In fact, it is inaccurate to characterize this foregone savings in interest rates as a loss to A. A has willingly forfeited the possibility of a lower mortgage payment to avoid the possibility of a higher one, a risk unacceptable to A. B’s losses, on the other hand, are theoretically unlimited and will continue to rise with interest rates. Although some would cite this as an argument in favor of restricting speculation on derivatives, it is unlikely that A could find a counterparty in need of such a hedge transaction. Speculators are needed, therefore, to provide liquidity to the derivatives market. The example of two homeowners acting as direct counterparties is used for simplicity only, but the argument holds equally true if one assumes the existence of an intermediary. The intermediary, to hedge its own risk, must offset the hedgers’ positions through counter transactions and is unlikely to find sufficient counterparties in need of such an offsetting hedge. Once again, parties interested in speculation are a necessary element of a well-functioning, liquid derivatives market. See also Romano, supra note 9, at 5 (“Because the demand of business hedgers is rarely met by hedgers on the other side of the market, speculators play an essential role in derivative markets.”).

\(^{66}\) GROUP OF THIRTY, supra note 11, at 64 n.28. See also Macey, supra note 9, at 72-3 (noting that derivatives have many beneficial uses); Romano, supra note 9, at 5 (finding that derivatives serve important economic functions); Becker and Mazur, supra note 9, at 178 (stating that derivatives are “undeniably valuable”). But see Stout, supra note 9, at 64-5 (noting that derivatives trading decreases social wealth); Hedging Expectations, supra note 9, at 34 (finding that derivatives hedging benefits the corporation’s shareholders only if they are undiversified or if the firm can hedge more cheaply).
In addition, one must recognize the difficulty in separating a hedge transaction from one of pure speculation. Often an OTC derivative will contain elements of both, making the same derivative contract a hedge for one end-user and a speculation for another, depending on the purchaser’s other open market positions.67

Hedgers may use derivatives to lower funding costs, diversify sources of funding, or avoid market volatility.68 W.R. Grace & Co., for instance, reduced interest rate costs by $30 million in 1993 through a series of interest rate swaps69 and the Metropolitan Atlanta Rapid Transit Authority (MARTA) has for several years successfully used swaps to lock in diesel fuel expenses up to a year in advance.70 The Student Loan Marketing Association (Sallie Mae) borrows money from the public and loans it to banks and others to finance student loans. The group’s financial health obviously depends on its ability to borrow money at a lower rate than the rate at which it lends. Because interest rates are sometimes volatile, however, Sallie Mae engages in simple, "plain vanilla" interest rate swaps to hedge the risk of interest rate fluctuations.71

B. Dealers

Dealers often use derivatives for the same purposes and in the same manner as end-users. They are distinguished from end-users, however, by their willingness to meet demand by buying and selling derivatives, thus performing a market-making function and providing liquidity to the OTC derivatives markets. The OTC derivatives market is almost completely intermediated, with the dealer acting as principal in the transaction rather than as an agent. Dealers trade with other dealers as well as with end-users, and studies indicate that these interdealer trades are not necessarily related to underlying customer trades. Thus, both dealers and end-users create market demand.72

Banks dominate the OTC dealer market, followed by securities firms and insurance companies.73 OTC dealing activity is highly concentrated, with a relatively small num-

67. The difficulty of distinguishing a hedge from a speculation is highlighted by end-users who recently suffered derivatives losses, many of whom reported that they thought they were buying a hedge when, in fact, they had purchased a highly risky, speculative investment. Many of these investors are now suing the dealers who sold them the derivative. See, e.g., Orange County Inv. Pool v. Merrill Lynch & Co., 203 B.R. 983 (Bankr. C.D. Cal. 1996); Proctor & Gamble Co. v. Bankers Trust Co., C-1-94-735, at 2 (S.D. Ohio, filed Sept. 22, 1994) (Complaint for Declaratory Relief and Damages); Gibson Greetings, Inc. v. Bankers Trust Co., C-1-94-620, at 3-9 (S.D. Ohio, filed Sept. 12, 1994) (Complaint and Jury Demand); Fromson, Rules Sought for Derivative Trading, supra note 7 (the three injured investors were Odessa College (Texas), Charles County (Maryland), and the Eastern Shoshone Tribe of the Wind River Reservation (Wyoming)); see also Hedging Expectations, supra note 9, at 12 n.39 (noting the difficulty of distinguishing a hedge from a speculation).

68. GROUP OF THIRTY, supra note 11, at 34.


70. See Hiltzik, supra note 13.

71. See Robert Manor, Risky Business Firms’ Losses Put Derivatives in Spotlight, ST. LOUIS POST DIS- PATCH, Aug. 21, 1994, at 1E.

72. CFTC, supra note 11, at 23.

73. The 1996 General Accounting Office (GAO) study found that of the top 15 U.S. OTC derivatives dealers, seven were banks (accounting for about 69% of OTC derivatives dealer market share each year since
ber of firms controlling a large share of the market. At the end of 1992, for example, the top seven domestic bank OTC derivatives dealers accounted for over ninety percent of total U.S. bank derivatives activity and the General Accounting Office (GAO) indicated in its 1996 report that this trend toward concentration in the major bank dealers had continued.\(^\text{74}\) Similarly, the top five U.S. securities firms dealing in OTC derivatives accounted for over ninety percent of total derivatives activity for all U.S. securities firms.\(^\text{75}\)

IV. IDENTIFYING THE RISKS

Although derivatives are generally perceived as very risky products, the dangers presented by derivative instruments are neither new nor unique. The risks associated with derivatives—market, credit, legal, operational, liquidity, and systemic risk—are the same risks found in more traditional lending and investment activities. However, because OTC derivatives are customized to meet the needs of a particular counterparty, these risks are often assembled in new and unexpected ways, sometimes leading to unforeseen losses.\(^\text{76}\)

A. Market Risk

Market risk is the risk of loss from adverse price movements in the market. Dealers typically manage market risk on a portfolio basis, combining offsetting positions to determine net risk exposure and then hedging any net excess risk in the futures or options markets or through derivatives hedging trades.\(^\text{77}\) Managing the market risk of derivatives is closely related to the pricing of derivatives, specifically to options pricing techniques. Options hedging and pricing techniques are based on theories first developed in 1973 by Fischer Black and Myron Scholes (the Black-Scholes options pricing model).\(^\text{78}\) The Black-Scholes model identified five factors that affect the price of any option: the price of the underlying, the exercise price of the option, the time to expiration of the option, the volatility of the price of the underlying, and the risk-free rate of return. The model provides a method for hedging options with the underlying asset, thus allowing for arbitrage pricing and hedging.\(^\text{79}\)

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\(^{74}\) GAO, supra note 20, at 6. GAO II, supra note 30, at *30.

\(^{75}\) GAO, supra note 20, at 6; GAO II, supra note 30, at *71.

\(^{76}\) GAO, supra note 20, at 9; Macey, supra note 9, at 82.

\(^{77}\) CFTC, supra note 11, at 94.


\(^{79}\) Black and Scholes recognized that stocks and calls on stocks can be combined to construct a risk-free portfolio. By combining the underlying stock and a money market investment, an investor can always form a riskless hedge (the delta hedge) that exactly replicates the payoff of the option being hedged. Thus, a portfolio consisting of the option and its riskless hedge must always appreciate at the risk-free interest rate. For any given time period the value of such a portfolio can be computed as its value at the end of the period discounted back one period at the risk-free rate. The price of an option is a function of the price of the underlying asset at that time. If the distribution of asset prices is known for each time period (the model assumes a
1. Market Risk Factors

To determine the net risk of a portfolio, dealers must decompose the individual contracts into their underlying market risk factors (delta, elasticity, convexity, volatility, time decay, basis, and discount rate risk) so they can be netted and managed.\(^8\) Delta is the rate of change in the value of the derivative contract for a given change in the value of the underlying. For example, an option with a delta of .5 should change in value fifty cents for every one dollar move in the underlying. Delta makes it possible to convert a derivative position into an equivalent position in the underlying. A derivative (or portfolio) is said to be delta hedged (or delta neutral) if an offsetting position has been taken in the underlying in proportion to the contract's (or portfolio's) delta. A portfolio that is long 100 stock call options with delta equal to .3 can, for example, be hedged by a short position of thirty shares.\(^1\)

Delta is always a number between zero and one (i.e., all other factors being equal, a derivative cannot move more in absolute terms than the underlying). A swap will generally have a delta of about one. Thus, a price movement in the underlying should produce an equivalent price movement in the swap. For options, delta moves non-linearly from zero to one as the option moves from far out-of-the-money to deep in-the-money. In other words, the closer an option is to the money, the faster delta changes. Very out-of-the-money options are nearly unaffected by price moves in the underlying (because the probability of the underlying price hitting the strike price remains very low) and, therefore, have deltas near zero. Because very-in-the-money options have a high probability of being exercised, they tend to rise and fall with the underlying and, therefore, have deltas near one. At-the-money options have about an equal chance of being exercised and of expiring unexercised and thus have deltas of about .5. In addition, if an option is not at-the-money, its delta will be affected by implied volatility levels, the passage of time, and changes in the discount rate, as each of these affect the probability that the option will be exercised.\(^2\)

Closely related to delta is the concept of elasticity or leverage, represented in pricing models by the Greek letter lambda. Lambda measures the percentage change in option price given a one percent change in underlying price. An option with a lambda of eight, for example, will experience an eight percent increase in price for every one percent increase in the price of the underlying.\(^3\) Because elasticity is usually positive (i.e., a one percent change in underlying price is normally accompanied by a greater

\(^{1}\) lognormal—i.e., bell curve—distribution of the rate of return on the underlying, then the initial value of the option can be deduced by working backwards in time. Deficiencies in the Black-Scholes model, such as its assumption of no dividends, taxes, or transaction costs; constant volatility; stable short-term interest rates, and lognormal stock price distribution are addressed by other types of models. Id. at 637-44; Citibank, supra note 57, at 6 (explaining the Black-Scholes Model).

\(^{2}\) GROUP OF THIRTY, supra note 11, at 43-44.

\(^{3}\) See Citibank, supra note 57, at 15 (defining "delta").

\(^{4}\) Id.; MARKI, supra note 40, at 45-46.

\(^{5}\) DAIGLER, supra note 63, at 416-17 (providing an overview of elasticity). Lambda is sometimes used interchangeably with delta, although technically the two are not the same. Whereas lambda measures the percentage change in option premium for a one percent change in the underlying price, delta measures the absolute change in option premium for a one unit change in the underlying. Citibank, supra note 57, at 19 (defining "elasticity").
percentage change in option premium), this relationship is typically referred to as the leverage factor. Leverage is higher when an option is deep out-of-the-money because of the much lower premium paid for an option with little chance of exercise. Many speculators, therefore, prefer to purchase deep out-of-the-money options.

Convexity risk (measured by the Greek letter gamma) is the rate of change in delta relative to changes in the price of the underlying. If, for example, an option had a delta of .5 and a gamma of .04, an underlying price move of one unit should result in a delta of either .52 or .48 (a delta move of four percent), depending on the direction of underlying price movement. Because gamma is the expected change in delta, it provides a measure of the expected change in the equivalent position given a change in underlying price. Gamma, therefore, is an important measure for any investor hedging a derivatives portfolio because it indicates the frequency with which delta hedges must be rebalanced. A position that is delta hedged but which has a high gamma will quickly become imbalanced with changes in the underlying, thus resulting in a derivative contract or portfolio that is not exactly offset by the position in the underlying—i.e., an imperfect hedge.

Volatility risk is the degree to which the value of an option is affected by changes in volatility levels (i.e., price movement) in the underlying. Volatility is important in option pricing because the more volatile the price, rate, or return is on an underlying, the more valuable the option is on that underlying. Two common volatility measures are historical volatility and implied volatility. Historical volatility measures past market action, but may not be an accurate indicator of future volatility. For this reason, historical volatility is considered by many to be an inaccurate index for option pricing. Implied volatility is calculated by deriving from all the known characteristics of an option the volatility estimate that must have been used in setting the market price of an option. Because volatility is the only pricing input (other than short-term interest rates)

84. See Daigler, supra note 63, at 338. Leverage refers to the ability to control a large notional amount of an underlying through a relatively small capital outlay. Forward-based and option-based derivatives are both leveraged, as a comparatively small capital outlay (in the form of margin or premium) provides the buyer with exposure to a large amount of the underlying. Citibank, supra note 57, at 29 (defining "leverage").

85. Daigler, supra note 63, at 417. Although leverage may be a factor in many types of transactions and investments, including traditional securities transactions, the complexity of many OTC derivatives often allows users to disguise the amount of leverage—and, therefore, risk—present in the contract. Such hidden leverage is not possible in exchange-traded derivatives because the automatic marking-to-market performed on all exchanges makes gains and losses immediately apparent.

86. Citibank, supra note 57, at 22-3 (defining "gamma").

87. Id. at 45-46 (defining "vega" and "volatility"). To illustrate, assume a call option with an exercise price of $6 on an underlying with a current price of $5. Assume further that there are only two possible prices for the underlying for the duration of the life of the call: either $5.50 or $7. If the price of the underlying is only $5.50 on the exercise date, the option is worthless. Despite that possibility the option has present value because the underlying may vary between $7 on the exercise date. Alternatively, assume that the only two possible prices for the underlying are either $5.25 or $7.25. If the price of the underlying on the exercise date is $5.25, the option is still worthless. However, the call has a higher present value than in the previous example because the increase in the upper possibility from $7 to $7.25 makes the option worth more when it is in-the-money. Because the underlying is more volatile, therefore, the option is more valuable. See Victor Brudney & William W. Bratton, Corporate Finance 400 (4th ed. 1993).

88. Mark, supra note 40, at 55.
that is not directly observable, its derivation requires subjective determinations and estimates by the portfolio manager. These estimates are necessarily affected by the trader’s individual perceptions and biases as to future events.

Volatility is a vitally important measure when hedging an options portfolio because implied volatility often changes (reflecting changing views as to future volatility) without any change in the price of the underlying, particularly over the life of an option that has longer to maturity. A change in implied volatility should cause a change in option value and, therefore, a change in hedge position value, meaning that even a position that has been properly delta- and gamma-hedged can become unbalanced due to changes in volatility.\(^\text{89}\)

Volatility is measured by vega. Vega is usually expressed as a dollar amount per one percent change in volatility. An option with a vega of two dollars thus increases (decreases) in value two dollars for every one percent increase (decrease) in volatility.\(^\text{90}\)

Time decay (measured by the Greek letter theta) is the loss in value of an option due strictly to the passage of time, assuming constant price and implied volatility of the underlying. At- or out-of-the-money options lose value over time because, as the option nears maturity, the probability of becoming in-the-money decreases. For example, the value of an option with theta equal to 0.075 will decrease by 0.075 each day until maturity.\(^\text{91}\)

Basis or correlation risk is the risk of market inefficiency, that is, the risk that prices in the underlying market are not perfectly correlated with prices in the derivative market. Thus, basis or correlation risk is the risk that hedges composed of offsetting positions in the cash and derivatives markets may become unbalanced, resulting in an imperfect hedge.\(^\text{92}\)

Discount rate risk (represented by the Greek letter rho) measures the extent to which a derivative (or portfolio) is affected by changes in the rate used for discounting future cash flows to present value (the risk-free rate of return). For options, a higher discount rate generally means a higher value for calls and a lower value for puts due to the lower present value of the exercise price.\(^\text{93}\)

2. Managing Market Risk

When hedging a derivatives portfolio, managers aggregate and manage forward-based derivatives of similar asset classes as a group, offsetting forwards with forwards and delta hedging any residual risk. The dominant market risk factor of a forward-based derivative is delta. Forward-based derivatives generally do not suffer from elasticity, time decay, volatility, or convexity risk, meaning that changes in the price of the underlying produce proportional changes in the value of the derivative.\(^\text{94}\) Although forward-

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89. See Citibank, supra note 57, at 45 (defining “vega”).
90. See MARKI, supra note 40, at 56.
91. See Citibank, supra note 57, at 44 (defining “theta”).
92. See id. at 4-5 (defining “basis”).
93. See id. at 39 (defining “rho”).
94. See GROUP OF THIRTY, supra note 11, at 44-45.
based derivatives are subject to basis and discount-rate risk, these risks generally are not hedged.\textsuperscript{95} Forward-based derivatives thus have relatively straightforward market risk profiles, making hedging and monitoring easier than with option-based derivatives. A portfolio of forward-based derivatives can, therefore, be hedged with a proportional amount of the underlying and the hedge will remain somewhat stable.\textsuperscript{96}

The market risk factors of an option-based derivative are much more complex. Because option-based derivatives are subject to convexity risk, the relationship between the price of the option and the price of the underlying is not constant as it is with forward-based derivatives. In addition, options are subject to volatility risk and time decay risk, even if the price of the underlying remains constant.\textsuperscript{97} For this reason, a delta hedged options portfolio is not static, but must be monitored and readjusted over time, a process known as dynamic hedging. As with forward-based derivatives, option-based derivatives of similar asset classes are aggregated and managed as a group, by offsetting options with options (gamma hedging) and dynamically hedging any residual risk arising from mismatches in the options portfolio.\textsuperscript{98}

As an example of dynamic hedging, assume that a portfolio is long 100 at-the-money call options on shares of Company X. Such an option would have a delta of .5. An appropriate delta hedge, therefore, would consist of a short position of fifty shares of Company X. As the price of X shares moves away from the strike price, however, delta changes. When the market for X shares falls, the delta of the option increases toward one; when the market for X shares rises, the delta decreases toward zero. As delta changes, the hedge ratio must also change and positions in X must be bought or sold until delta again matches the position in the underlying hedge.

There are two risks associated with dynamic hedging: first, the cost of hedging may be greater than expected because actual volatility is greater than expected; second, prices may move significantly before positions can be adjusted, resulting in losses.\textsuperscript{99} The portfolio manager must decide how often to rehedge as a result of price changes in

\textsuperscript{95} Basis or correlation risk is caused by possible inefficiencies between the derivatives market and the underlying market. This risk is beyond the control of the portfolio manager and therefore cannot be hedged. \textit{Markk}, supra note 40, at 237-38. Although it is possible to hedge interest rate risk by taking positions in short-term securities such as United States Treasury Bills, this risk is considered to be relatively small compared to delta, at least in the United States where interest rates are comparatively stable. A portfolio manager in a more volatile interest rate market, such as Brazil, may find discount rate hedging necessary.

\textsuperscript{96} See \textit{Group of Thirty}, supra note 11, at 44-45. The pricing of forward-based derivatives is relatively straightforward as well: the price of the contract is based on the price of the underlying, adjusted for the time differential between the contract date and the settlement date. The price must be adjusted for the time differential for three reasons: "the buyer earns interest on the deferred price payment during the contract period; the buyer avoids the incurrence of storage costs [the cost of carry] during the contract period;" and the seller may derive a benefit (a convenience yield) from holding the underlying in inventory during the contract period, as with a high dividend stock that pays out during the contract period. Carrying cost and convenience yield factors depend upon the particular underlying. Some commodities, for example, may have large carrying costs and no convenience yield, while a high coupon bond may have no carrying costs and a high convenience yield. \textit{Brudney & Bratton Supplement}, supra note 46, at 9.

\textsuperscript{97} See \textit{Group of Thirty}, supra note 11, at 45. As with forward-based derivatives, the basis and rho of an options portfolio are typically left unhedged.

\textsuperscript{98} See \textit{id.} at 46.

\textsuperscript{99} See \textit{id.}
the underlying or changes in expected future volatility. The more frequently the hedge is balanced, the greater the protection against loss. However, frequent adjustments (known as “delta chasing”) involve expense. Successful dynamic hedging, therefore, depends on accurate forecasts by the investor of market volatility and interest rates, as well as the choice of an appropriate rehedging rule. These are not easy tasks.100 As discussed in Part IV, many large derivatives losses have resulted from the failure to perform accurately one or all of these functions.101

This periodic repricing (marking-to-market) and rehedging of OTC derivatives highlights a difference in the risk profile of OTC and exchange-traded derivatives. Because exchange-traded derivatives are, by definition, actively traded, the market performs a constant pricing function, relieving the portfolio manager of this duty. For many highly customized OTC derivatives, however, there is no trading market and, therefore, no market price. Market participants determine price using elaborate (and generally proprietary) pricing models. Recent evidence indicates that great differences exist in proprietary risk pricing models and in sophistication regarding market risks generally, with the large dealers having an informational advantage over most end-users.102 Moreover, because methods of marking-to-market are not standardized and some inputs require subjective determinations by the investor, market participants often arrive at different prices for identical derivative instruments.103

Numerous reports have been written advising derivatives dealers and end-users of accepted methods for managing market risk.104 For dealers, these recommendations include marking derivatives contracts to market on at least a daily basis.105 The studies also recommend that dealers calculate the market risk of their derivatives portfolios daily, considering changes in all major market risk components (delta, elasticity, convexity, volatility, time decay, basis, and interest rate risk), and compare the results to pre-established market risk limits.106 The studies emphasize that market risk limits

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100. MARKI, supra note 40, at 235-36.
101. See infra Part IV.A.3.
102. See CFTC, supra note 11, at 96-97 (stating that an “adequate understanding of the risks is not equally distributed among all users of the marketplace”).
103. See Hearing, supra note 20, at 44-45 (noting that managers have great flexibility in using computer modeling techniques because there are no accepted accounting methods). Another risk advantage of exchange-traded derivatives is that each exchange marks all contracts to market on at least a daily basis. Profits and losses on each contract are calculated and netted at the end of each trading day. At market opening on the following day, the exercise price of the contract is adjusted to match the previous day’s closing spot price of the underlying. BRUDNEY & BRATTON SUPPLEMENT, supra note 48, at 8. Such price transparency substantially reduces the uncertainty and, therefore, the risk in any derivatives contract.
104. See, e.g., GROUP OF THIRTY, supra note 11; DERIVATIVES POLICY GROUP, A FRAMEWORK FOR VOLUNTARY OVERSIGHT OF THE OTC DERIVATIVES ACTIVITIES OF SECURITIES FIRM AFFILIATES TO PROMOTE CONFIDENCE AND STABILITY IN FINANCIAL MARKETS (1995) [hereinafter FRAMEWORK FOR VOLUNTARY OVERSIGHT]. The Derivatives Policy Group (DPG) was formed at the suggestion of SEC Chairman Arthur Levitt and consists of the six Wall Street firms that are the largest non-bank participants in OTC derivative transactions: CS First Boston Corporation; Goldman, Sachs & Co.; Morgan Stanley & Co.; Merrill Lynch; Salomon Brothers, Inc.; and Lehman Brothers. The Framework for Voluntary Oversight was intended to address the public policy concerns that have been raised regarding the OTC derivatives activities of broker-dealer affiliates that are not subject to other regulatory schemes. Id. at 1.
105. See GROUP OF THIRTY, supra note 11, at 9.
106. See id. at 10-11 (noting that market risk is typically measured as value at risk or capital at risk using
should be established based on factors such as tolerance for low probability large losses versus high probability small losses, capital resources, market liquidity, and business strategy.\textsuperscript{107} Because the capital at risk procedure does not account for the low probability events that would have the greatest negative impact on portfolio value, dealers are urged to perform regular stress simulations to determine potential losses under abnormal market conditions, such as extreme volatility.\textsuperscript{108} The studies further recommend that end-users, as appropriate to the size, and complexity of their derivatives activities, adopt the same valuation and market risk management procedures used by dealers.\textsuperscript{109}

The CFTC reported in its seminal study that all dealers interviewed for the study reported using a variety of methods to price transactions and portfolios and to monitor and manage market risk.\textsuperscript{110} Most dealers reported using scenario analyses to evaluate market risk relative to pre-defined limits and periodic stress tests to evaluate portfolios based on non-standard conditions, such as unexpectedly large underlying volatility. All dealers in the study also reported daily marking-to-market of positions. Most dealers that were interviewed reported that they reviewed risk limits and positions daily.\textsuperscript{111}

End-users that participated in the study also reported the use of computer software and pricing models to value positions. All the end-users surveyed stated that they used a standard pricing model to obtain a theoretical price before seeking quotes from dealers. All but one end-user reported the daily marking-to-market of positions.\textsuperscript{112} All end-users reported using some accepted risk management procedure for offsetting market risk.\textsuperscript{113}

The results of the CFTC and similar studies have led many market observers to conclude that market risk is not a serious problem in the derivatives markets.\textsuperscript{114} Recent large derivatives losses, however, clearly indicate that some market participants—particularly end-users—were not, in fact, prudently managing market risk.

\begin{footnotesize}
\begin{itemize}
\item probability analysis based on a common confidence interval and time horizon. For example, with a confidence interval of 97.5\% and a time horizon of one day, one can determine that there is a 97.5\% probability that losses in portfolio value over one day due to adverse price movements will not exceed a specific amount.
\item After considerable debate, the DPG agreed on a common definition of capital at risk as the "maximum loss expected to be exceeded with a probability of one percent over a two-week period." \textit{FRAMEWORK FOR VOLUNTARY OVERSIGHT}, supra note 104, at 28.
\item See \textit{GROUP OF THIRTY}, supra note 11, at 11.
\item See \textit{id}.
\item See \textit{id} at 13.
\item See \textit{id} at 13.
\item CFTC, supra note 11, at 95 (reporting methods such as risk management committees, credit risk committees, scenario analyses, and stress simulations).
\item \textit{id} at 95-96.
\item \textit{id} at 96. The Group of Thirty study, by contrast, found that less than half of the end-users surveyed marked their derivatives positions to market. \textit{GROUP OF THIRTY}, supra note 11, at 13.
\item CFTC, supra note 11, at 96 (stating that "half the end-users reported managing their market risk by putting on hedges at the time of the transaction or by matching transactions" while the other half managed their market risk using a portfolio approach).
\item \textit{id}.
\end{itemize}
\end{footnotesize}
3. Market Risk Control Failure

On September 12, 1994, Gibson Greetings, Inc. (Gibson) filed suit against Bankers Trust Company and its registered broker-dealer affiliate, BT Securities Corp. (collectively, BT), alleging losses of $23 million suffered as a result of derivatives transactions with BT. In May 1991, Gibson issued $50 million of non-callable, fixed rate (9.33%) notes with annual serial maturities from 1995 through 2001 (the Notes). After the issuance of the Notes, interest rates declined. Because the Notes were non-callable, Gibson could not refinance them at lower rates. Gibson, therefore, decided to enter into a series of interest rate swaps with BT to lower its interest rate costs on the Notes.

From November 1991 to March 1994, BT and Gibson entered into twenty-nine derivatives transactions, including amendments to and cancellations (or unwinding) of existing derivatives, which became increasingly complex and leveraged. Because the BT-Gibson swaps were OTC derivatives, there was no established market price by which the parties could judge the value of their transactions. BT thus used proprietary computer models to price the swaps. Gibson, however, did not have the expertise or software to value the derivatives it had purchased from BT and, consequently, relied on BT to provide price information to Gibson. BT representatives misled Gibson about the value of the derivatives it had purchased, providing Gibson with estimates that significantly understated Gibson's losses on the transactions. Gibson, therefore, re-

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115. The examples in this section could easily be classified as operational failures as well. Certainly all three cases demonstrate lack of supervision of the end-users' employees. The Gibson case also demonstrates lack of supervision over the dealer's employees. See the discussion of operational risk, infra Part IV.D.


117. In re BT Sec. Corp., No. 95-3, 1994 CFTC LEXIS 340, at *3-4 (CFTC Dec. 22, 1994). In most of these transactions, Gibson exchanged fixed rate payments for floating rate payments, thus taking the view that interest rates would decline or remain stable. When the Federal Reserve Bank began increasing the federal funds rate on February 4, 1994, the value of Gibson's positions declined rapidly. Gibson Greetings, No. C-1-94-620, at 21 (Defendant's Answer and Counterclaim for Declaratory Judgment).


119. Id. at *5. BT disputed this assertion, arguing that the derivative contracts themselves and the related memoranda describing potential transactions accurately described Gibson's trades in a manner that permitted Gibson to price and evaluate each transaction. Defendant's Answer and Counterclaim for Declaratory Judgment, Gibson Greetings, No. C-1-94-620, at 10. Gibson alleged in its complaint, however, that BT knew Gibson was inexperienced in the use of derivatives and did not have the capacity to evaluate the risks involved or value the transactions. Complaint and Jury Demand, Gibson Greetings, No. C-1-94-620, at 6. Furthermore, BT was clearly aware of Gibson's reliance on BT. In a February 1994 phone conversation taped by a BT internal recording system, a BT managing director for the Gibson account told his supervisor that "these guys [Gibson] have done some pretty wild stuff. And you know, they probably do not understand it quite as well as they should. I think they have a pretty good understanding of it, but not perfect. And that's like perfect for us." BT Sec. Corp., 1994 CFTC LEXIS 340, at *15.

120. BT Sec. Corp., 1994 CFTC LEXIS 340, at *7. In response to at least two requests by Gibson to provide pricing information on its derivatives positions, BT provided Gibson with estimates that understated Gibson's losses by more than 50% of the value generated by BT's computer model and recorded on BT's books. Id. at *9.
mained unaware of the true extent of its losses and continued to purchase more derivatives from BT.\footnote{121}

In a similar incident also involving BT, BT entered into two swaps with the Proctor & Gamble Company (P&G)—the 5s/30s swap entered into on November 4, 1993, and the DM swap entered into on February 14, 1994.\footnote{122} The 5s/30s swap had a term of five years and was based on a notional amount of $200 million. Under the swap agreement, BT agreed to pay P&G a fixed rate of interest of 5.30%, while P&G agreed to pay BT a floating interest rate. For the first six months of the swap, the floating rate would equal the prevailing commercial paper rate (CP) minus seventy-five basis points (.75%). After the first six months, the floating rate paid by P&G would equal CP minus seventy-five basis points plus a spread which was to be calculated at the end of the initial six month period.\footnote{123} The swap entitled P&G to receive floating rate payments at seventy-five basis points above market levels in the event that interest rates remained somewhat stable. If interest rates increased during the first six months of the swap contract, however, P&G would be required to make payments in amounts substantially above prevailing interest rates. Because the spread formula contained a high leverage factor, even small increases in interest rates would result in large losses to P&G.\footnote{124}

The DM swap required BT to pay P&G a floating interest rate plus 233 basis points (2.33%). During the first year of the swap, P&G was required to pay BT the same floating rate plus 133 basis points (1.33%), allowing P&G to receive a 1% premium on the chosen floating rate for one year. After one year, the swap contract required P&G to add a spread to its payments to BT if the four-year Deutchmark swap rate (DM rate) rose above 6.01% or fell below 4.05% at any time between January 16, 1994 and January 16, 1995.\footnote{125} If the DM rate stayed between 4.05% and 6.01%, however, the spread would be zero. P&G thus took a highly leveraged bet that German interest rates would remain stable, exposing itself to significant liability if this assumption later proved to be incorrect.


\footnote{123} Id. In January of 1994, the parties amended the transaction to postpone the date on which the spread was to be set and to adjust the floating rate that P&G would pay from CP minus 75 basis points to CP minus 88 basis points. Id.

\footnote{124} Id. Because the swap contained the economic equivalent of an embedded put option which P&G had sold to BT, the value of the option-like feature could also fluctuate considerably due to convexity, volatility, and time decay. Proctor & Gamble Co. v. Bankers Trust Co., No. C-1-94-735, at 44 (S.D. Ohio 1994) (Defendant's Answer and Counterclaims).

\footnote{125} Proctor & Gamble, 925 F. Supp. at 1277 (stating the formula for calculating the spread as: 10 x [4-year DM swap rate-4.50%]).
P&G's estimates of future interest rate volatility were incorrect and, as interest rates in the United States and Germany rose rapidly beginning in early 1994, P&G was forced to unwind both swaps at a $200 million loss.\textsuperscript{126} P&G filed a complaint against BT in October 1994, alleging fraud, misrepresentation, breach of fiduciary duty, negligence, and negligent misrepresentation in connection with the 5s/30s swap, and filed a first amended complaint in February 1995, adding claims related to the DM swap.\textsuperscript{127}

P&G alleged that BT had falsely assured P&G that it could safely lock-in an interest rate if rates began to rise, thus capping its exposure to significant loss. The complaint further alleged that when rates did rise and P&G attempted to lock-in, BT imposed a lock-in fee based on a "secret, proprietary, complex, multi-variable pricing model" that BT refused to share with P&G.\textsuperscript{128} P&G further claimed that the swaps contained large, concealed risks; that there was a great disparity between the parties in knowledge of complex swaps; and that in memoranda dated October 25, 1993, and January 31, 1994, BT presented time decay analyses for both swaps showing that, assuming stable interest rates and volatility, P&G could lock-in early while obtaining much of the basis point advantage. Finally, P&G claimed that the memoranda failed to disclose what would transpire in the event of unstable or volatile interest rates.\textsuperscript{129}

BT responded that P&G, a sophisticated investor familiar with derivatives, had engaged in an arm's length commercial transaction with BT. In that transaction, P&G assumed that interest rates would not rise significantly. That assumption later proved to be incorrect.\textsuperscript{130} In arriving at that assumption, P&G relied on its own internal analysts who regularly monitored the bond and currency markets, consulted widely with other experts as to future interest rate movements and volatilities, and made internal forecasts of likely interest rate movements. P&G then employed those forecasts in managing its own multi-billion dollar debt portfolio and in its investment activities, including the interest rate swaps with BT.\textsuperscript{131} BT argued that there were no hidden risks in either swap transaction: BT provided P&G with charts that showed the net amounts that P&G would owe under various assumptions. Furthermore, the formulas that were set forth in the swap agreement itself and in subsequent memoranda enabled P&G to calculate its potential gains and losses based on any assumptions it chose to use as to future interest

\begin{enumerate}
\item P&G’s \textsuperscript{126} \textit{Id.}
\item P&G’s \textsuperscript{127} \textit{Id. at 1274.}
\item Proctor & Gamble Co. v. Bankers Trust Co., No. C-1-94-735, ¶7 (S.D. Ohio 1995) (Second Amended Complaint for Declaratory Relief and Damages).
\item BT’s \textsuperscript{129} \textit{Id. at ¶¶ 6, 12, 25, 39.} BT explained that the time decay analysis was sent to P&G only to demonstrate the change in value of the option-like features as time passed, assuming all other factors and market conditions remained unchanged. Gibson Greetings, Inc. v. Bankers Trust Co., No. C-1-94-620, at 14 (S.D. Ohio, filed Sept. 12, 1994) (Defendant’s Answer and Counterclaim for Declaratory Judgment). \textit{See also supra note 91 and accompanying text (discussing time decay).}
\item Proctor & Gamble Co. v. Bankers Trust Co., No. C-1-94-735, 2 (S.D. Ohio 1994) (Defendant’s Answer and Counterclaim). From January 1993 through March 1994, P&G entered into several highly leveraged derivatives transactions with BT based on assumptions that interest rates would fall or remain stable. P&G made a significant profit on many of these transactions. \textit{Id. at 37-40.}
\item P&G’s \textsuperscript{131} \textit{Id. at 32-33.}
\end{enumerate}
rate movements. BT also provided P&G with a computer disk that would make such calculations. 132

With respect to the alleged lock-in feature, BT responded that P&G had no contractual right to amend or modify the swap transaction. However, BT, like other derivatives dealers, was always willing to quote prices at which it would be willing to amend or tear up a particular transaction. The actual price of any unwind would naturally depend on BT's estimate of the value of the transaction at the time of any amendment. That estimate in turn depended on BT's forecasts of future interest rate volatilities and other factors. 133 P&G, a regular user of interest rate derivatives, was aware of the factors that affect the pricing of option-based derivatives, including estimates of future yields and volatilities. 134 Although BT did not provide P&G with BT's proprietary pricing model (which would reveal BT's estimates of those factors), it did provide P&G with historical yields and volatilities for the five-year and thirty-year treasuries. 135 Furthermore, P&G was free to contact other derivatives dealers to seek competing unwind prices and BT believed that P&G did seek such price quotes. Finally, BT argued that P&G never expressed surprise or disagreement with the quoted unwind prices, nor did P&G ever complain about the method by which such prices were derived. 136

In another highly-publicized case of market risk control failure, Orange County California filed for protection against creditors under Chapter 9 of the Federal Bankruptcy Code 137 on December 6, 1994, beginning the largest municipal bankruptcy in United States history. The Orange County Treasury managed approximately $7.5 billion for 187 different governmental agencies. 138 Prior to the bankruptcy filing, the Orange County funds had been managed for over twenty years by Robert L. Citron, the Orange County Treasurer. Citron followed a highly leveraged investment strategy, taking positions based on a belief that interest rates would remain low for a minimum of three years. Specifically, Citron used reverse repurchase agreements (reverse repos) to invest in a certain type of structured note known as an inverse floater. 139

132. Id. at 12, 42.
133. Id. at 13.
135. Id. at 16. BT alleged that it offered to bring its computer models to P&G's offices for a demonstration of the unwind price calculations, but that P&G felt this was unnecessary and canceled the visit. Id. at 20. P&G disputed this allegation. Proctor & Gamble Co. v. Bankers Trust Co., No. C-1-94-735, ¶7 (S.D. Ohio 1995) (Second Amended Complaint for Declaratory Relief and Damages).
136. Id. at 19-20 ¶34. Most of P&G's claims were dismissed by Judge Feikens on various grounds, including rulings that the swaps were not securities under the Securities Act or Securities Exchange Act, that BT was not a "commodity trading adviser" to P&G under the CEA, and that no fiduciary relationship existed between the parties. Proctor & Gamble Co. v. Banker's Trust Co., 925 F. Supp. 1270, 1287 (S.D. Ohio 1996). An out of court settlement was announced that same day, with P&G agreeing to pay $35 million in cash to BT. This amount represented about 85% of the total owed to BT under the agreements. BT agreed to absorb the remaining losses pursuant to the settlement agreement. Bankers Trust, P&G Settle Two-year Old Lawsuit Surrounding Derivatives Losses, 28 SEC. REG. & L. REP. 635 (1996).
139. Id. (quoting COUNTY OF ORANGE (CALIFORNIA) OFFICE OF THE TREASURER-TAX COLLECTOR, AN-
This combination of reverse repos (entered into at short-term rates to take long-term rate positions) and inverse floaters resulted in a highly leveraged portfolio that was extremely sensitive to interest rate movements. This accounted for Citron’s phenomenal returns during the period of declining interest rates prior to 1994. When the Federal Reserve began raising interest rates in February of 1994, however, the Orange County portfolio suffered massive losses. These losses were effectively hidden from the public until December 1, 1994, when Orange County publicly disclosed that the investment funds had suffered a paper loss of $1.5 billion. On December 6, Orange County filed an objection under a reverse repurchase agreement with CS First Boston Corp. and First Boston immediately liquidated approximately $2.6 billion in securities that it held subject to reverse repos with Orange County. Other firms began to follow suit and Orange County filed for bankruptcy later that day.

The losses incurred by Gibson, P&G, and Orange County were not the result of derivatives themselves, but were the result of the failure to understand, evaluate, and properly hedge market risk, coupled with old fashioned greed and fraud. All three parties had taken highly leveraged, unhedged positions based on views that interest rates

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NUAL 1993-94 SUMMARY FINANCIAL STATEMENT (1994)). Under a reverse repurchase agreement, the customer agrees to sell a security and enters into a simultaneous agreement to buy the same security at a later certain date or on demand. *Id.* at n.16. This repurchase price is known as the repo rate and represents the interest rate applicable over the life of the repurchase agreement. Citibank, *supra* note 57, at 38 (defining “repurchase agreement”). A reverse repo agreement is thus similar to purchasing securities on margin and posting the security as collateral. An inverse floater is a type of structured note that provides a return equal to a fixed rate minus a floating reference rate. The returns on an inverse floater thus decrease as interest rates rise. *Id.* at 28 (defining “inverse floating rate note”).

140. Levitt Testimony, *supra* note 138. By December 1994, the $7.5 billion on deposit with the Orange County Treasury had been leveraged to over $20 billion. *Id.*

141. The Orange County fund had an average return of 10.1% during the 15 years prior to 1994 and had averaged an impressive 8-9% during the recessionary years of the early 1990s. California’s treasury, by contrast, had followed a more conservative investment philosophy and, after 1988, had average rates of return far below those of Orange County. *American Municipalities: Citron Pressed*, THE ECONOMIST, December 10, 1994, at 78.

142. The large Orange County losses are attributable to the double leverage of its portfolio. First, because the value of an inverse floater declines as interest rates rise, the securities within the Orange County portfolio declined rapidly as interest rates rose. Second, under the reverse repos, Citron had in effect borrowed at short term rates to finance long term investments (the inverse floaters). As rates increased, the return on the investments was exceeded by the cost of funds used to acquire them, resulting in losses. Furthermore, as the inverse floaters that were subject to reverse repo agreements declined in value, new securities had to be committed subject to reverse repo agreements (similar to posting more collateral under a margin call) to offset the declines. Levitt Testimony, *supra* note 138. It is thus no surprise that the county suffered large losses on such a risky and one-sided investment strategy.

would fall or remain stable, subjecting themselves to theoretically unlimited losses if interest rates instead rose. When interest rates did rise in early 1994, each party suffered immediate and significant declines in portfolio value due to the high interest rate sensitivity of the investments they had created. In short, each party severely miscalculated volatility risk by assuming stable future interest rates, an assumption that proved to be misguided as interest rates moved sharply upward.144

There is no reason why these parties should not have understood the risks involved in their contracts, though all now claim a lack of such understanding.145 While determining the price and yields of OTC derivatives is certainly more complex than making such determinations with respect to traditional securities and lending activities, anyone familiar with investment strategy (including the treasury department at any large United States corporation or municipal investment fund) should have no trouble understanding that a highly leveraged, unhedged, one-sided investment strategy presents both the possibility of great gains if the investor’s expectations of future market conditions are correct, and the possibility of great losses if those expectations prove to be wrong.

It is also important to understand the role that leverage played in each of these transactions. Gibson, P&G, and Orange County all had constructed highly leveraged portfolios that greatly magnified any changes in underlying value. Gibson, for example, was first informed by BT on February 25, 1994, that its open swap positions had a negative net value of $8 million. By the next business day, February 28, 1994, BT informed Gibson that its losses stood at $13.4 million. Three days later, on March 3,

144. With respect to the reverse repos in the Orange County portfolio, Citron may have evaluated the contracts by comparing the cost of carry (the repo rate) and the convenience yield (the expected yield on the inverse floaters) and concluded that the market would never reach interest rate levels that jeopardized the investments. Unfortunately for Citron, the market did reach such levels and as interest rates rose, his cost of carry far exceeded his convenience yield, resulting in a loss. Stan Jonas, A Roundtable on Orange County, Derivatives Strategy, Jan. 2, 1995, Vol.4, No.1, at 7; see also supra notes 94-96 and accompanying text (discussing forward pricing).

145. In this author’s view, only Gibson could credibly assert such naïveté. P&G was apparently quite familiar with derivatives (particularly interest rate derivatives) and had profitably used such contracts in the past. See supra notes 130-132 and accompanying text. Robert Citron, the Orange County Treasurer, was by all accounts an extremely knowledgeable and sophisticated investor who, due to his phenomenally high returns, was considered a “financial guru” by the many investors who poured money into the Orange County-managed funds. Nell Henderson & Brett D. Fromson, Merrill Lynch: The Broker Behind Orange County, Wash. Post, Dec. 10, 1994, at F1. While Gibson’s assertions of unsophistication may be true (and the company certainly was not aided by BT’s fraud and misrepresentations), such a situation never should have been allowed to develop. Gibson is a public company with more than 4,500 employees, assets in excess of $580 million, and shareholders’ equity of over $323 million. GibsonGreetings, Inc. v. Bankers Trust Co., No. C-1-94-620, at 18 ¶3 (S.D. Ohio, filed Sept. 12, 1994) (Defendant’s Answer and Counterclaim for Declaratory Judgment). Gibson thus had the financial ability to staff its treasury department with professionals knowledgeable about any type of investments Gibson chose to pursue. Any end-user without such expertise should confine its activities to the more regulated and price transparent exchange markets.
1994, Gibson was told that it owed BT $17.5 million under the swap contracts.\textsuperscript{146} Such rapid price movements can impose substantial losses before the investor is able to unwind a complex portfolio.

Market observers should recognize that incidents such as these could not have taken place in the exchange-traded derivative market. First, no counterparty to an exchange-traded derivative contract could argue that it was unable to value the contract. By definition, the market performs this pricing function for the parties, resulting in much greater price transparency. Second, hidden losses such as those concealed by BT from Gibson (and those concealed by Citron from his investors) are not possible on the exchanges, as the automatic marking-to-market on all exchanges makes investor gains and losses immediately apparent. End-users who want the custom-tailoring of risk and rewards available in the OTC market should recognize that such flexibility comes at a price: the OTC market is less price transparent, less liquid, and requires greater knowledge and sophistication on the part of end-users than does the exchange-traded market.

Finally, Gibson, P&G, and Orange County each failed to follow recommended procedures for managing market risk. Apparently none used scenario analyses to evaluate market risk relative to pre-defined limits. These scenario analyses should have included both investor forecasts of future market movements and assumptions of nonstandard conditions, such as unexpectedly large underlying volatility. If they had performed such stress tests, each party would have been aware of its possible losses in the event of interest rate increases. In addition, it is evident that these end-users were not marking-to-market on a regular basis.\textsuperscript{147} If Gibson had performed this basic function, which is recommended for all end-users, then it could not have been so easily misled by BT. Furthermore, it does not appear that Gibson, P&G, or Orange County used any standard procedure for offsetting market risk. Instead, each took highly leveraged, unhedged positions based on an assumption of stable interest rates. It is not surprising, therefore, that these investors suffered large losses when that assumption later proved to be misguided.

\textsuperscript{146} Gibson Greetings, Inc. v. Bankers Trust Co., No. C-1-94-620, at 13-14 ¶27 (S.D. Ohio, filed Sept. 12, 1994) (Complaint and Jury Demand). It is hard to evaluate the true elasticity of Gibson’s portfolio because BT purposely misled Gibson about its losses. One taped telephone conversation revealed the manner in which BT did this: “I think that we should use this [downward market price movement] as an opportunity. We should just call [the Gibson contact], and maybe chip away at the differential a little more. I mean we told him $8.1 million when the real number was 14. So now if the real number is 16, we’ll tell him that it is 11. You know, just slowly chip away at the differential between what it really is and what we’re telling him.” BT Sec. Corp., Securities Act Release No. 7124 [1994-1995 Transfer Binder] Fed. Sec. L. Rep. (CCH) ¶ 85,477, at 86,111 (Dec. 22, 1994).

\textsuperscript{147} According to BT, P&G admitted to this complete breakdown in risk assessment and risk management procedures. P&G’s CEO allegedly told the board of directors that P&G’s treasurer “simply went to sleep . . . [and] . . . ignored the risk assessment.” P&G’s CFO further informed the board that the treasury department “didn’t test any ‘worst case’ scenarios to see what would happen if interest rates took off on us” and that treasury personnel failed to conduct probability analyses and had “chosen to take a less scientific path to valuation.” Proctor & Gamble Co. v. Bankers Trust Co., No. C-1-94-735, at 19 (S.D. Ohio 1995) (Memorandum of BT in Opposition to Plaintiff’s Motion for Leave to Amend the Complaint).
B. Credit Risk

1. Measuring Credit Risk

Credit risk is the risk of loss in the event of default by a counterparty.\textsuperscript{148} Although credit risk is present in every financial transaction between the trade date and settlement date, due to the inherent leverage in every derivatives contract, derivatives credit risk may change substantially over time in response to changes in market risk.\textsuperscript{149} Assessing credit risk requires answering two questions: First, if a counterparty defaulted today, what would it cost to replace the transaction? In other words, what is current exposure? Second, if a counterparty defaulted at some point in the future, what is a reasonable estimate of the potential replacement costs or, what is potential exposure?\textsuperscript{150}

Determining current exposure is relatively straightforward and entails simply ascertaining the current market value of a derivative, or the replacement cost.\textsuperscript{151} Replacement cost can be positive or negative, depending on changes in the underlying since the trade date of the transaction. When replacement cost is negative, the remaining party incurs no loss in the event of a counterparty’s default.\textsuperscript{152}

Potential exposure is more difficult to measure because it requires a subjective determination of what the replacement cost of a transaction could be at some future date. This estimate is primarily a function of the time remaining to maturity on the contract and the expected volatility of the underlying. Portfolio managers generally use historical simulation studies or options pricing models to assess potential exposure, which involves modeling the volatility of the underlying and the effect of its movements on the value of the transaction. These techniques produce two measures of potential exposure: expected exposure and maximum, or worst case, exposure.\textsuperscript{153}

Expected exposure is the mean of all possible replacement costs, where replacement cost is equal to market value, if positive, and zero, if negative. Expected exposure is thus the best estimate of the present value of the positive replacement costs that are likely to materialize. The worst case exposure is calculated based on adverse price movements in the underlying which are so extreme that they are unlikely to be exceeded.\textsuperscript{154}

\textsuperscript{148} It is important to distinguish between credit risk and market risk. Although the two are related, credit risk is unique to a particular counterparty or group of counterparties, whereas market risk relates to a particular product, portfolio or class of assets. \textsc{Framework for Voluntary Oversight, supra note} 104, at 31.

\textsuperscript{149} \textsc{CFTC, supra} note 11, at 97. In fact, credit risk is present in every contract between the execution date and performance date and may change over time due to changes in market factors. It is only the inherent leverage of a derivatives contract that sets it apart from other types of contracts.

\textsuperscript{150} \textsc{Group of Thirty, supra} note 11, at 47.

\textsuperscript{151} \textit{But see supra} Part IV.A (noting that ascertaining the current market value of a complex derivative, however, is not necessarily an easy task, nor one that is likely to elicit agreement among market participants).

\textsuperscript{152} \textsc{Group of Thirty, supra} note 11, at 47. This contrasts with the credit risk of traditional lending activities. The lender faces loss on a loan any time the borrower defaults. Moreover, the creditor faces default risk on the principal amount of the loan as well as on interest payments. In a derivative, however, the notional principal generally is not at risk. For these reasons, the impact of credit differentials on swap spreads is much smaller than that on loans. \textit{Id.} at 48 n.14.

\textsuperscript{153} \textit{Id.} at 47.

\textsuperscript{154} \textit{Id.}
Notably, the credit risk profiles of option-based derivatives and forward-based derivatives differ. Counterparty risk in forward-based derivatives is two-sided: both the buyer and the seller can suffer a potential loss in the event of a default by the other party. Although counterparty default in a forward-based transaction will cause a loss only if replacement cost is positive, because either party could ultimately be in this position at maturity, each party faces credit risk. In contrast, counterparty risk in option-based derivatives is one-sided. The buyer of the option pays a premium up front. The seller, however, is not required to perform unless and until the option is exercised. This exposes the buyer to the risk of counterparty default without a corresponding risk to the seller.\footnote{Id. at 48.}

In addition, the credit risk profiles of exchange-traded and OTC derivatives differ sharply. First, the contractual obligation in an exchange-traded derivative is entered into directly with the exchange clearinghouse rather than with an individual counterparty, making the clearinghouse the guarantor of all exchange transactions and dispersing credit risk among all clearinghouse participants. This effectively transforms counterparty credit risk into the much lower risk of the failure of the clearing organization itself. To manage its own credit risk, the clearinghouse generally enters into an equal offsetting position for each trade, leaving itself with zero net exposure.\footnote{GROUP OF THIRTY, supra note 11, at 32; CFTC, supra note 11, at 97-98; Romano, supra note 9, at 16-17.}

Exchanges also mark contracts to market at least daily, with a resultant settling of any changes in contract value. Profits and losses on each contract are thus tabulated and netted out at the end of each trading day (or more frequently). If the daily closing spot price of the underlying is below the exercise price of the contract, the seller realizes a profit and the buyer a loss. The new exercise price now becomes the previous closing spot price. OTC derivatives, in contrast, do not settle until maturity, thus giving rise to substantial default risk in the event of extreme underlying volatility.\footnote{BRUDNEY & BRATTON SUPPLEMENT, supra note 46, at 8.}

Finally, exchanges impose minimum capital requirements on their participants and require the posting of collateral in the form of a margin account. After the daily marking-to-market, losses are deducted from and gains are added to the trader’s account. If the account balance drops below a certain minimum level, the account holder must post additional capital or the account will be closed, eliminating default in all but the most extreme cases of price volatility.\footnote{Id.}

In addition to calculating the credit exposure of a single derivatives transaction, portfolio managers must calculate the credit exposure on a portfolio of transactions with the same counterparty. In calculating the current exposure of a portfolio of transactions with the same counterparty, the manager must consider whether netting applies and is enforceable. If netting applies and a counterparty defaults, application of close-out netting results in all the outstanding transactions being terminated and marked-to-market. The net amount owed under all the transactions is the replacement cost for that...
counterparty. If netting does not apply, only positive mark-to-market positions may be added in calculating current exposure, because these could not be offset by negative positions in the event of default.159

The potential exposure of a portfolio of transactions is more difficult to evaluate. The simplest method is to add the potential exposure of each transaction in the portfolio. In most cases, however, this method dramatically overstates the actual potential exposure because it does not take into account transactions in the portfolio with offsetting exposures or transactions that have peak maximum potential exposures that occur at different times.160 The method adopted, after much debate, by the Derivatives Policy Group requires portfolio managers to apply a “capital-at-risk” calculation to the OTC derivatives portfolio of each counterparty with whom the manager has outstanding derivatives positions, irrespective of whether net replacement value is positive or negative. Capital-at-risk is defined as “the maximum loss [expected] to be exceeded with a probability of one percent over a two week period.”161 The resulting figure is then “multiplied by the counterparty’s applicable default ratio, based on the firm’s internal credit rating for the relevant counterparty, to [determine] the potential credit risk associated with that counterparty’s OTC derivatives portfolio.”162 Aggregate potential credit risk equals the sum of such potential credit risk calculations for all counterparties.163

This measure of potential credit risk is not without problems, however. First, although the capital-at-risk definition is quite conservative, it does not include the low probability events that are of greatest concern to many people. In addition, the measure fails to account for the extent of diversification across specific counterparties and types of counterparties. A concentration of transactions with a single counterparty or type of counterparty increases credit risk. For large, diversified portfolios, measurements of worst case exposure are less useful, as it is highly unlikely that all worst case outcomes will occur simultaneously.164

A subcategory of credit risk is settlement risk.165 Settlement risk is “the risk that a party which has fulfilled its obligations under an agreement by delivering funds or property will not receive within [the] agreed settlement timeframes the funds or property owed by its counterparty.”166 One aspect of settlement risk arises from the fact that

159. GROUP OF THIRTY, supra note 11, at 48. Legal uncertainties still exist as to the validity of netting arrangements in some circumstances. For example, a bankruptcy trustee or liquidator could attempt to “cherry pick” among a portfolio of derivatives, enforcing only those that have positive value to the bankrupt party. Id. at 52. While much has been done to ensure the validity of netting arrangements in the United States, substantial uncertainties still exist in other jurisdictions. CFTC, supra note 11, at 109 (discussing international proposals for reform).
160. GROUP OF THIRTY, supra note 11, at 48.
161. FRAMEWORK FOR VOLUNTARY OVERSIGHT, supra note 104, at 32.
162. Id.
163. Id.
164. Id. at 28, 33; GROUP OF THIRTY, supra note 11, at 49.
165. Some studies have treated settlement risk as a separate risk independent of credit risk. See, e.g., GROUP OF THIRTY, supra note 11; CFTC, supra note 11, at 97-106 (discussing credit and settlement risks). This article follows those studies which treat settlement risk as a subset of credit risk. See, e.g., BASLE COMMITTEE ON BANKING SUPERVISION, RISK MANAGEMENT GUIDELINES FOR DERIVATIVES, (Bank for Int’l Settlements, Basle, Italy) July 27, 1994, at 13 [hereinafter BASLE COMMITTEE]; GAO, supra note 20.
166. CFTC, supra note 11, at 102.
financial transactions rarely settle on the trade date. If prices move in one party’s favor after the trade date, that party could suffer a loss if her counterparty refuses to exchange on the settlement date. Most settlement risk, however, is due to the fact that transactions are rarely settled simultaneously. Parties face the largest settlement risk, therefore, on the settlement date itself, when the entire value of the contract could be at risk if payment exchanges are not synchronized.\textsuperscript{167}

2. Managing Credit Risk

Credit risk has not been as great a problem in the derivatives market as has market risk. Because derivatives market participants are often borrowers in the public market, they are generally investment grade-rated.\textsuperscript{168} In addition, credit losses due to derivatives activities have been very low.\textsuperscript{169} Nevertheless, because OTC derivative transactions are not subject to the same regulatory and self-regulatory credit risk reduction mechanisms as exchange-traded derivatives, such as clearinghouse organizations, margin requirements, and capital requirements, participants in the OTC derivatives market must adopt their own policies and procedures for managing credit risk.\textsuperscript{170} These policies and procedures generally take the form of counterparty credit evaluation and the use of risk limits for individual counterparties.

The October 1993 CFTC survey indicated that both dealers and end-users evaluated the creditworthiness of counterparties before engaging in any derivatives transactions. All market participants that were interviewed reported the use of standard credit ratings obtained from a rating agency, such as Moody’s or Standard & Poors. Some participants, primarily dealers, reported supplementing this evaluation with their own internal rating.\textsuperscript{171}

Some participants prefer doing business with counterparties with very high credit ratings. In response, many derivatives dealers have established derivatives subsidiaries that are AAA rated. To qualify for such a rating, the subsidiary must be independently capitalized, legally insulated from the parent’s financial difficulties, and deal only with counterparties with a rating of AA- or higher. For example, Merrill Lynch has established a derivatives subsidiary, Merrill Lynch Derivatives Products (MLDP). All swaps entered into by MLDP are offset by a matching swap with Merrill Lynch. The subsidiary’s books, therefore, are always perfectly balanced—it bears no market risk. MLDP deals only with counterparties that have a credit rating of AA—or higher. If the counterparty’s rating falls below that level during the life of the swap, the contract will be reassigned to Merrill Lynch. To some extent then, the AAA subsidiary is equivalent to the clearinghouse on a futures exchange, insulating customers from credit risk.\textsuperscript{172}

The use of subsidiaries creates a two-tiered market in which firms with high credit

\textsuperscript{167} GROUP OF THIRTY, \textit{supra} note 11, at 49-50. The settlement risk of some derivatives, such as interest rate swaps, is greatly reduced by the fact that notional principal amounts are not exchanged at maturity. \textit{Id.} at 50.

\textsuperscript{168} \textit{Id.} at 49.

\textsuperscript{169} \textit{Id.} at 62.

\textsuperscript{170} CFTC, \textit{supra} note 11, at 98-99.

\textsuperscript{171} \textit{Id.} at 99.

\textsuperscript{172} Except to the extent that the parent could default on its contracts with the subsidiary.
ratings can do business with the subsidiary, virtually eliminating the counterparty’s credit risk. Lower rated firms must deal with the parent and find other methods of reducing credit risk.173

All dealers and about half the end-users interviewed in the CFTC study reported using some type of collateral to reduce credit risk. Most participants that use collateral arrangements require only lower credit rated counterparties to post collateral at the inception of a transaction. In other cases, collateral is required to be posted only upon the happening of some pre-specified event, such as a credit downgrading or the exceeding of a pre-established obligation threshold.174 To reduce transaction costs, the adequacy of collateral obligations in OTC derivatives is generally reviewed much less frequently than the daily review and revision that occurs in connection with exchange-traded derivatives.175 In addition, the pre-agreed thresholds that trigger collateral payments are typically higher than in the exchange-traded market.176 Both of these transaction cost “savings” devices impose other costs by increasing credit risk.

C. Legal Risk

Legal risk is the risk of loss on a derivative because the contract cannot be enforced. Unenforceability can be caused by: insufficient documentation, insufficient capacity or authority of a counterparty (ultra vires), illegality of a contract, and bankruptcy or insolvency of a counterparty. Although legal risk is present in all financial activities, including traditional lending and trading activities, legal risk takes on added importance in the context of derivatives transactions because they are relatively novel, particularly in jurisdictions outside of the United States.177 OTC derivatives, in particular, are subject to legal risk due to the lack of exchange standardization of contracts and regulatory review of their terms and conditions to which exchange-traded derivatives are subject.178

A major legal risk faced by participants in the derivatives market is the risk that a contract will be unenforceable because an entire class of contracts is declared illegal or unenforceable. This is a very real danger in cross-border transactions where the legal status of the transaction in the counterparty’s home country is uncertain.179 In the United States, this risk has arisen primarily in connection with the requirement in the Commodity Exchange Act (CEA)180 that commodity futures contracts be exchange-traded.181 This requirement does not extend to spot182 or forward contracts.183 Be-

173. Hearing, supra note 20, at 27.
174. CFTC, supra note 11, at 100.
175. The Congressional Research Service reported in 1993 that collateral obligations in the OTC market were typically revised every six months to one year. Hearing, supra note 20, at 27. Today, it is apparently more typical for such periodic collateral reviews to be conducted in the OTC market on a monthly or quarterly basis.
176. Id.
177. Group of Thirty, supra note 11, at 51.
178. CFTC, supra note 11, at 106. This is not to say, however, that exchange-traded derivatives or other regulated products do not suffer from legal risk, as private litigants may challenge the legality of contracts that have received regulatory approval. Id. at 106 n.89.
179. CFTC, supra note 11, at 106-07.
181. Section 6(a) of the CEA prohibits entrance into a commodity futures contract except on or subject
cause forwards and futures share many similarities (the primary distinguishing features being standardization and exchange trading) and because the term commodity has been defined broadly in the Commodity Exchange Act, significant legal uncertainty has arisen as to whether certain forward or option products are actually illegal off-exchange futures contracts.

In Transnor (Bermuda) Ltd. v. B.P. North America Petroleum, for example, the court held that the off-exchange contracts in question—fifteen day forward delivery contracts for Brent crude oil—were entered into primarily for hedging purposes and not for the actual future delivery of oil and were thus off-exchange futures contracts. Without intervention by the CFTC, losing counterparties could have refused to perform their obligations under the contracts, arguing instead that the contracts were unenforceable, illegal off-exchange commodity futures contracts.

More recently, Washington surgeon Laszlo Tauber refused to pay twenty-five million dollars owed to Salomon Forex, Inc. (the currency trading subsidiary of Salomon Brothers, Inc.) for losses on sixty-eight foreign currency options and forwards. When Salomon sued in federal court for breach of contract, Tauber claimed that the contracts were unenforceable as illegal off-exchange foreign currency futures. The court disagreed, holding that the trades were exempt under the "Treasury Amendment" and that Tauber must pay to Salomon the amounts owed under the contracts.

to the rules of a CFTC-designated "contract market," unless a section 6(c) exemption applies. 7 U.S.C. §6(a).

182. Spot transactions involve the current purchase or sale of specific physical commodities.

183. The CFTC has jurisdiction over "contracts of sale of a commodity for future delivery" (i.e., futures contracts), 7 U.S.C. § 2(i), but not the "sale of any cash commodity for deferred shipment or delivery" (i.e., forward contracts), 7 U.S.C. § 1a(11). Thus, forward transactions are those in which delivery of the physical commodity is contemplated and typically occurs, but is deferred until some later time. The primary purpose of a futures contract, by contrast, is to assume or shift risk without transfer of the underlying commodity. Futures contracts, therefore, typically provide for settlement by either physical delivery or offset. Transnor (Bermuda) Ltd. v. B.P. N. Am. Petroleum, 738 F. Supp. 1472, 1489 (S.D.N.Y. 1990). 184. See supra Part II.A.

185. The CEA’s definition of commodity includes virtually all agricultural products and "all other goods and articles . . . and all services, rights and interests in which contracts for future delivery are presently or in the future dealt in." 7 U.S.C. § 1a(3).


187. Transnor, 738 F. Supp. at 1491. ("The high levels of speculation and performance without delivery, as well as the relatively standardized contracts, distinguish the 15-day Brent contracts from the forward contracts contemplated by the drafters of the Act.").

188. See CFTC Statutory Interpretation Concerning Forward Transactions, 55 Fed. Reg. 39,188 (1990) (stating that 15-day Brent oil contracts are forwards, not futures).

189. Tauber, 8 F.3d at 970-71.

190. Id. at 973.

191. Id. at 979. The Treasury Amendment states that "[n]othing in this Act shall be deemed to govern or in any way be applicable to transactions in foreign currency . . . unless such transactions involve the sale thereof for future delivery conducted on a board of trade." 7 U.S.C. § 2(ii). Tauber had argued, based on the origins and history of the Treasury Amendment, that it applied only to institutions and not to individual traders. Tauber, 8 F.3d at 976-77. The court disagreed, holding that the amendment exempted transactions such as Tauber's—individually negotiated foreign currency options and futures transactions between sophisticated,
prospect of a decision against Salomon, however, raised such a specter of disaster that the Justice Department, the SEC, and the Foreign Exchange Committee (composed of representatives of major domestic and foreign commercial and investment banks and foreign currency brokers) each filed amicus briefs in the case urging a decision in favor of Salomon.\textsuperscript{192} The case also caused Congress to debate whether new legislation might be necessary.\textsuperscript{193}

The Second Circuit in \textit{Commodity Futures Trading Commission v. Dunn}\textsuperscript{194} recently confused the issue further by ruling contrary to \textit{Taubert}. Holding that the term "transactions in foreign currency" does not include options, the court ruled that the foreign currency options in question were not exempted by the Treasury Amendment and were thus subject to CFTC jurisdiction.\textsuperscript{195} The Supreme Court reversed, holding that the Treasury Amendment exempts foreign currency options from CFTC jurisdiction, thus resolving, at least temporarily, the issue of CFTC authority over OTC foreign currency transactions.\textsuperscript{196} It is unlikely, however, that the matter will rest there. The exchanges, arguing that the greater regulation of exchange-traded markets renders them uncompetitive against the OTC dealers, have for some time been lobbying Congress for equal treatment.\textsuperscript{197} Some members of Congress are sympathetic to the argument and at least one bill has already been introduced.\textsuperscript{198}

In addition, the legality of swaps has been a matter of some uncertainty in the United States. In an Advance Notice of Proposed Rulemaking issued in 1987, the CFTC questioned whether the relatively new U.S. commodity swap market was an illegal off-exchange futures market, thus driving commodity swap activity offshore.\textsuperscript{199} This position was reversed and clarified in a subsequent Policy Statement.\textsuperscript{200} With the passage

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large-scale foreign currency traders. \textit{Id.} at 978.

\textsuperscript{192} Tauber, 8 F.3d at 974; Knight, supra note 25. The CFTC, the Board of Trade of the City of Chicago and the Chicago Mercantile Exchange, among others, also filed as amici curiae urging the opposite result because, they argued, to leave such contracts unregulated would frustrate the intent of Congress and lead to bucket shops and boiler rooms. Tauber, 8 F.3d at 974.

\textsuperscript{193} Knight, supra note 25.

\textsuperscript{194} 58 F.3d 50 (2d Cir. 1995), rev'd, 117 S. Ct. 913 (1997).

\textsuperscript{195} \textit{Id.} at 53.

\textsuperscript{196} Commodity Futures Trading Comm'n v. Dunn, 117 S. Ct. 913, 920-21 (1997).


\textsuperscript{198} \textit{Id.} On February 4, 1997, Senators Lugar, Harkin, and Leahy introduced a bill that would amend the CEA and clarify CFTC jurisdiction under the Treasury Amendment. \textit{See} Commodity Exchange Act Amendments of 1997, S. 257, 105th Cong. (1997). The bill's proposed amendments to the Treasury Amendment state that "[n]othing in this Act shall be deemed to govern or in any way be applicable to transactions in or involving foreign currency . . . unless such transactions involve the sale thereof to the general public for future delivery conducted on a board of trade." \textit{Id.} A "transaction" is specifically defined to include options. \textit{Id.}

The term "board of trade" is defined to include "unsupervised entities engaged in the systematic marketing of standardized, non-negotiable foreign currency transactions to retail investors," thus affirming that the CFTC retains jurisdiction over these retail foreign exchange transactions. The bill directs the CFTC to define the term "retail investors" but provides that the definition shall not include natural persons with total assets exceeding $10 million. \textit{Id.}


of the Futures Trading Practices Act of 1992, the CFTC was given authority in section 6(c) of the CEA to exempt swaps from its regulation. In January 1993, the CFTC used this authority to exempt qualifying swap agreements entered into on or after October 23, 1974, from many provisions of the CEA and the CFTC’s regulations thereunder, including the exchange-trading requirement, thus substantially reducing the legal uncertainty surrounding swap transactions with United States counterparties.

Legal risk can also arise from the possibility that a counterparty will be declared legally incapable of entering into a derivatives contract (ultra vires). During the 1980s the London borough of Hammersmith and Fulham entered into several interest rate swaps that initially earned outstanding returns. When interest rates moved adversely, however, the borough suffered large losses. In January 1991, the United Kingdom House of Lords held that Hammersmith and Fulham lacked the necessary capacity to enter into the trades to begin with and therefore was not liable for payments due on the contracts, thus instantly transferring more than $150 million in losses from the seventy contracting municipalities to the dealers. These losses represent approximately fifty percent of total losses due to default on swaps since the inception of swap transactions.

In the United States, legal incapacity has been raised as a defense by several investors who found themselves on the losing end of derivative transactions. Charles County, Maryland, for example, alleged lack of authority to engage in derivative transactions when it lost five to seven million dollars on derivatives and mortgage-backed transactions. The case was settled out of court. City Colleges of Chicago made a similar argument in federal court after losing several million dollars in derivatives transactions. The suit was subsequently transferred by the judge to an arbitration hear-

Policy Statement expressed the CFTC’s view that “most swap transactions, although possessing elements of futures or options contracts, are not appropriately regulated as such under the Act,” thus creating a non-exclusive safe harbor for most swaps. Id.

201. 7 U.S.C. § 6(c) (1994).
202. CFTC Exemption of Swap Agreements, 17 C.F.R. pt. 35 (1995). The new rules do not, however, provide an exemption from certain antifraud and antimanipulation provisions of the CEA. Id. at § 35.2.
204. GROUP OF THIRTY, supra note 11, at 51.
205. Recent Derivatives Losses: Hearing Before the House Comm. On Banking, Fin. and Urban Affairs, 103d Cong. 15 (1994) (Testimony of Roger Lee Fink, County Attorney for Charles County, Maryland). Local public law required the treasurer to invest county money not needed for disbursement in less than 15 days in short-term United States government securities. Virtually all of the county’s funds, nearly $31 million, had been invested by the treasurer in derivative and mortgage-backed investments with maturity dates between two and 29 years. Id. at 14.
207. City Colleges argued that the treasurer’s authority to invest college funds was limited to securities guaranteed by the full faith and credit of the United States government. The entire City Colleges portfolio, however, had been invested by the treasurer in PO (Principal Only) and SPO (Support Class Principal Only) collateralized mortgage obligations. Community College Dist. No. 508 v. Westcap Gov. Sec., Inc., No. 94-C-1920, 1994 U.S. Dist. LEXIS 13909, at *1-3 (N.D. Ill. 1994).
ing. U.S. courts, therefore, have not yet had an opportunity to rule on the ultra vires defense.

D. Operational Risk

Operational risk is the risk of loss occurring as a result of inadequate systems and controls, human error, or management failure. Although operational risk is also present in traditional trading and lending activities, the complexity of many derivatives requires a special emphasis on internal controls. Operational failure can increase the other types of risks discussed so far. For example, the failure to monitor and review trading activity to ensure that counterparty credit limits or risk exposures are not exceeded can increase credit and market risk, respectively.

1. Controlling Operational Risk

The investment banking firm of Merrill Lynch is considered by some to be a model of effective internal controls, having learned the dangers of operational risk after a $377 million loss in 1987 by a single trader. After the 1987 disaster, Merrill Lynch set up a separate risk management division, headed by a respected former trader at the firm. To highlight the importance of the division and prevent collusion with traders, Merrill Lynch required the head of risk management to report only to the Chairman and the President of Merrill Lynch. To ensure that orders were reported promptly, an operations clerk—reporting only to the head of operations, not to the head of trading—was placed between every two traders. Each trader was made subject to specific risk limits. A risk manager, reporting only to the head of risk management, was given the authority to force a trader to liquidate any positions that exceeded the set risk limits. Each night, data from all of Merrill Lynch’s worldwide computers was collected and analyzed to determine the risk of each desk. If outstanding positions exceeded the risk limits set by risk management, positions would be liquidated. Merrill Lynch implemented a series of independent checks and balances to ensure that these procedures would be followed by all traders so big money makers would not be allowed to slip through the cracks.

Numerous reports have been written advising derivatives users of the need and methods to control operational risk. These recommendations include oversight of

208. Id. at *22. City Colleges later sued the accounting firms of Coopers & Lybrand and Arthur Andersen as well. Art Golab, City Colleges Suit Seeks $30 Million from 2 Firms, CHI. SUN-TIMES, June 15, 1995, at S8.
209. GROUP OF THIRTY, supra note 11, at 50.
210. CFTC, supra note 11, at 110.
211. Kurt Eichenwald, Learning the Hard Way How to Monitor Traders, N.Y. TIMES, March 9, 1995, at D1. The trader was Howard A. Rubin, former head of mortgage securities trading. Rubin, against company policy, had taken a $500 million position in the “principal only” portion of a mortgage-backed strip, while selling the interest only portions to Merrill Lynch clients. The SEC suspended Rubin from the industry for nine months. Hansell, supra note 3, at D8.
212. Eichenwald, supra note 211, at D1.
213. Id. at D1, D8.
214. See, e.g., GROUP OF THIRTY, supra note 11, at 50-51; CFTC, supra note 11, at 110-12; BANK OF INTERNATIONAL SETTLEMENTS, RECENT DEVELOPMENTS IN INTERNATIONAL INTERBANK RELATIONS, REPORT
derivatives functions by informed and involved senior management. Because derivatives transactions are often more complex than are other financial transactions in which the firm may engage, it is especially important that management be well informed and knowledgeable about derivatives activity.\textsuperscript{215} The reports indicate that management should ensure that sufficient resources are available to support systems for data collection, processing, settlement, and reporting to properly measure, document, and control market and credit risk.\textsuperscript{216} Operational duties should be segregated from the business unit and an independent risk management unit should be established.\textsuperscript{217} Firms should document policies and procedures, listing approved activities and establishing limits and exceptions, and should establish internal audits to verify compliance with such policies.\textsuperscript{218} Proper internal control should be provided over the entry of transactions into the database as well as over the confirmation and settlement procedures.\textsuperscript{219} Finally, the reports urge firms to implement an internal system of checks and balances over the entire process—from front office trade initiation to back room settlement—to ensure compliance with specified firm policies and procedures.\textsuperscript{220}

\section*{2. Operational Failure}

Despite the abundance of recommendations concerning operational risk management, it is obvious that many of them have been ignored. The billion dollar losses incurred by "rogue trader" Nicholas Leeson, which caused the collapse of Barings, presents a perfect example. On February 26, 1995, Barings, plc, one of Britain's oldest and most prestigious merchant banks, collapsed due to losses of over $1 billion by 28-year-old trader Nicholas Leeson.\textsuperscript{221} Before his losses came to the attention of Barings management, Leeson had bought $7 billion worth of stock-index futures and sold $20 billion worth of bond and interest rate futures.\textsuperscript{222} Most of Baring's losses arose from the stock index futures.\textsuperscript{223}

\begin{thebibliography}{99}
\item GROUP OF THIRTY, supra note 11, at 18.
\item Id. at 18; BASLE COMMITTEE, supra note 165, at 16.
\item GROUP OF THIRTY, supra note 11, at 50; BASLE COMMITTEE, supra note 165, at 16.
\item GROUP OF THIRTY, supra note 11, at 50.
\item BASLE COMMITTEE, supra note 165, at 17.
\item GROUP OF THIRTY, supra note 11, at 50; BASLE COMMITTEE, supra note 165, at 17.
\item The Collapse of Barings, supra note 221, at 19-21.
\item Id. at 19. The interest rate trades involved buying futures contracts on Japanese Government Bonds
There is some dispute as to the trading strategy that ultimately caused the losses. The Bank of England (the chief banking regulatory body in England) reports that although Leeson was supposed to be engaged in a simple arbitrage strategy, seeking to profit from pricing inefficiencies between the prices of Nikkei-225 futures contracts listed on the Osaka Securities Exchange (OSE) and the Singapore Monetary Exchange (SIMEX), he had in fact abandoned this strategy to place unhedged positions, speculating on the future direction of Nikkei movement. Sources within Barings itself, however, indicate that Leeson was engaging in short “straddles” that would pay off only if the Nikkei stayed within the 18,500 to 19,500 range. When the Kobe earthquake hit on January 17, 1995, the Japanese stock market fell and Leeson suffered substantial losses. Leeson dramatically increased the size of his trades, either in an attempt to recoup losses or push up the market through his trading. When the Tokyo market plunged one thousand points on January 23, Leeson continued to increase dramatically the size of his trades, until his losses were eventually discovered and he fled Singapore sometime around February 26, 1995.

The Barings incident is a classic case of operational failure. Simple internal controls at even one of several levels could have easily prevented such a catastrophe. First, Leeson was head of both settlements and trading, even though it is considered improper practice to have one person in charge of both functions. Allowing a trader to settle his own trades makes it easier for him to hide both his losses and his risk exposure. Leeson’s dual role allowed him easily to deceive Barings’ internal auditors, who exam-
ined Leeson’s office three times in the twelve months before the bank collapsed.\textsuperscript{229} Leeson simply forged documents indicating that he was offsetting his futures positions with OTC contracts purchased through a Bermuda-based hedge fund and created a fictitious client account to hide his losses.\textsuperscript{230} In addition, Barings lacked an independent risk management unit to monitor Leeson’s positions.\textsuperscript{231} Finally, Barings seems to have been blinded by Leeson’s stellar profits. Bank officials reported that no suspicions were raised and that Leeson continued to enjoy a reputation as a conservative trader within the bank, long after traders at rival firms had noticed the growth of Barings’ positions and its risky, aggressive trading strategy.\textsuperscript{232}

The total breakdown in operational controls can be seen clearly in the context of Leeson’s margin calls. Because all of Leeson’s contracts were exchange-traded, the firm had to put up initial margin and meet calls as the firm’s account lost value. As Leeson’s losses mounted, these calls must have been substantial, yet no eyebrows were raised at Barings for several reasons. First, the cash required to pay the margin calls did not exceed the bank’s limits until February 23, when the losses were far greater than what the bank could absorb, indicating an incredible lapse in the establishment of the firm’s risk limits.\textsuperscript{233} Second, Leeson had set up a fictitious client account into which he had funneled Barings’ money and out of which he paid margin calls.\textsuperscript{234} When this account was exhausted, Leeson requested money from Barings in London, which readily extended the credit because the “client” had so far provided the bank with such large commissions.\textsuperscript{235}

The Barings incident was also exacerbated by the lack of proper oversight by the exchanges. Neither the Japanese nor the Singapore markets determined the cause of Barings’ increasingly large positions. Although inquiries were apparently made, Leeson, as the Barings representative, was able to respond by merely supplying a few fictitious client names.\textsuperscript{236} In addition, the situation perhaps could have been detected before reaching crisis proportions if the exchanges had done a better job of information sharing.\textsuperscript{237}

Although many have tried to blame the Barings collapse on derivatives, Leeson’s losses had nothing to do with the contracts being traded and everything to do with a lack of internal controls. The typical reasons asserted for the need for greater regulation of derivatives—lack of regulatory oversight for OTC derivatives and the complexity and sophistication of some derivatives instruments which makes them impossible for all but experts to understand—do not apply at all to Barings.\textsuperscript{238} Leeson’s losses resulted from transactions in simple exchange-traded options and futures—products that have been in

\textsuperscript{229} The Collapse of Barings, supra note 221, at 20.
\textsuperscript{230} Id.
\textsuperscript{231} Id.
\textsuperscript{232} Id. By the time Leeson’s losses were finally discovered, Barings’ exposure on the OSE was eight times the size of its nearest rival’s and was even greater on the SIMEX. Id.
\textsuperscript{233} The Collapse of Barings, supra note 221, at 20.
\textsuperscript{234} Id.
\textsuperscript{235} Id.
\textsuperscript{236} Id. at 21.
\textsuperscript{237} Id.
\textsuperscript{238} The Collapse of Barings, supra note 221, at 21.
existence for decades and are (or should be) easily understood by anyone connected with the financial industry.

An examination of other cases of operational failure shows that such failures are neither limited to instances of derivatives trading nor confined to foreign markets, which are viewed as less mature and less regulated than U.S. markets. In April 1994, Kidder, Peabody announced that its chief government bond trader, Joseph Jett, a rising star within the firm who had earned a $9 million bonus in 1993, had used an accounting loophole to credit himself with $350 million in fictitious trades. Jett’s real trades had, in fact, lost $100 million.239 Victor Gomez, a trader at Chemical Bank, purchased large, unauthorized positions in the Mexican peso in late 1994.240 When the Mexican government suddenly devalued its currency in December 1994, Chemical was left with seventy million dollars in unexpected losses.241 Paul W. Mozer, the former head of the government trading desk at Salomon Brothers, violated rules limiting the amount of securities a single dealer could purchase at U.S. Treasury auctions by submitting false orders in the names of Salomon clients. After these violations came to light in 1991, Mozer was fired by Salomon, barred from the industry for life, and sentenced to four months in prison. Salomon paid nearly $290 million in fines and several members of senior management, including Chairman John H. Gutfreund, resigned.242

The most recent such case of operational failure took place at the New York office of a Japanese bank—meaning that the office was subject to regulation and review by the Federal Reserve.243 On September 18, 1995, Daiwa Bank reported to federal regulators that its New York Branch had incurred losses of $1.1 billion due to thirty thousand unauthorized trades from 1983 to September 1995 by trader Toshihide Iguchi, an executive vice president in the bank’s New York branch.244 As was the case with Nicholas Leeson of Barings, Iguchi was allowed both to execute and record trades, which enabled him to hide his losses by maintaining a false set of books.245 Because confirmation slips sent by securities firms with which Iguchi did business went directly to Iguchi, rather than to a separate settlement department, no one at Daiwa knew of

239. Hansell, supra note 3, at D8. Jett’s trades, like all of those discussed in this paragraph, were in the cash markets and were not derivative-related. Id.

240. Id.

241. Id.

242. Id.

243. The Foreign Bank Supervision Enhancement Act of 1991, passed by Congress in December of 1991 in response to the BCCI and BNL scandals, requires foreign banks to acquire Federal Reserve approval before establishing a state or federally licensed branch, and mandates that each such branch be examined by the Federal Reserve at least once during each twelve-month period. Foreign Bank Supervision Enhancement Act of 1991, Pub. L. No. 102-242, 105 Stat. 2286-2305 (1991). Daiwa’s New York branch was also subject to supervision by the New York State Banking Department and the Ministry of Finance in Japan, an institution renowned for its careful supervision of the banks under its authority. Financial Conditions of BIF and SAIF and Proposals to Merge the Banking Thrift Industries, Hearings Before the Subcomm. on Fin. Insrs. and Consumer Credit of the House Comm. on Banking and Fin. Servs., 104th Cong. 67 (1995) (statement of Alan Greenspan) [hereinafter Statement of Greenspan]. “I believe that it is fair to say that the system of supervision in Japan is detailed and extensive and requires substantial financial reporting.” Id. at 75.


245. Pollack, supra note 244.
Iguchi's trades.\textsuperscript{246} Iguchi covered his losses by selling $1.1 billion in bonds from Daiwa's custodial account at Bankers Trust, then intercepting the periodic Bankers Trust statements and forging his own.\textsuperscript{247} Although Daiwa officials tried to portray themselves as fooled by a sophisticated trader, Iguchi engaged only in very simple spot-market trades of U.S. Treasury securities.\textsuperscript{248} He did not trade in derivatives.\textsuperscript{249} A simple cross-checking system easily could have saved Daiwa over $1 billion in losses. As in the Barings case, however, Daiwa officials seem to have been operating with blinders on. Although the aggressiveness and large sums of Iguchi's trades had become well-known and often aroused comment among traders at rival firms, no suspicions were raised at Daiwa.\textsuperscript{250}

On October 9, 1995, Daiwa also announced that its separate federally insured bank subsidiary in New York, Daiwa Bank Trust Company, had suffered unreported losses of nearly $97 million as a result of trading activities, at least some of which were unauthorized.\textsuperscript{251} Although these losses should have been reflected in the company's books and records or financial statements, they were not. With the apparent knowledge of Daiwa management, these losses were concealed from regulators by transferring the losses to offshore affiliates.\textsuperscript{252}

The Daiwa incident is especially disturbing because Daiwa was subject to heavy regulation and supervision by banking authorities both in the U.S. and in Japan, none of whom (allegedly) discovered the eleven year cover-up. The Federal Reserve Board examined Daiwa three times between 1992 and 1994.\textsuperscript{253} Examiners identified several lapses in internal controls and instructed Daiwa management promptly to remedy the problems. In particular, Daiwa was warned that the duties of Iguchi, who was responsible for both securities trading and back office settlement (as well as other back office functions), should be separated. Unfortunately, however, Federal Reserve examiners did not follow up to ensure that their instructions had been implemented, and merely accepted assurances from Daiwa branch management that the internal control problems had been corrected.\textsuperscript{254} In testimony before the U.S. House of Representatives, Federal Reserve Chairman Alan Greenspan acknowledged that lax oversight by Federal Reserve examiners had partially contributed to the Daiwa incident.\textsuperscript{255}

In addition, from October 1984 to January 1994, Daiwa Trust was examined ten times by the Federal Deposit Insurance Corporation (FDIC) and the New York State Banking Department (NYSBD).\textsuperscript{256} Although Daiwa's lack of internal controls, includ-

\textsuperscript{246} Id.
\textsuperscript{247} Id.
\textsuperscript{248} Id. Apparently the damage began with a loss of $200,000 on an early trade in 1984, shortly after Iguchi began trading for Daiwa. He began trading more heavily in an attempt to recoup the losses, but they continued to mount until, by 1995, Iguchi had lost over $1 billion. Id.
\textsuperscript{249} Pollack, supra note 244.
\textsuperscript{250} Id.
\textsuperscript{251} Statement of Greenspan, supra note 243, at 69.
\textsuperscript{252} Id. at 68-70.
\textsuperscript{253} Id. at 73.
\textsuperscript{254} Id. at 74.
\textsuperscript{255} Id. ("With the benefit of hindsight, there were some clues that were missed in the examination of Daiwa. With a more robust follow-up, the problem might have been found sooner.").
\textsuperscript{256} Hearings Before the Subcomm. on Fin. Insts. And Consumer Credit of the House Comm. on Banking
ing its failure to adhere to an adequate vacation policy, no action was taken.227 External audits by an independent accounting firm were also performed annually at Daiwa Trust during the period of unreported losses (1983-1987), but apparently no improprieties were found.228

Perhaps the most disturbing element of the Daiwa scandal, however, is the lack of cooperation exhibited by Daiwa management and the Japanese Ministry. Although Daiwa senior management learned of Iguchi's losses in July of 1995, they not only concealed the losses from regulators until September, but directed Iguchi to continue with the cover-up to avoid detection by regulators.229 In addition, officials at the Japanese Ministry of Finance were informed of Daiwa's losses in early August of 1995, but neither instructed Daiwa to inform American authorities nor took any independent action to alert the Federal Reserve.230 It was precisely this lack of cooperation that led regulatory agencies to take the rather unusual step of closing Daiwa's United States operations.231

E. Liquidity Risk

A liquid market is generally considered to possess both depth, meaning that trades can be made on either side of the market close to the current price, and breadth, meaning that trading is of high volume and the market exhibits resiliency through the rapid return to price equilibrium following a market disruption.232 Users of derivatives products face two types of liquidity risk: product liquidity risk and funding liquidity risk.233 Product liquidity risk is the risk that a party will not be able to easily unwind

—and Fin. Servs., 104th Cong. 91, 102 (1995) (testimony of Ricki Helfer) [hereinafter Testimony of Ricki Helfer].
227. Id. The FDIC "strongly encourages" that bank officers and employees be absent from their duties for an uninterrupted two-week period. The policy is intended to prevent improper activities, which usually require the constant presence of the employee to manipulate records and prevent detection. Id. This lack of enforcement of the two-week vacation rule was also a major factor in the Daiwa scandal, as Iguchi had not taken a vacation in eleven years. Presumably a substitute trader would have discovered the cover-up in Iguchi's absence. See generally Keith Bradsher, U.S. Concedes Lax Response in Daiwa Case, N.Y. TIMES, Nov. 28, 1995, at D2.
228. Testimony of Ricki Helfer, supra note 256, at 103.
230. Statement of Greenspan, supra note 243, at 69. The general consensus seems to be that bank management never would have engaged in a cover-up without the tacit approval of the Japanese regulators. Daiwa officials have reported that the Ministry's major priority was to protect the integrity of the Japanese financial system at all costs and that Yoshimasa Nishimura, Japan's top banking officer, told Daiwa officials that "the timing is bad" for disclosure of such a large loss. Blustein, supra note 259, at 18.
231. On October 2, 1995, the Federal Reserve, the FDIC, and the New York Superintendent of Banks issued cease and desist orders against Daiwa requiring the termination of trading activities in the United States, and also issued joint consent orders directing Daiwa to cease all banking operations in the United States by February 1996. Statement of Greenspan, supra note 243, at 70.
232. Hearing, supra note 20, at 35.
233. BASLE COMMITTEE, supra note 165, at 15.
or hedge a particular position because of inadequate market depth or breadth. Funding liquidity risk is the risk that a market participant will be unable to meet its payment obligations on the settlement date or in the event of a margin call.

Because any net exposure in a derivatives portfolio is generally hedged through a dynamic process, illiquidity can be an important risk for portfolio managers. Parties who have sold options and thus have short volatility and convexity positions are most at risk. By managing components of market risk rather than individual market positions, portfolio managers can transform an illiquid product into liquid risks. In other words, although a customized swap or forward may appear to be illiquid, it still can be easily unwound if its component risks are liquid.

Neither product liquidity risk nor funding liquidity risk are unique to derivatives transactions or markets. Nonetheless, it is important that derivatives users be aware of liquidity risk, as it can greatly impact the credit and market risk of a portfolio. A participant in the derivatives markets must recognize the possibility of losing access to one or more markets, due to either adverse changes in its own creditworthiness or to that of a major counterparty, or to a general market disturbance. In such an event, the participant will have less flexibility in monitoring credit and market risk, and should adjust its exposures accordingly, if possible. Derivatives users should have in place a liquidity contingency plan to provide for the use of alternative markets, such as the futures or spot markets, or to provide for the use of credit enhancements, such as collateral, in the event of an illiquid market.

The OTC derivatives market is considered significantly less liquid than the exchange-traded market. The standardization of exchange-traded contracts leads to greater fungibility and, therefore, greater liquidity. The use of clearinghouses, the anonymous nature of exchange trading, and the relatively small contract size all lead to a highly liquid exchange-traded derivatives market that is different from the OTC market. In addition, many standard form OTC derivatives contracts allow counterparties to request collateral or require the termination of the contract upon some triggering event, such as a deterioration in the financial condition or creditworthiness of a party. Such a call for collateral or termination of the contract is likely to come at a time when the party is already experiencing liquidity problems from other sources.

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264. Id.
265. Id.
266. GROUP OF THIRTY, supra note 11, at 62.
267. Id. Thus, although a particular derivative may be so customized and complex that it is illiquid, by breaking the transaction down into its component risks (volatility, convexity, time decay, etc.), the investor can hedge or unwind the component risks individually.
268. BASLE COMMITTEE, supra note 165, at 15.
269. Id.
270. GROUP OF THIRTY, supra note 11, at 32.
271. BASLE COMMITTEE, supra note 165, at 15-16.
272. Id.
F. Systemic Risk

The risk of greatest concern to many observers of derivatives markets is systemic risk—the risk that a disturbance will impair the efficient functioning of the financial system and, at the extreme, cause its complete breakdown.273 Many argue that systemic risk arises from the danger that the collapse of a single large dealer or end-user could spread in a domino effect, causing serious repercussions for the entire global financial system (the “traditional view”).274 Proponents of this side of the debate are able to point out that, although governments are often unwilling to intervene to prevent the failure of an individual market participant,275 they generally have no choice when the financial system itself is perceived (rightly or wrongly) to be threatened.276

Other scholars argue that market forces provide incentives that encourage market participants themselves to guard against insolvency and systemic crisis of the type just described. Even in the absence of regulation, they argue, firms will endeavor to provide adequate disclosure to customers, remain solvent, and guard against financial loss.277 According to these scholars, it is only the existence of federal deposit insurance and the consequent risk to federal taxpayer dollars, which implicate systemic concerns (the “localized view”).278 Proponents of the localized view are able to point out that the financial system has already successfully weathered the collapse of major financial institutions, such as Drexel Burnham Lambert and Barings, without a hint of systemic crisis.279

Although a final resolution of the debate is beyond the scope of this paper, it is notable that many of the largest and most important participants in the derivatives markets are federally regulated and insured banks. A large bank failure due to derivatives losses could thus lead to systemic loss even under the localized view.280 One could ar-

273. Hearing, supra note 20, at 43; Stout, supra note 9, at 54; Misunderstood Derivatives, supra note 9, at 1502; Albrecht, supra note 197, at 114; Becker & Mazur, supra note 9, at 180.

274. See Hearing, supra note 20, at 32 (discussing the exposure to systemic risk); see also Albrecht, supra note 197, at 114.

275. For example, the Bank of England refused to rescue Barings from its 1995 derivatives loss after determining that the bank’s failure would not threaten the British or international financial systems as a whole or cause severe losses to small depositors. Paul Lewis, Acceptable Failure Not Seen as Threat to Financial Systems, N.Y. TIMES, Feb. 28, 1995, at D8.

276. For example, the United States Federal Reserve is generally credited with halting the October 19, 1987 stock market crash by promising to provide liquidity for the “financial and economic system.” Hearing, supra note 20, at 37. The United States government took more drastic action to avoid a perceived systemic crisis during the Savings and Loan collapse. In 1989, Congress passed the largest bailout in United States history, costing taxpayers a total of $166 billion. Paulette Thomas, S&L Bailout Makes Lawmakers a Bit Thriftier About Doling Out Help to Their Constituents, WALL ST. J., Nov. 6, 1989, § 1, at 18.

277. See, e.g., Macey, supra note 9, at 84; Albrecht, supra note 197, at 114; see generally Macey & Miller, supra note 15.

278. See Macey, supra note 9, at 84; see generally Macey & Miller, supra note 15.

279. Neither Drexel nor Barings, however, were financial institutions of the magnitude of the seven banks and five securities firms that are major derivatives dealers. See infra note 285 (listing the 15 largest derivatives dealers).

280. See Macey, supra note 9, at 84. At least one proponent of the localized view has argued that, because some of the costs associated with systemic risk in the derivatives markets are borne by outsiders, the public policy concerns associated with systemic risk are far greater than those associated with firm-specific
gue that as long as the federal reserve's capital requirements are adequate and are being followed, even massive losses at a federally insured institution should not lead to systemic loss. Incidents at federally regulated and insured banks such as those discussed in Parts IV and V of this article, however, should at the very least give pause.281

Furthermore, given the lack of vigilance and foresight exhibited by some market participants in connection with their derivatives transactions during the early 1990s, one should perhaps be wary of placing too much faith in the ability or desire of market participants themselves to behave responsibly and guard against loss, even when to do so is in their own best interest. This Article, therefore, treats the issue of systemic risk in the derivatives market as one that should at least be further explored and, therefore, summarizes below many of the concerns that in regard that have been expressed by others.

Although systemic risk has been cited as an issue with respect to all financial markets, it has been of particular concern with respect to the derivatives markets, especially the OTC market.282 The danger of a systemic crisis in the OTC market is seen as more severe than such a possibility in the exchange-traded market for several reasons. First, the exchange-traded market is more liquid than the OTC market. Second, the exchange-traded market contains protections designed to isolate distress within a market participant, such as the use of clearinghouses that guarantee contracts and the daily marking-to-market of positions (both of which reduce credit risk). These protections are not present in the OTC market.283 Finally, regulation of the OTC derivatives markets in the United States is spread among diverse agencies primarily concerned with the integrity of the individual participants or industries that fall within their regulatory power—not with the integrity of the OTC derivatives market as a whole. It is argued that this lack of oversight by a single market regulator contributes to systemic risk, as fragmented oversight impedes the regulatory coordination necessary to deal with a financial crisis spanning firms, industries and, perhaps, national boundaries.284

It is also argued that the high concentration of derivatives activity contributes to systemic risk. Most OTC derivatives activity in the United States is concentrated among fifteen major United States dealers that are extensively linked to one another, to end-users, and to other markets.285 At year-end 1992, for example, the top seven domestic

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281. See supra Part IV.D (discussing losses at Daiwa Bank and Daiwa Trust) and infra Part V.A.1 (discussing losses at Bankers Trust).
283. CFTC, supra note 11, at 98-99. However, OTC market participants have developed other mechanisms to control credit risk and, in fact, credit losses have played a relatively minor role in the OTC market. See supra Part IV.B.
284. Hearing, supra note 20, at 43 n.12. Others argue that consolidating regulatory authority in a single regulator increases, rather than decreases, systemic risk. Macey, supra note 9, at 91.
bank OTC derivatives dealers accounted for over ninety percent of total U.S. bank derivatives activity, and the GAO indicated in its 1996 report that this trend toward concentration in the major bank dealers had continued.286 Similarly, the top five U.S. securities firms dealing in OTC derivatives accounted for over ninety percent of total derivatives activity for all U.S. securities firms,287 and the three insurance companies completing the list of the top fifteen U.S. OTC derivatives dealers were the only insurance companies GAO could identify as derivatives dealers.288 It is believed by some that this combination of market concentration and linkages across firms and markets means that the sudden failure of one large market participant could have systemic consequences and lead to the failure of other market participants, including insured depository institutions.289

The size and complexity of the derivatives market is believed to contribute to systemic risk as well. The exponential growth in the market, coupled with the obvious complexity of the products themselves, means that new market actors and products are constantly being introduced. As with any new market actor or product, there is an initial learning period during which errors are inevitable. Some argue that a sizeable error, if not isolated, could lead to a systemic crisis.290 Nonetheless, these dangers should not be overstated. The derivatives market, although large, does not nearly approach the size of other financial markets.291 While some studies have discounted the risks arising from the complexity of derivatives, noting that such risk is irrelevant in that it is exceeded by the ability of users to evaluate and manage such risk,292 other studies have identified the complexity of derivatives products as significantly contributing to risk.293 These later studies appear to be supported by instances of derivatives losses, particularly losses due to market and operational risk control failures.294

The lack of transparency in derivatives markets has also been cited as a possible source of systemic risk.295 Transparency concerns in the derivatives markets stem from two sources: the absence of widely disseminated, reliable price data and the lack of

286. GAO, supra note 20, at 6; GAO II supra note 30, at *30.
287. GAO II, supra note 30, at *71.
288. Id. The Group of Thirty’s 1993 report found that the top eight dealers accounted for 58% of the interest rate and currency swap markets at year-end 1991. GROUP OF THIRTY, supra note 11, at 61. Surprisingly, the Group of Thirty presents this statistic as evidence against the existence of market concentration, a conclusion not shared by most market observers. See, e.g., GAO, supra note 20, at 6-7; INTERNATIONAL MONETARY FUND, INTERNATIONAL CAPITAL MARKETS, PART II, SYSTEMIC ISSUES IN INTERNATIONAL FINANCE (IMF SYSTEMIC ISSUES) 31, reprinted in Safety and Soundness Issues Related to Bank Derivatives Activities Part 2: Hearing Before the House Comm. on Banking, Fin., and Urban Affairs, 103d Cong. 1165 (1993). The Group of Thirty study further pointed out that no dealer in its survey had a greater than 10% market share and that there were 150 ISDA dealers—three times the number of primary dealers in government bonds. GROUP OF THIRTY, supra note 11, at 61.
289. See GAO, supra note 20, at 7.
290. See CFTC, supra note 11, at 112.
291. See GROUP OF THIRTY, supra note 11, at 61.
292. See id.
294. See supra Part IV.A.3 and D.2.
295. See, e.g., CFTC, supra note 11, at 115-18.
financial disclosure of derivatives exposure by individual firms. Without reliable price information, valuation and effective risk management are impossible. Lack of price transparency can also exacerbate liquidity problems because market participants may refuse to conduct trades without meaningful price information. This is particularly true of the more complex OTC derivatives and derivatives of longer maturities, which tend to be subject to greater volatility risk. It should be noted, however, that some market participants have cited this market secrecy as one of the advantages offered by the OTC markets which the exchange markets lack.

Even the Group of Thirty, noting the lack of financial disclosure by derivatives users, acknowledges that financial accounting and reporting standards and requirements have failed to keep pace with developments in the derivatives market. Lack of transparency of this type makes it difficult to assess risk distribution and, therefore, hampers counterparties’ attempts to monitor credit risk. Nearly every study undertaken of the derivatives market has urged the adoption of new accounting standards to deal with the unique problems presented by the financial reporting of derivatives transactions. The Financial Accounting Standards Board and the SEC have made progress in correcting these deficiencies. However, recent studies indicate that significant accounting and disclosure problems still exist with respect to derivatives transactions.

Market linkages are also a factor cited as contributing to systemic risk in the derivatives markets. Because the derivatives market is global in nature, it links United States financial markets closely with foreign ones. A disruption outside the United States arguably could have drastic and far-ranging effects in this country. The derivatives market is also linked to the underlying market. For example, a disruption in the stock index futures market clearly has an affect on the stock spot market and vice-versa.

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296.  *Id.* at 115-16.
297.  *Id.* at 116.
298.  *Id.*
299.  *Id.*
300.  GROUP OF THIRTY, supra note 11, at 62. The Group of Thirty report is well known for its favorable portrayal of the derivatives market.
301.  See PROMISEL REPORT, supra note 214, at 34.
302.  See, e.g., GROUP OF THIRTY, supra note 11, at 62; Hearing, supra note 22; GAO, supra note 20, at 128.
303.  See infra Part V.C.
304.  See GAO II, supra note 30, at *82.
305.  Because Daiwa and Barings were relatively small actors on a global scale, the effects of those incidents were mild in the United States. However, the potential effects of a true global crisis, involving more significant actors, are still unknown and could be substantial.
306.  It is clear, for example, that derivatives trading played a role in the 1987 stock market crash. On October 19, 1987, about nine percent of New York Stock Exchange trading was due to index arbitrage and 12-24% of total trading in the Chicago Mercantile Exchange’s S&P 500 stock index futures contract was due to portfolio insurance trading (i.e., derivative trading). Hearing, supra note 20, at 35. Index arbitrage (also known as program trading) refers to attempts to exploit the basis relationship by buying (selling) the cash index and selling (buying) the futures against it when the index appears underpriced (overpriced) relative to the futures. Index arbitrage performs an important market efficiency function by eliminating or reducing basis risk. MARKI, supra note 40, at 222-23. See also supra note 95 and accompanying text (discussing basis risk). Portfolio insurance (also known as option replication theory) is a dynamic hedging strategy that attempts to
Finally, OTC derivatives dealers also tend to be active participants in the other financial markets, such as banking, lending, futures, or stock, so that the failure of a financial institution due to derivatives trading could have systemic and liquidity repercussions in the other markets as well.\textsuperscript{307}

V. RECOMMENDATIONS TO PROTECT THE FINANCIAL SYSTEM

The large derivatives losses suffered by investors in recent years have led many observers to conclude that more regulation is necessary. They may be correct. However, most of the proposals attempt solutions without understanding the problem. Federal regulation is appropriate to the extent that federal interests are implicated or state law solutions fail to provide adequate protection. Because the derivatives market is a zerosum game, the only federal interest at stake is the protection of the United States financial system and United States taxpayer dollars. Although there is substantial scholarly debate as to the degree of such a threat, as noted above,\textsuperscript{308} systemic loss in the OTC derivatives market is a concern under either view due to the existence of federally insured banks that are active and important players in the OTC derivatives market.

Regulators and scholars alike must carefully distinguish systemic risks from firm-specific risks when debating the need for greater federal oversight.\textsuperscript{309} Although regulation may prevent losses to individual investors, it leads to added costs. Those costs may impede the innovation and creativity that are the hallmarks of the OTC derivatives market and may even push the industry offshore. In addition, federal legislation is not necessary to protect investors because parties to derivatives contracts have state law remedies to protect against fraud, misrepresentation, and other allegations of wrongdoing in connection with derivatives transactions. Finally, counterparties who do not want the added risk of contracting in a largely unregulated market have the option of investing only in the exchange-traded derivatives market.

Although other federal regulatory regimes may have as their goal protection against individual investor losses, the policy concerns behind those statutes are very different than those implicated by OTC derivatives trading. For example, although one purpose of the federal securities acts is to protect investors, Congress felt that a federal statute was needed in this area to ameliorate the ineffectiveness of existing state remedies.\textsuperscript{310}

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{307} See Hearing, supra note 20, at 35-36; MARKI, supra note 40, at 238.
\item \textsuperscript{308} See supra notes 274-279 and accompanying text.
\item \textsuperscript{309} See supra note 9, at 85 (noting that the costs of non-systemic risks are internalized while some costs of systemic risks are born by outsiders).
\item \textsuperscript{310} Joel Seligman, The Historical Need for a Mandatory Corporate Disclosure System, 9 J. CORP. L. 1, 56 (1983) (noting the ease with which securities defrauders could circumvent the state blue-sky laws); Chiarella v. United States, 445 U.S. 222, 248 (1980) ("[T]heir [the federal securities laws] purpose is to en-
There has been no contention that the state law remedies against fraud, misrepresentation, and breach of contract that are currently available to counterparties who believe themselves wronged in an OTC derivatives transaction are inadequate. Furthermore, the federal securities laws are designed primarily to protect unsophisticated investors. Offerings made only to those persons deemed not to need the protection of the securities acts are generally exempt from the registration requirements of section five of the Securities Act. Similarly, federal banking regulation and federal deposit insurance are designed to protect depositors in federally chartered and insured banks, many of whom are unsophisticated, private individuals. By contrast, players in the OTC derivatives market are without exception sophisticated investors. The only area, therefore, where increased federal regulation would be appropriate is with respect to systemic risks that threaten the integrity of the United States financial system or put United States taxpayer dollars at risk. Although regulation to control other types of risk—particularly market and operational risk—surely could help to prevent future derivatives losses (especially among some end-users), such regulation is appropriate only to the extent that systemic loss is implicated.

311. Although the sophistication of offerees and purchasers has played a major role in the interpretation of the Securities Act, the term is nowhere defined in the Act or the rules thereunder. A few courts have provided guidance. See, e.g., Lively v. Hirschfeld, 440 F.2d 631, 633 (10th Cir. 1971) (noting that offerees, to be sophisticated, must have “exceptional business experience”). The American Bar Association offered the following explanation: “The relevant inquiry should be whether the investor can understand and evaluate the nature of the risk based upon the information supplied to him.” Section of Corporation, Banking and Business Law of the American Bar Association, Section 4(2) and Statutory Law: A Position Paper of the Federal Regulation of Securities Committee, 31 BUS. LAW. 485 (1975). Even the federal securities laws, however, attempt this investor protection primarily through forcing the disclosure of all relevant information. See SEC v. Capital Gains Research Bureau, Inc., 375 U.S. 180, 186 (1963) (stating that the fundamental purpose of the securities laws is “to substitute a philosophy of full disclosure for the philosophy of caveat emptor”); COX ET AL., SECURITIES REGULATION 3 (1997) (“Disclosure is the remedy the Securities Act embraces for this malady.”).

312. Section 4(2) of the Securities Act, for example, exempts from section 5 “transactions by an issuer not involving any public offering.” Securities Exchange Act of 1933, 15 U.S.C. § 77d(2) (1994). The Supreme Court held in SEC v. Ralston Purina, 346 U.S. 119, 125 (1953), that the applicability of the section 4(2) exemption “should turn on whether the particular class of persons affected need[s] the protection of the Act. An offering to those who are shown to be able to fend for themselves is a transaction ‘not involving any public offering.’” Similarly, Rules 505 and 506 of Regulation D allow offerings to an unlimited number of accredited investors (there is a $5,000,000 cap during any 12-month period under Rule 505). 17 C.F.R. § 230.505-06 (1997). “Accredited investor” is defined by section 2(15) and Rule 501(a) to include banks, insurance companies, and other financial institutions, and persons who, due to factors such as wealth, financial sophistication, and access to the issuer are deemed not to need the protection of the Act. 15 U.S.C. § 77b(15). The antifraud provisions of section 10(b) and Rule 10b-5 thereunder, however, still apply to these exempt transactions. See 15 U.S.C. § 78j(b) (1994); 17 C.F.R. § 240.10b-5 (1997).

313. See supra Part III (discussing market participants). Very few participants in the OTC derivatives market are even natural persons. One well-known exception to this is Laszlo Tauber, an extremely wealthy and financially sophisticated Washington D.C.-based investor. See supra notes 189-192 and accompanying text.
A. Recommendation 1: Federal regulation should ensure that all OTC derivatives dealers that control sufficient trading volume to implicate systemic concerns properly control market, credit, legal, and operational risk.

As demonstrated in Part IV, controlling the risks that OTC derivatives pose for market participants and the financial system is primarily the responsibility of the market participants themselves through the use of internal procedures designed to control market, credit, legal, and operational risk. For end-users and most dealers this self-monitoring provides sufficient protection to the market because derivatives users who do not adequately control risk will learn the hard way—through large losses—that the OTC market requires vigilance on the part of investors. Thus, market participants will ultimately implement internal controls out of self-interest or abandon the OTC market altogether in favor of the more regulated and price-transparent exchange-traded market.

OTC derivatives activity in the United States, however, is highly concentrated among fifteen major dealers that are extensively linked to each other, to end-users, and to other markets. These fifteen dealers consist of seven banks, five securities firms, and three insurance companies or their affiliates. A serious disruption at any one of these major market participants could lead to systemic loss under the traditional view. Therefore, federal regulators should explore whether these fifteen dealers (as well as other market participants, if any, with derivatives trading at a level that implicates serious systemic concerns) adequately control risk through proper internal procedures.

Federal regulation of market participants whose derivatives activities do not implicate systemic concerns should be limited to preserving investor confidence in the market. This can best be accomplished by ensuring that each participant adequately discloses derivatives activities and risk exposures in financial reports so investors are aware of the risks they may be assuming in purchasing the securities of dealers or end-users of derivatives.

1. Federal regulation of bank derivatives dealers already exists, but must be enforced to be effective.

The seven banks that are major OTC derivatives dealers are regulated by one or more bank regulators: the Office of the Comptroller of the Currency (OCC), the Federal Reserve System (Federal Reserve), the Federal Deposit Insurance Corporation (FDIC), or state banking authorities. The OCC oversees banks with national charters. The Federal Reserve monitors all bank holding companies and state-chartered banks that are members of the Federal Reserve. State-chartered banks that are not Federal Reserve members but have deposits insured by the FDIC are subject to oversight by the FDIC and by state banking regulators.

314. See supra note 285.
315. Under the localized view, only a failure at one of the seven banks would implicate systemic concerns.
316. See GAO II, supra note 30, at *25.
Bank regulators have the authority to supervise all the financial activities of the banks and bank holding companies under their jurisdiction. The seven bank OTC derivatives dealers are thus subject to: capital requirements; regulations with respect to internal controls designed to minimize market, credit, legal and operational risk; extensive disclosure requirements; annual and periodic on-site examinations; and other controls designed to prevent serious unforeseen losses at a regulated bank or bank holding company.317 The GAO found in its 1996 study that the OCC, the Federal Reserve, and the FDIC had taken significant steps to improve their oversight of derivatives activities by expanding reporting requirements to include information on derivatives activities and improving their examination processes to assess more adequately derivatives-related risks and risk management.318 Nonetheless, GAO also found that, while examiners reviewed the internal controls at the seven major bank derivatives dealers, the examinations were not extensive and bank examiners primarily relied on reports of internal and external auditors to ensure that banks were complying with proper internal risk control procedures.319

These findings are supported by anecdotal evidence of three federally regulated banks whose internal controls were clearly inadequate. According to the Federal Reserve Bank of New York, Bankers Trust failed to adjust its internal controls (including enhanced supervision of sales employees) when its market risks and exposures increased after the bank embarked on a new and riskier business venture—leveraged derivatives. Bankers Trust suffered significant losses when several derivatives counterparties failed to honor their obligations and instead sued Bankers Trust on various charges.320 It is unclear why federal bank examiners did not notice and correct these inadequacies until they received national publicity when a Bankers Trust client, Gibson Greetings, Inc., filed suit in federal court alleging losses of $23 million on a series of derivatives trades.321

Similarly, Daiwa Bank’s $1.1 billion loss and Daiwa Trust’s $97 million loss resulting from unauthorized trades can be attributed to grossly inadequate internal controls.322 The Federal Reserve examined Daiwa three times and the FDIC examined Daiwa Trust ten times during the time period when the losses occurred and identified several lapses in internal controls which bank management was instructed to promptly remedy. Unfortunately, federal banking examiners did not follow up to ensure that their instructions had been implemented, and merely accepted assurances from Daiwa and Daiwa Trust management that the internal control problems had been remedied. In testi-

318. GAO II, supra note 30, at *50.
319. Id. at *56-57.
320. Id. at *37. See supra notes 115-136 (discussing Bankers Trust’s dealings with Gibson Greetings, Inc. and Proctor & Gamble Company).
321. See supra note 116 and accompanying text.
322. See supra notes 243-255 and accompanying text.
mony before the United States House of Representatives, Federal Reserve Chairman Alan Greenspan acknowledged that lax oversight by federal examiners had partially contributed to Daiwa’s loss.323

With respect to the seven bank OTC dealers whose trading activities present a potential systemic risk, adequate regulation seems to exist. Such regulation is meaningless, however, if federal examiners are not trained to detect improprieties and ensure that regulated banks have complied with their instructions. Once lax controls have been discovered, it is imperative that they be quickly corrected. The regulatory authority already exists, it simply needs to be exercised.

2. The major securities firm derivatives dealers are largely unregulated but operate under a voluntary framework. The question remains whether such voluntary oversight is a viable alternative to federal regulation.

The SEC regulates securities and firms that trade securities, including broker-dealers, which are required to register with the SEC and comply with requirements for regulatory reporting, minimum capital and periodic regulatory examinations. The CFTC regulates futures and firms that trade futures, including firms, known as Futures Commission Merchants (FCMs), that buy and sell futures contracts as agents for customers. Neither the SEC nor the CFTC directly regulates OTC derivative products or the dealers of such products, unless their trading is conducted through a regulated entity.324

The five securities firms that, under the traditional view, pose potential systemic threats conduct their OTC derivatives dealings outside the entities subject to SEC or CFTC regulation.325 This has led some market observers to conclude that further regulation is needed in this area.326 Nonetheless, both the SEC and CFTC have enacted risk-assessment rules that grant them access to information about the activities of unregulated affiliates of FCMs and registered broker-dealers if those activities pose a material risk to the FCM or broker-dealer.327 More importantly, in March of 1995, the six United States broker-dealer affiliates with the highest OTC derivatives trading volume formed the Derivatives Policy Group (DPG) to provide a self-regulatory framework for voluntary oversight of its members’ unregulated OTC derivatives activities.328 The DPG members include the five securities firms whose trading activities could pose systemic risks. These firms represent over ninety percent of the total United States broker-dealer OTC derivatives trading activity.329

DPG members have agreed to abide by internal control procedures that were developed by the DPG and approved by the CFTC and SEC. Five of the six members also have agreed to provide annual external auditor reports to the SEC and the CFTC.330

324. See GAO II, supra note 30, at *26.
325. Id. at *65. Under the localized view, the derivatives activities of these five securities firms presumably would not be viewed as a systemic threat.
326. See, e.g., id. at *77.
327. Id. at *65.
328. Id. at *41. The Derivatives Policy Group members are: CS First Boston, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley, and Salomon Brothers. GAO II, supra note 30, at *11.
329. Id. at *41.
330. Id. at *11. Although CS First Boston is a DPG member, its OTC derivatives affiliate is regulated by
The agencies will evaluate the firms' compliance with the agreed-upon internal procedures. This information is reported on a confidential basis and is not publicly disclosed. The five reporting firms have also voluntarily provided the CFTC and the SEC with quarterly reports that assess the overall credit quality of their portfolios and include information on net exposure, aggregate net replacement value, and gross replacement value for all counterparties.

Finally, the DPG has agreed on a framework for evaluating risk in relation to capital and agreed to report these estimates to the SEC and the CFTC. The guidelines for capital-at-risk calculations contemplate a two-step process. First, methods are suggested for evaluating market and credit exposures associated with OTC derivatives activity. Second, the framework outlines an approach for evaluating those risks in relation to capital. This estimate is to be generated using the firm's proprietary model. Although the methods adopted for measuring capital-at-risk are similar to those required by bank regulators, the DPG rejected the use of a multiplier to establish minimum capital requirements based on capital-at-risk.

Although most commentators have applauded the DPG as an important step toward protecting the financial system from the derivatives activities of unregulated affiliates of broker-dealers and FCMs, some have still expressed concern that the DPG is voluntary and has been limited to the five reporting firms. As previously mentioned, these five firms control over a ninety percent market share of securities firms dealer activity, which should be sufficient to ensure against systemic dangers. If other firms exist whose derivatives activities pose potential systemic threats, they should be brought within the DPG framework.

As to criticisms of the voluntary nature of the DPG, the SEC and the CFTC have responded that, as of August 1996, all agreed-upon reports had been provided under the guidelines. The SEC and the CFTC have further responded that they believe their oversight of the parent firms and the threat of reputational damage provide sufficient incentive for DPG members to adhere to the framework.

Only time will tell whether voluntary self-monitoring and reporting, coupled with federal oversight of the parent companies and the self-interest of firms in maintaining their reputation, will adequately protect the financial system. There is, of course, always the danger that one or more firms, in an attempt to acquire greater market share or cut transaction costs, will exceed prudent market or credit risk limits, fail to oversee employees properly, or fail to follow the agreed-upon internal controls. This possibility is evidenced by the behavior of Bankers Trust in connection with its leveraged derivatives

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and reports to the Bank of England and therefore does not report information directly to the CFTC or SEC. However, the SEC does receive copies of the reports filed with the Bank of England. *Id.* at *42 n.12.

331. *Id.* at *42.
332. GAO II, *supra* note 30, at *70.
333. *See supra* notes 104-109 and accompanying text.
334. *See GAO II, supra* note 30, at *71. The DPG also adopted minimum standards and procedures to ensure that all models used to estimate capital at risk are comparable. *Id.* at *69-70.
335. *Id.* at *73.
336. *Id.* at *74.
337. *Id.* at *68 n.7.
338. GAO II, *supra* note 30, at *75.
business. Only if it becomes apparent that the voluntary nature of the DPG is impeding effective control of systemic risk should these currently unregulated broker-dealer and FCM affiliates be brought under some mandatory regulatory structure.

3. Because insurance company derivatives dealers are unregulated, federal regulators should seek to determine whether this trading is of sufficient volume to implicate systemic concerns.

The three insurance companies identified by GAO as major derivative dealers are the only insurance companies in the United States that GAO was able to identify as derivatives dealers.339 Although the volume of derivatives trading by insurance companies was much smaller than volumes for either banks or securities firms, it was still very large in absolute dollar amount and increased at a faster rate than the trading volume at either banks or securities firms.340 At least under the traditional view, the derivatives activities at these insurance companies could thus implicate systemic dangers and may, therefore, be a matter of federal concern.

State insurance regulators are responsible for monitoring the financial activities of insurance companies that are both headquartered and licensed to do business in the state. However, most derivatives activities of insurance companies are conducted through unregulated affiliates that are not subject to direct oversight by state insurance regulators.341 These insurance company affiliate dealers are thus subject to neither federal nor state regulation.342

Federal regulators should make efforts to determine whether the derivatives activities of these three insurance company affiliates implicate systemic concerns despite their relatively small volumes of trading as compared to bank and securities firm dealers. If it is determined that insurance company affiliate derivatives activity is of sufficient volume to present systemic dangers, then federal regulation should be extended to cover these three dealers.

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339. Id. at *30.
340. Id. at *80. For example, the total notional amount of derivatives trading reported by the banks was $5.311 trillion in 1990 and $15.809 trillion in 1995. The comparable figures for securities firms and insurance companies were $1.730 trillion and $6.966 trillion, and $193 billion and $985 billion, respectively. Id. at *25, tbl. 1-1.
341. Id. at *76. This is the case with the three insurance companies that are derivatives dealers. Although the parent companies are subject to regulatory oversight by state insurance officials in New York, Delaware, and New Jersey, the state has no authority over the derivatives dealer affiliates. GAO II, supra note 30, at *76.
342. Id. The applicable state insurance regulatory agency does, however, receive audited consolidated financial statements for the parent or holding company that includes information on the activities of the derivatives dealer affiliate. Id.
B. Recommendation 2: Federal regulators should examine whether the current system of market participant regulation adequately protects against systemic risk or imposes excessive costs on OTC derivatives dealers.

The market for exchange-traded derivatives is a regulated market. In other words, the exchanges are subject to regulation by either the CFTC or the SEC, both of which have broad authority to monitor transactions, mandate standardized disclosures, require registration of, and reporting by, market participants, and take enforcement actions for regulatory violations. No such comprehensive framework governs the regulation of OTC derivatives.343

Whereas the exchange-traded derivatives market is a regulated market, the regulation of OTC derivatives is primarily accomplished through the regulation of its market participants. As discussed, the fifteen major OTC derivatives dealers whose trading activities pose potential systemic dangers are regulated either by federal bank regulators, indirectly by the SEC or the CFTC or, to a limited extent, by state insurance authorities. The regulatory approaches of each of these entities differs greatly. The primary mission of bank regulators, for example, is to promote the safety and soundness of the financial system and protect federal deposit insurance funds.344 The SEC's and the CFTC's primary purposes are to protect investors in the public securities and futures markets and to maintain fair and orderly markets.345 The primary goal of state insurance regulators is to protect policy holders. It has been argued that the major weakness in such market participant regulation is that it is not effective in preventing systemic crises: without a coordinated, comprehensive regulatory system, no regulator has primary responsibility for ensuring the well-being of the OTC derivatives market as a whole.346 Federal regulators need to explore whether the current system of market participant regulation adequately protects the financial system from systemic risk. At the very least, some type of regulatory coordination among the various agencies that share responsibility for the regulation of the major derivatives dealers may be in order.

Another potential disadvantage of a participant-based regulatory structure is the complexity and expense which often result from overlapping regulations. For example, in one series of OTC derivatives transactions between Bankers Trust and Gibson Greeting Cards, the SEC, the CFTC and the Federal Reserve each asserted jurisdiction over the transaction and took regulatory action against the dealer, Bankers Trust.347 Such

343. See Hearing, supra note 20, at 17.
344. GAO II, supra note 30, at *26.
345. Id. at *26-27.
346. See Hearing, supra note 20, at 18 (comparing the regulation of the OTC and exchange-traded markets). But see Macey, supra note 9, at 91 (arguing that consolidation of regulatory authority in a single regulator increases, rather than decreases, systemic risk).
duplicative regulation is costly, confusing, and unnecessary. Federal regulators should question whether the current regulatory structure could be streamlined to benefit dealers while maintaining adequate oversight.\(^{348}\)

**C. Recommendation 3: Federal regulation of end-users and dealers whose activities pose no systemic risk should be limited to ensuring adequate disclosure of market, credit and operational risk exposures.**

The case studies presented in Part IV indicate that many end-users are not adequately controlling risk and have accordingly suffered large losses.\(^{349}\) This has led some market observers to recommend that the SEC require all 1934 Act reporting companies that are major dealers or end-users of derivatives to establish audit committees and publicly report on internal controls, which would include reports on derivatives risk-management systems. The SEC, citing the increased costs of such a requirement, has rejected these suggestions, choosing instead to focus on expanding the accounting and disclosure requirements with regard to the market risk of derivatives activities.\(^{350}\) The SEC has also rebuffed recommendations that it issue guidelines for directors on oversight of derivatives activities, noting that such action would constitute an unprecedented involvement in corporate governance, which is properly a subject of state law.\(^{351}\)

On January 28, 1997, the SEC adopted final rules requiring registrants to disclose both quantitative and qualitative information about their market risk exposures from derivatives and other financial instruments, as well as expanded disclosures regarding accounting policies for derivatives.\(^{352}\) The accounting policy disclosures are required

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348. Proposals for the establishment of a single regulatory body to oversee the derivatives and securities markets have been considered and rejected. For example, the Conference Report on the Futures Trading Practices Act of 1992 requested that the CFTC study "whether a single Federal regulatory agency should regulate the exchange or off-exchange trading of, and markets for, futures, options, swaps, derivative products and securities." H.R. REP. NO. 102-978, at 83 (1992). Furthermore, a House bill that would effect a merger of the SEC and FTC was introduced. H.R. 2550, 103d Cong. (1993). The CFTC has been adamantly opposed to this idea. In addition, some market observers have suggested a complete overhaul of the current regulatory system which would include revisions to existing securities and banking regulatory structures. CFTC, *supra* note 11, at 157.

349. This anecdotal evidence is supported by several surveys and studies which indicate that many end-users and smaller derivatives dealers do not have effective internal controls in place to protect adequately against risk of loss from OTC derivatives activities. For example, a survey conducted by Ernst & Young LLP indicated that although boards of directors and senior management at 96% of the responding companies had established policies to monitor and control derivatives activity, only a few boards of directors had a representative familiar with complex financial instruments or risk management. GAO II, *supra* note 30, at *45. Similarly, a study by the Wharton School at the University of Pennsylvania indicated that fewer than half the United States non-financial firms surveyed regularly reported to their boards of directors on derivatives use and that about one-fourth did not have a documented policy on derivatives. *Id.* Other studies, however, have revealed contrary results. See, e.g., GAO II, *supra* note 30, at *44 (citing GROUP OF THIRTY, DERIVATIVES: PRACTICES AND PRINCIPALS, FOLLOW-UP SURVEYS OF INDUSTRY PRACTICE (1994)).


351. *Id.* at *47-48. (expressing concern with the potential director liability that could result from noncompliance with such guidelines).

by new paragraph (n) of Rule 4-08 of Regulation S-X.353 The market risk disclosure requirements are contained in new Item 305 of Regulation S-K and require disclosure of the mandated market risk information whenever: (1) the fair values of market risk sensitive instruments outstanding as of the end of the latest fiscal year are material,354 or (2) the potential near-term losses in future earnings, fair values or cash flows of market risk sensitive instruments from reasonably possible near-term market movements are material.355

Registrants may furnish the required quantitative information through either: (1) the tabular presentation of fair values and contract terms sufficient to determine future cash flows; (2) sensitivity analyses showing potential losses based on hypothetical changes in market rates and prices; or (3) value at risk disclosures.356 The qualitative disclosure provisions require registrants to describe, to the extent material, their primary risk exposures, including a discussion of how they manage those exposures.357

The SEC is correct in directing its regulatory focus toward more accurate disclosure of the potential risks of derivative products. Unless a market participant's OTC derivative trading activities are significant enough to implicate systemic concerns, the only federal interest lies in protecting investor confidence in the public markets. In the case of derivatives usage, this federal interest is best served through proper disclosure of risk exposures so a market participant's potential investors are not subjected to unknown (and perhaps undesired) risks. However, the SEC should also consider including credit and operational risk exposures in its derivatives disclosure requirements.358

353. 62 Fed. Reg. at 6047 (codified at 17 C.F.R. pt. 210.4-.08). The SEC has indicated that it will review Rule 4-08(n) and recommend any necessary amendments to accord that rule with the new Financial Accounting Standards Board (FASB) accounting standards when the FASB's derivatives accounting project is complete. See infra notes 361-364 (discussing FASB proposals).

354. The term "market risk sensitive instruments" includes traditional derivatives, such as futures, forwards, options and swaps, and other financial instruments such as loans, structured notes, mortgage-backed securities, and deposits. Id. at 6048.

355. Id. at 6049. "Near-term" includes the period up to one year from the date of the financial statements. In making this determination, registrants should consider, among other things, the magnitude of (1) past market movements, (2) reasonably possible near-term market movements, and (3) potential losses that could arise from leverage, option, and multiplier features. Id. at 6052.

356. 62 Fed. Reg. at 6048. With respect to the sensitivity analyses and value-at-risk options, the registrant must also describe the model, assumptions and parameters used. Those registrants that present a sensitivity analysis should use hypothetical changes that are not less than 10% of the end-of-period market rates or prices. Those registrants that employ value-at-risk disclosures should use a confidence level of 95% or higher. Id. at 6049.

357. Id. at 6051. The release defines primary market risk exposures to include "interest rate risk, foreign currency exchange rate risk, commodity price risk and other relevant market rate or price risks . . . [and directs the registrant to disclose] within each of these categories, the particular markets that present the primary risks of loss to the registrant." Id. at 6051 n.58.

358. Credit risk exposures could be disclosed without revealing the identity of counterparties by, for example, disclosing the percentage of credit exposure to individual counterparties or types of counterparties, as well as information on the current and potential credit risk of the portfolio as a whole. Operational risk exposures could best be evaluated by investors through a description of relevant internal controls and audit pro-
D. Recommendation 4: Federal regulators should seek to improve accounting standards to provide for accurate disclosure of OTC derivatives exposures.

Accurate disclosure of OTC derivatives exposures not only protects investor confidence in the public markets by informing investors in individual market participants of the potential risks of an investment in that participant, but also assists federal regulators and leads to a more fully-informed and transparent market. Studies have noted that the lack of transparency in the balance sheets of firms engaged in OTC derivative transactions makes it more difficult to assess the distribution of risk in the market and creates the potential for financial statement manipulation by counterparties. Some regulators have concluded that the lack of useful accounting standards for derivatives transactions has reduced the transparency, not only of individual firm exposures, but of the financial system as a whole. The lack of transparency of individual market participants’ balance sheets may, especially during periods of market turbulence, exacerbate the strains on the financial markets and on individual firms, as the lack of information may cause parties to refuse to contract with individual firms. Such lack of information similarly may impede regulatory efforts to minimize the impact of market disturbances on regulated firms.

The SEC has found that at least three different accounting methods are currently being used to account for derivatives on end-user’s balance sheets—fair value accounting, deferral (or hedge) accounting, and accrual (or settlement) accounting—and that no definitive criteria exist to determine the proper accounting method for any individual derivatives transaction. FASB began an effort four years ago to improve accounting standards for derivatives transactions and in June 1996 issued a proposed accounting standard for derivatives, “Accounting for Derivative and Similar Financial Instruments and for Hedging Activities.” However, the proposal faces strong opposition from market participants, many of whom are already seeking ways to avoid application of the new standards. Derivatives dealers in particular have lobbied fiercely against the proposal, arguing that the rules are already “chilling” the demand for OTC derivatives.

359. CFTC, supra note 11, at 117.
360. Id. at 117-18.
361. Securities Act Release Nos. 33-7386, 34-38223, 62 Fed. Reg. 6044, 6047 (Feb. 10, 1997). The use of deferral accounting is particularly problematic because it does not require that gains and losses from derivatives transactions be included in income as they occur. GAO II, supra note 30, at *83. Deferral accounting treatment may be appropriate for derivatives engaged in for hedging purposes because, if the hedge operates effectively, “the income statement effects of the derivative and the hedged item would theoretically offset each other.” Id. at *82. However, determining which transactions properly qualify for hedge accounting treatment is difficult and is exacerbated by the lack of up-to-date guidelines. Id.
363. McGee and MacDonald, supra note 362, at C1.
364. Id. Congressional Hearings concerning the FASB proposal were held in October of 1997. Elizabeth MacDonald, Business Opposition to Derivatives Rules Proposal by FASB Appears to Weaken, WALL ST. J., Sept. 30, 1997, at C19. Although business opposition to the proposed rules appeared to be weakening, several issues remained unresolved. Id. As of this writing, final standards had not yet been issued.
E. Recommendation 5: United States regulators must continue to work with regulators abroad to encourage international cooperation in overseeing the OTC derivatives market.

Because the OTC derivatives market is global in nature, it closely links United States and foreign markets. A disruption outside the United States could, therefore, have drastic and far-ranging effects in this country. The GAO’s 1996 study reviewed the regulatory structure of seven countries (Australia, France, Germany, Japan, Singapore, Switzerland, and the United Kingdom) and found that major OTC derivatives dealers were regulated in each country. As in the United States, however, the level of oversight in many countries depends on the nature of the market participant. Furthermore, reporting requirements differ between countries.365

There has already been great progress in the area of international cooperation and harmonization of derivatives oversight. For example, United States and foreign bank regulators, working primarily through the Basle Committee on Banking Supervision, have issued worldwide guidelines for sound risk management of derivatives activities.366 The SEC and the CFTC have, through the International Organization of Securities Commissioners (IOSCO), worked closely with regulators abroad to improve international regulatory coordination in the derivatives markets.367 Furthermore, the Barings collapse focused international attention on systemic risk and resulted in the Windsor Declaration, which called for greater international regulatory coordination and communication. Finally, on March 15, 1996, forty-nine exchanges and clearinghouse organizations signed a multilateral information sharing agreement, while fourteen regulatory agencies signed a separate companion agreement.368

Although these agreements represent important steps toward controlling systemic risk, they are not always legally binding and have not been adopted by all regulators.369 In addition, most coordination among regulators still occurs informally, and the lack of cooperation evidenced by Japanese regulators in the Daiwa incident highlights the dangers of this limitation. Although the Barings incident raised international awareness of systemic risk and encouraged efforts to improve regulatory coordination and information sharing, regulators from some countries (most notably Switzerland and Japan) were unable legally to sign the resulting information-sharing agreements. Furthermore, confidentiality concerns and the limited availability of information on some exchanges (primarily because of inadequate controls) may limit the effectiveness of

365. See GAO II, supra note 30, at *104.
366. Id. at *14. The Basle Committee on Banking Supervision was established by the Central Bank Governors of the Group of Ten in 1975 and is made up of bank supervisory authorities from participating countries. The Group of Ten consists of eleven major industrialized nations: Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United States, and the United Kingdom. Id. at *7-8 n.6.
368. See id. at *118-20. Signatories to the two agreements agreed to share information regarding member firms' exposures to unusual risks. A primary objective of the agreement is to reduce systemic risk by enabling regulators to better monitor market participants' exposures across multiple markets. GAO II, supra note 30, at *119-20.
369. Id. at *113.
these agreements. Finally, to the extent that information-sharing agreements collect risk exposure information only from exchanges, such agreements are of limited benefit in reducing systemic risk in the OTC derivatives market.

VI. CONCLUSION

The large volume and rapid growth of derivatives activity indicates that derivatives are valuable, and perhaps vital, risk management tools in today's global business environment. Nonetheless, as with any new market innovation, a period of growing pains is to be expected as market participants learn from their mistakes and adapt risk management practices accordingly. In the OTC derivatives market, the early 1990s must surely be viewed as that period. The large losses experienced by derivatives investors during recent years, although painful for some, performed a valuable function for the industry as a whole by serving as a wake-up call to market participants and federal regulators who may have assumed that current industry practices and regulations were sufficient to protect against such disasters.

Perhaps in retrospect commentators will look back on these years, and particularly on 1994, as the turning point at which OTC derivatives developed from a fast-growing, volatile and risky playing field to a truly mature market which, although less transparent and liquid than the exchange-traded derivatives market, remains a valuable option for participants who desire customized risk management tools. Although the advantages of the OTC market are attractive, the dangers demand extra caution, discipline, and awareness on the part of market participants. Perhaps the most important function served by the large derivatives losses of the 1990s will prove to be one of self-elimination as some investors recognize that they are not yet ready to handle the self-monitoring required by the OTC market, and choose instead to remain in the more regulated, liquid, and price-transparent exchange-traded market.

370. *Id.* at *112-13.