



**60th Anniversary Collector's Edition**  
**OUR CALL TO ARMS: The Attack on Pearl Harbor**  
**First-Run Commemorative Edition**



**Taking you  
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TIME Domestic

April 11, 1994 Volume 143, No. 15

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## COVER STORIES

# WHAT'S GOING DOWN It's perverse: the better the economic news, the more the markets dive. How long can the little guys keep their cool?

**BY GEORGE J. CHURCH - Reported by John F. Dickerson and Jane Van Tassel/New York, Suneel Ratan/Washington and Leslie Whittaker/Chicago**

Damn! The economy is strong. Production, sales, incomes are up. More people are finding jobs. Damn! Nobody on Wall Street would use those exact words; they sound too hardhearted. But the essential thought is voiced by many analysts trying to explain last week's sudden bust in the stock and bond markets (which is no easy job). In extenso, their reasoning goes like this: a strong economy threatens a revival of inflation, at least in the minds of the governors of the Federal Reserve Board. It also means higher interest rates: automatically, because of rising loan demand from business and consumers, but even more because the Federal Reserve is actively pushing up rates to ward off the not-yet-visible inflation. Rising interest rates by definition mean lower bond prices. And falling bond prices pull down stock prices too. "The economy is doing well, and the market is doing terribly," sums up Byron Wein, chief U.S. market strategist for the investment firm Morgan Stanley.

Even on Wall Street, that sounds like twisted logic to some. "The rational reasons for the sell-off ((inflation worries and interest rates)) in my mind just barely border on the rational," says Stephen Quickel, editor of U.S. Investment Report, a biweekly newsletter. Michael Metz, chief investment strategist for Oppenheimer & Co., concurs: "Financial markets have a world of their own and motivations of their own."

If such experts as these are puzzled, what are new investors to make of the tailspin? That question worries market professionals more than almost anything else. Since the 1987 crash gave way to a new boom, millions of investors have put a few thousand dollars each into the market, mostly by way of mutual funds. The great majority are getting their first bitter taste of a down market. If they panic and sell out, they could turn a downward spiral into a genuine crash.

So far, the so-called little guys have kept their cool. Rationally enough, most have stopped putting new money into stock or bond purchases, but few are rushing to sell. "I've done nothing," says Don Halbert, 41, a project leader and biologist with Abbott Labs in suburban Chicago. "I had a couple of stocks that were doing so well that at the beginning of last week I decided it was time to sell them. But then the market started to die, so I'm hanging on to everything," at least until prices recover a bit. After 2 1/2 years in the market, Aimee Swenby, 31, an executive assistant at a financial planning firm, and her husband John, 37, have sold, on the advice of a planner who told them to cash in some of their gains, 25% of the \$20,000 worth of mutual-fund shares they had accumulated. They intend to hold the rest. Says Aimee: "I have confidence the market will come back."

But can small investors stay calm if they have to endure more weeks as nerve-racking as the past two? In the five trading days between Thursday, March 24, and Wednesday, March 30, the Dow Jones industrial average fell almost 243 points, or more than 6%. Rallies interrupted the downfall only briefly; on some days prices dropped sickeningly in a matter of minutes, as computers at some big investment houses reacted to preprogrammed signals and sold huge masses of stocks. On Thursday, just before stock trading was suspended for Good Friday, the Dow average of 30 blue chips finally squeezed out a 9.21-point gain - but that was misleading; in the broader market many more stocks fell than rose. Moreover, the roller-coaster ride - up 20 points, down 72, then back up, then down -

was the wildest yet. On a normal day the Dow average may fluctuate 40 to 50 points; Thursday the swings added up to 380 points.

Can such dizzying gyrations be explained solely by worries about inflation and interest rates? No; analysts also emphasize two factors internal to the markets. To begin with, stock and bond prices by late January may well have been bid up higher than any financial logic would justify, largely by money seeking a higher return than was available on other investments. Thus prices were exceptionally vulnerable to even such a mild blow as the Federal Reserve administered on Feb. 4 when it raised a key short-term interest rate a quarter-point (the Fed added another quarter-point boost on March 22).

Once the slide began, it was aggravated by the operations of complex new investment vehicles called derivatives, a parallel world of side bets designed to hedge against the fluctuations in various markets. These derivatives can be enormously profitable, but they can also make trading even more volatile (see following story). Last week in the bond market, for instance, the managers of big hedge funds, which use derivatives to speculate, were caught in a vise. They had bought bonds heavily with borrowed money, betting that the prices would stay high. When prices dropped instead, reducing the collateral value of the bonds, the traders were forced to dump their holdings for whatever they could get to raise cash to pay off the loans. Their selling "just opened a black hole under the bond market," says Charles Clough, chief investment strategist for Merrill Lynch.

Whether analysts put more emphasis on inflation and interest rates or on internal market factors, however, they agree that the market crack does not point to any weakness in the "real," goods-and-services economy; it may even be a perverse sign of strength. That is also Bill Clinton's view. On Thursday, when the Dow average closed about 9% below its Jan. 31 peak of 3978, the President asserted that "the underlying American economy . . . is healthy and it is sound." The "skittishness" in the financial markets should not alarm anybody, he insisted: "Every single report I have ((points to)) very solid economic growth."

A President who takes that line always risks sounding like Herbert Hoover in 1929. But Clinton has the numbers on his side. In March more Americans found jobs than in any other month in more than six years. Nonfarm employment grew by 456,000, the biggest rise since October 1987. Though the unemployment rate paradoxically remained at 6.5%, some government analysts hailed the report as indicating that the era of what has been called "jobless recovery" is coming to an end.

Other indicators are also strong. Personal income rose 1.3% in February, its largest increase since April 1993. Consumer spending, which accounts for two-thirds of all U.S. economic activity, went up 1%; it has advanced 11 months in a row. There are a few negative signs as well: slight declines in factory orders and construction spending. And nobody expects output of goods and services to grow at anything like the gangbusters annual rate of 7% achieved at the end of 1993; that was just too fast to be sustained. But Laura D'Andrea Tyson, chairman of the Council of Economic Advisers, says the latest statistics "paint a picture of a moderate, sustainable recovery" - one that is likely to lift production about 3% this year and create 2 million new jobs. Some other analysts think that pace will at last bring the unemployment rate below 6% by year's end.

Such predictions, however, are not at all what many Wall Street traders want to hear. The markets for some time have been treating every bit of good economic news like a tiding of disaster, because it seems to foretell more inflationary pressure and a further rise in interest rates. When the employment figures were announced last Friday, the bond market was open and gave the cheerful news dismal reception. Prices, which had begun to rally the day before, dropped sharply: 30-year Treasury bonds lost \$19.38 for each \$1,000 of face value, and the interest yield rose to 7.28%, the highest since January 1993. David Hale, chief economist for Kemper Financial Companies, had been expecting stock prices to begin rebounding this week but abruptly changed his mind after reading the employment figures.

There is no consensus on how much further the downturn may go. Instead, a lively debate is going on between those who think that the stock-market drop is a classic "correction" - meaning stock prices go down around 10%, in which case the decline would now be almost over - and others who believe Wall Street is in the first stages of a true bear market. In that case, the decline would not be even half finished; a bear market usually means stock prices plummet 20% or more.

There is no controversy, though, over what - and who - started the spin; it began as soon as Federal Reserve chairman Alan Greenspan began raising interest rates. A hot dispute still rages as to whether there is really enough of a threat of inflation to justify his course. The argument in favor is that the economy is fast approaching two guideposts. If U.S. factories operate at more than 85% of capacity, this theory holds, and the unemployment rate drops below 6.2%, shortages of goods and labor start to push up prices rapidly. The economy is not there yet - but at an operating rate of 84% and an unemployment rate of 6.5%, it is no longer far away. The time of arrival is debatable, but David Wyss, economist at DRI/McGraw-Hill, a major economic forecasting firm, believes there is good reason to fear rising inflation "a year, year and a half away, and so now is the time when the Fed has to start tightening."

The opposite view is that the old rules of thumb are no longer valid. The U.S. is much more a part of the world economy now, and there is ample unused production capacity overseas. Any shortages can be filled not by pushing the operating rate of American factories to high-cost levels or bidding up the wages of scarce labor but simply by buying from abroad. At home labor costs per unit of output are going down, a consequence of rising productivity, and falling oil prices are putting another damper on inflation. In fact, consumer prices in the past three months have risen at the extremely low annual rate of 1.9%. No one thinks that can last. But one Clinton economic adviser sees excellent chances for a year of "double threes" - production and prices both rising a comfortable 3% this year.

In any case, rightly or wrongly, the Fed did start raising interest rates - and what Greenspan may have intended to be a warning shot across the bow of speculators, as one analyst puts it, sounded to many investors and traders like the crack of doom. Metz of Oppenheimer explains some reasons: the Fed had previously been driving interest rates so far down that savers were getting as little as 3% on CDs - effectively zero, when matched against the rate of inflation. To get even a chance for a real return, "they were forced into the stock and bond markets." Not just little investors, either: banks and hedge funds became "enormous buyers of bonds" because they could borrow at 3% and buy bonds yielding 6%, making a big profit immediately and expecting it to become even bigger as prices rose also. The Fed's move reversed all the calculations: stock and bond prices that looked reasonable, if high, at January's level of interest rates seemed way out of line at whatever one guessed might be the new level the Fed was aiming for.

As always in the financial markets, however, rational calculation was only part of the story. A cascade effect quickly began. Some Japanese investors are said to have dumped U.S. Treasury bonds they were holding when interest rates began going up, accelerating the price decline. That aggravated the squeeze on hedge funds, which dumped heavily. And some money managers seem to have panicked, fearing that the Fed's move must mean the threat of inflation was far greater and more imminent than they had realized - so better sell, sell, sell.

What happens next depends partly on what small investors do, how many speculative bond and stock holdings financed by borrowed money still have to be unwound - and also, of course, on what the Fed does. One guess is that Greenspan may push rates up another half to three-quarters of a point but let it go at that. If so, the economy may slow somewhat, particularly as higher interest rates translate into more expensive mortgage, car-purchase and credit-card loans. Tyson, however, thinks any such effect would only balance forces that may be working for a faster expansion, keeping growth at the overall desired, moderate, low-inflationary 3% - at least for the rest of the year. That of course is the optimistic scenario. The pessimistic one? Well, there is an old joke about the store owner who was miffed that no one would ask him, "How's business?" - but when he finally did prompt someone to raise that question, clapped his hand to his head and moaned, "Don't ask."

(chart)NOT AVAILABLE CREDIT: Sources: Datastream, the Conference board, Blue Chip Economic Indicators CAPTION: Dow Jones industrials weekly closings

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# COVER STORIES

## HOW THE BIG GAME BEGAN

BY JOHN ROTHCHILD

THIS BUSINESS OF DERIVATIVES CAN BE TRACED BACK TO CHICAGO, the old hog butcher for the world and stacker of wheat. Chicago learned it could make an easier living by selling pretend wheat and pretend hogs in the pits of the commodities exchanges. These imaginary creatures are called "futures." The point was you could buy a hog future and turn a nice profit before the real hog ever showed up. Or, if you were Hillary Rodham Clinton, you could make 100 times your money on cattle futures without ever having to put up with a cow.

Having taken the bother out of farming and changed it into high finance, Chicago then turned its attention to high finance itself, introducing futures and options so that investors could buy and sell pretend baskets of stocks. These baskets were a big hit among professional fund managers, who used the pretend stocks to hedge their positions whenever they were afraid they owned too many real stocks.

The whole shebang spread to New York City, where banks and brokerage firms hired roomfuls of geniuses and paid them handsome salaries to develop new lines of imaginary products. The geniuses stared up at the ceilings and came down with derivatives, some of which they called ELKS (equity-linked securities), YEELDS (yield-enhanced equity-linked securities) and CHIPS (common-linked higher-income participation securities), as well as LYONS, TIGRS and CMOs. A decade ago, if you wanted to work on Wall Street, you went to business school; but now you can study genetics and end up at Merrill Lynch, where instead of splitting genes to clone an elk, you can graft a share of Snapple (which doesn't pay a dividend) onto a dividend, thus creating the Snapple ELK - a dividend-paying fictitious concoction that rises and falls in value along with Snapple itself.

The makers of derivatives like to say their products are used mostly by people who are trying to reduce risk in the market, but they also provide exciting betting opportunities for billion-dollar gamblers who are too big for Vegas. The potential payoffs are so huge that if the word gets out to the crowd at the track and the casinos, they'll give up horses and blackjack for oil straddles and currency swaps.

If you have a home mortgage, you can be involved in derivatives already without even knowing it. These days there's a good chance yours won't be kept in one piece by the banks that lent you the money. Instead, many mortgages are shipped off and bundled into packages called mortgage-backed securities, which in turn can become raw material for other derivatives such as REMICs (real estate mortgage-investment conduits).

It's possible that your mortgage has been chopped in half - with the principal portion sold off and bundled up into a P/O, which stands for "principal only," and the I/O, "interest only," going another way. Bond funds use I/O derivatives to add yield to their portfolios and make aggressive bets on the direction of interest rates.

Two trillion dollars in mortgages is now bound up in mortgage-backed securities, up from zero two decades ago. All told, there's a huge speculative overlay on stocks, bonds, mortgages, corn, hogs, etc., owned by regular people in the real world, which the derivative people refer to as "the underlying." These abstract concoctions are floating over the real world of stocks, bonds, corn and hogs in the same way that the island of Laputa, that fanciful domain of theorizers and stargazers, floated over real towns and villages in Gulliver's Travels.

It's not the first time in American history that so much is riding on so little. In the 1920s there were investment pools and trusts. In the

investment trusts, a series of shell companies was piled on top of a real company, most often a dividend-paying utility. Each shell company offered a dividend that was dependent on its receiving the dividend from below. The price of each shell company's stock reached such lofty heights that the value of the original company below was lost sight of, and eventually the investment trusts came crashing down.

Two of the most celebrated operators were Samuel Insull and Ivar Krueger, a.k.a. the Swedish "Match King," both of whose faces appeared on the cover of this very magazine. Insull erected a Rube Goldberg-like structure of 65 companies that operated utilities in 32 states, and by 1932 it had completely collapsed in a \$750 million loss for investors. Krueger's ventures came to a similar end, and the Match King snuffed himself out.

How can the average investor in stocks and bonds down here in the underlying protect himself or herself if more of these shenanigans lead to a general calamity? One way is to avoid owning shares in companies that are the biggest players in derivatives. This would include several large banks, such as Chemical, Bankers Trust, Citicorp, J.P. Morgan and Chase Manhattan. Lately the banks have reported excellent earnings, helped along by a recent winning streak. But what happens if the banks get on a losing streak?

If and when another correction rattles the stock market, possibly aggravated by speculations from above, we inhabitants of the underlying have to remind ourselves that we own real shares in real companies with real earnings and real value, which will survive and prosper as long as our financial system survives. All the side bets Wall Street wants to make won't determine the ultimate outcome of the game.

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# THE SECRET MONEY MACHINE Seven years after the crash, Wall Street has become a cyberwonderland that could be riskier than ever

**BY JOHN GREENWALD - Reported by Massimo Calabresi, Thomas McCarroll, Sribala Subramanian, Jane Van Tassel/New York and William McWhirter/Chicago**

**AN OLD POKER JOKE GOES LIKE THIS:** If you look around the table and you can't spot the sucker, the sucker is probably you.

Looking around for places to invest their money, Americans in recent years have taken their seats at Wall Street's big casino as never before. Fewer than seven years after the crash, 61% of small investors' money is riding on publicly traded securities, up from a 46% share in 1987. More than \$1.3 trillion has flowed into mutual funds since the 1990s began, bringing the total to \$2 trillion.

Americans have had lots of good, sensible reasons for doing this. The economy finally seems robust, growing a vigorous 7% in the fourth quarter of last year. Corporations ranging from Sears to the papermaker Pentair, Inc. had record profits last year. Low interest rates have made bank accounts less attractive, and real estate is no longer for those looking to get rich quick. Even after last week's turbulent retreat, the Dow Jones industrial average closed at 3636, 53.7% higher than in October 1990.

So to those gamblers nervously tracking the Dow last week: Don't fret too much; this could be a natural correction. The more unsettling news is happening off the casino floor. For it is there, in the back room, that the big boys have been playing an even faster and bolder game, the outcome of which can affect the little guy's winnings. Much of the smart money is really riding on computer-generated, hypersophisticated financial instruments that use the public's massive bet on securities to create a parallel universe of side bets and speculative mutations so vast that the underlying \$14 trillion involved is more than three times the total value of all stocks traded on the New York Stock Exchange in a month and twice the size of the nation's gross domestic product. Collectively, these new financial instruments are called derivatives. Financially, they function like some giant unseen asteroid - they influence the markets' movements with a powerful and dimly understood gravitational pull. And if they wobble out of orbit, they could conceivably come crashing into the sphere of day-to-day investments with cataclysmic effects.

Derivatives, which are based on such real assets as stocks and bonds, work like most professional betting games. They have a zero-sum outcome, always producing a winner and a loser. The bettors put up their money, and the people who run the casino - a bank, a brokerage house or an insurance company - figure out ways to pass on the risks. Companies use derivatives to hedge against changes in interest rates, foreign-exchange rates and commodities prices. Mutual funds and pension funds use them to protect their stock and bond investments. Major banks, brokerage firms and insurance companies write them for customers, inventing such exotic names as forwards, caps, collars, swaps, options and swaptions. Derivatives can be as straightforward as options to buy or sell securities or as fancy as unregulated and customized agreements to purchase oil futures in Nigeria while selling dollars in Indonesia and graphite in Madagascar.

They can also be dangerous, and that is their paradox. For while they were created to diminish risk, they can introduce more because of the sheer volume of money that rides on them. These side bets pull with them a real world of securities worth 30 times their value. Experts worried about the perils of such instruments have no trouble coming up with bleak scenarios. For instance, a utility company,

trying to protect itself from an expected rise in oil prices, borrows lots of money to buy a derivative contract that will enable the firm to purchase oil in three months at current prices. But the price of oil goes down unexpectedly, and the utility is stuck with a commitment to buy oil at the higher price. That results in a big loss because the company not only has to pay more for oil than its competitors but also loses much of the money it borrowed to place the bet in the first place. The utility's stock plunges, leaving investors high and dry.

Even worse is a scenario in which one institution's troubles spread through the system. While that nightmare may be less likely than the first, it is the one that most experts are concerned about. Example: a major U.S. bank that deals in derivatives thinks it has covered all its bets around the world. But an unforeseen event, such as an earthquake in Tokyo or a coup in Latin America, sends markets crashing in some area. The bank's finely tuned hedging strategy is thrown off balance, and it has no choice but to default on its contracts. A whole chain of interlocking obligations snaps, setting off a series of uncontrollable defaults that shake the world financial system. The remaining stock markets plunge, companies go bankrupt, and lots of people lose their jobs.

What inspires such worst-case speculation is the unprecedented size of the derivatives balloon. Its growth has prompted some Wall Street sages to warn that many of the newfangled instruments could be spinning far beyond anyone's control. The Jeremiahs include investment banker Felix Rohatyn, 65, one of Wall Street's elder statesmen, whose son Nicolas, 33, runs a J.P. Morgan department that uses derivatives to transact business in emerging markets in Asia, Eastern Europe and Latin America. "There's a whole different world in off-balance-sheet transactions that are potentially quite dangerous if people don't know what they're doing and a chain of financial commitments breaks down," says the elder Rohatyn. "These are interlocking commitments of trillions of dollars. As long as they remain solid and stable, everything is fine. But what do you do if something goes wrong?"

The danger of derivatives is compounded by the fact that this fantastic system of side bets is not based on old-fashioned human hunches but on calculations designed and monitored by computer wizards using abstruse mathematical formulas that even their bosses at major trading houses do not really understand. "None of us really knows what the implications are, because nothing like this has ever happened before," concedes financial-market analyst Lowell Bryan, a partner in the consulting firm McKinsey & Co. Concurr a senior partner in a financial firm that is heavily invested in the derivatives market: "Whenever we get a new product and it's working and hasn't been tested, Wall Street won't ever try it for just \$5 billion or \$10 billion. It's got to go for \$20 billion, \$50 billion or \$100 billion without knowing what will happen under certain market circumstances. They have the numbers, but they don't have either the judgment or the experience to understand them."

This latticework of contracts may seem isolated in a kind of financial cyberspace, but it produces real victims. In Japan the accounting director of Nippon Steel Chemical leaped to his death beneath a train last May after he lost \$128 million of the company's money by using derivatives to play the foreign-exchange market. In Chile a derivatives trader named Juan Pablo Davila lost \$207 million of taxpayers' money last fall, instantly earning himself a place in Chilean infamy, by speculating in copper futures for the state-owned mining company. In Germany the giant conglomerate Metallgesellschaft dwarfed even those losses when it dropped \$1.3 billion last year by betting the wrong way on oil-futures contracts. Only a last-minute bailout by the company's banks saved it from bankruptcy.

Derivatives have clearly heightened the anxiety in stock, bond and currency markets around the world in the weeks since the U.S. Federal Reserve began raising interest rates for the first time in five years. The Fed's move on Feb. 4 led the aggressive speculators who run high-rolling investment vehicles called hedge funds, which use derivatives in daily trading, to dump billions of dollars' worth of bond futures and thereby drive down the prices of the underlying bonds. The worst fallout occurred in Europe, where bond prices plunged and interest rates, which move in the opposite direction of prices, climbed about one full percentage point. The biggest loser amid the global turmoil was legendary Wall Street investor Michael Steinhardt, who as of last week has lost \$1 billion since the beginning of the year, or a quarter of the funds under his management. Another big-name investor, George Soros, got caught in the February mayhem, which people inside his Quantum hedge fund called the "St. Valentine's Day Massacre." Soros lost \$600 million on Feb. 14 by wrongly betting that the U.S. dollar would rise against the yen. (Don't cry for Soros, though. He reportedly earned \$650 million in 1992 and at least as much last year, eclipsing Michael Milken's 1987 record of \$550 million.)

The turmoil in the bond derivative market, which has persisted since February, has troubled Wall Street watchers because it bears some of the hallmarks of the 1987 stock-market crash. That 508-point plunge on Black Monday was worsened by so-called portfolio insurance, which is computerized programs designed to bail investors out of stocks in a downturn by selling stock futures. But few buyers were willing to come forward while so many others rushed for the exits, and the decline accelerated instead of slowing down.

Such a scenario is what prompted the New York Stock Exchange in 1988 to add circuit breakers that temporarily halt automated transactions when the Dow Jones average rises or falls more than 50 points in a day. But even if the mechanisms work temporarily, some experts caution that all the computerized derivatives and other vehicles that Wall Street has developed since the Crash of '87 could keep shell-shocked buyers from returning to the market, out of fear of a new wave of selling. "A circuit breaker shuts off the overload," says Bruce Greenwald, a finance professor at the Columbia Business School and a staff member of the Brady Commission, which studied the Crash of '87. "But it doesn't come with an 'on' switch that can bring back buyers."

That's partly why U.S. lawmakers and regulators are stepping up their vigilance. Astonishingly, institutions like banks, insurance companies and brokerage houses now hold trillions of dollars of unregulated derivatives contracts that are not recorded on their books. Thus no one, including the firms themselves, knows just what pressures may be building up. In an effort to remedy that, Congressman

James Leach of Iowa, the ranking Republican on the House Banking Committee, sponsored a bill last January to create a federal derivatives commission with broad oversight authority. And the Comptroller of the Currency has begun to require banks to disclose the dollar value of all the derivatives contracts they hold that have gone sour, much as they must list the total dollar volume of their bad loans.

Regulators have had two good excuses recently to push their oversight of derivatives. Typically, derivatives contracts make up anywhere from 2% to 10% of the assets of the mutual funds that hold them. But the managers of a \$385 million government-bond fund called Hyperion 1999 Term Trust got carried away last fall. The trust put nearly one-third of its money into derivatives contracts that amounted to bets that interest rates would not drop anytime soon. When they did drop, the value of the trust's shares plunged about 25%. Just last week, a group of investment funds run by David Askin of Askin Capital Management was forced to liquidate its portfolio - reportedly worth about \$500 million - after playing a similar game. The funds speculated on the price difference between two different sets of mortgage-backed securities. When interest rates rose quickly, the speculative scheme fell apart.

Even though derivatives clearly increase market volatility, Wall Street seems to be rushing headlong into financial cyberspace, where few traders, or their bosses, have ever gone before. Many of the derivatives that have raised concern are those based on untested mathematical formulas developed by so-called quants, short for quantitative analysts, who are rapidly gaining ascendancy in the trading rooms of banks and securities firms. But their computerized risk-assessment models, which monitor global transactions on a moment-to-moment basis and tell the quants when to buy or sell to balance vast portfolios, are based on historical patterns that cannot foresee all the worldwide selling pressures that could build up in a crisis.

Such unknowns could throw billion-dollar decisions, and even the financial soundness of the firms that make them, right back into the laps of executives who could find themselves ill prepared to deal with what the rocket scientists have wrought. "These mathematical models, they are not dealing with statistically definable facts that can tell you with certainty that if a market moves this amount, this is precisely what will happen," acknowledges Stephen Friedman, the chairman of investment-banking giant Goldman Sachs. "In the last analysis, you need to have people with common sense who can understand enough of what the rocket scientists are saying to translate it up the line," says Friedman, whose firm earned \$2.7 billion before taxes last year, more than any other firm on Wall Street. "When there is a crisis, I want to have someone, like one of the heads of our fixed-income departments, sitting there at the trading desk with his shirt stuck to his body with sweat and interpreting for me what the rocket scientists are saying."

There were actually sound business reasons for the rise of derivatives, which first became popular in the 1980s. Money was moving around the globe like never before. The demise of communism in Europe expanded markets for American investors in countries such as Russia, Hungary and Poland. On the other side of the world, China lurched toward free enterprise. At the same time came the liberalization of economic policies in Latin America from Chile to Mexico and the rapid growth of the newly industrialized countries of Asia's Pacific Rim. The world was suddenly ravenous for American capital.

But American corporations and other prospective investors faced risks ranging from exchange-rate fluctuations to possible political coups. To underwrite the hazards, Wall Street began issuing over-the-counter derivatives contracts, which investors snapped up as security blankets. Such deals could be as simple as an agreement to buy German marks in six months' time at today's prices, or as Rubik's Cube-like as a single contract that covered the purchase of European bonds together with the sale of several foreign currencies and the acquisition of an option to buy U.S. dollars.

Investors could purchase these contracts directly from such dealers as Merrill Lynch or J.P. Morgan, or the dealers could arrange for swaps between investors; either way, the dealer got a fee. Such transactions could take place anywhere. A Texas manufacturer with a \$1 million fixed-rate loan who suspected that interest rates would soon fall could swap the loan with a Michigan company that had taken out a floating-rate note but was worried that rates were headed higher. The Texas firm would be the loser if rates did rise, since after the swap it would hold the floating-rate note that called for larger interest payments. "The fundamental advantage of derivatives is that they let you buy the risks you want and hedge the risks you don't want," says Columbia's Greenwald, "and that's an extraordinarily useful function."

This also helps explain how derivatives can be both conservative and highly speculative investments. Because there are two sides to each transaction, one party can pass along the risk he does not want to a speculator who will gladly take it. Such trades can often turn on fraction-of-a-point changes in currency rates or interest charges. "The speed of money is faster than it's ever been," says Laleen Doerrer, the co-founder of a one-year-old Chicago derivatives firm. "It seems like every day someone has created a new contract and a new swap option. We are almost equally divided between two groups of customers - one that wants to protect everything it has and the other that wants to make a 200% killing overnight."

These breakneck deals are possible because Wall Street today has transformed itself into a virtually seamless network of computer-linked brokers, dealers and exchanges around the globe. It is no longer (if it ever really was) defined by the canyons of buildings surrounding the New York Stock Exchange near the southern tip of Manhattan. The trades take place in an electronic neverland that can be entered from anywhere in the world. Billion-dollar transactions involving derivatives or other securities that once took hours or days to handle are now routinely completed in seconds - with all the potential risk or reward that comes with instant gains and losses.

Chicago trader Peter Dunne, who works and sleeps to the sound of bond futures markets buzzing from Frankfurt to Tokyo, can attest to the global expansion of derivatives trading in the past four years alone. Dunne's working day has lengthened four hours over that stretch: he rises at 4:30 a.m. to get to the Chicago Board of Trade by 6 a.m. to begin the business of trading that can last until 9 p.m. The trading day for stocks and bonds has grown to marathon proportions as well. Sophia Ulanday, who sells U.S. stocks for Lehman Brothers in Hong Kong, begins her workday at 7 a.m. and frequently toils until 1 a.m. to stay in touch with the home office in New York.

With banks and brokerages striving to create ever more exotic derivative products, it is hardly surprising that the markets have begun to show signs of overheating. "Some of the dynamics are too fast for the fastest players," says Doerrer. Concur Bruce Hauptman, a Fairfield, Iowa, money manager who handles \$800 million in derivatives investments: "You're going to have people getting blown out, and there is going to be bloodshed."

This happened to the German metals and mining concern Metallgesellschaft last year after it charged into the derivatives market. The company bought oil futures for a subsidiary - just before oil prices collapsed - leaving it with \$1.3 billion in losses and triggering a national scandal. Prosecutors have been investigating the role of fired CEO Heinz Schimmelbusch, who has denied doing anything wrong. Nonetheless, bank creditors demanded the layoff of 7,500 of Metallgesellschaft's 46,000 employees and the sale of several divisions as the price for rescuing the company.

But while some people have lost their jobs, Wall Street has become richer. Thanks to record sales of everything from derivatives to new stock and bond issues to merger financing, the pretax profits of U.S. brokers and investment banks zoomed to an unprecedented \$8.9 billion last year. "I see no reason why 1994 won't be better than 1993," exults Sanford Weil, chairman of Travelers Cos., which owns Smith Barney Shearson. "We're having a great time."

By no coincidence, Wall Street's big winners have been firms that are leaders in designing and selling derivatives. Record earnings at Goldman Sachs brought joy to its 161 partners, who each reportedly got \$5 million or more in profit sharing, which they can withdraw when they leave the company. The results brought even greater glee to 10 senior partners, who are believed to have got more than \$25 million each in profit sharing. At Merrill Lynch, which raked in \$1.3 billion after taxes, directors awarded chairman Daniel P. Tully \$9.6 million in salaries and bonuses in 1993, an increase of more than one-third from the previous year.

Wall Street is also spending lavishly to provide its whiz kids with all the tools they can use to build ever more elaborate toys. The arrival of powerful computer workstations in the late 1980s gave the quants the number-crunching capacity they needed to bring forth their brainchildren. Now Goldman Sachs, J.P. Morgan and Morgan Stanley each spend anywhere from \$800 million to \$1.2 billion a year to hone their derivatives operations. The money goes for the computers and software it takes to design and monitor derivatives contracts, and for the salaries of the quants who pilot the equipment.

And what has Wall Street finally wrought at the end of the day? Like nuclear power, derivatives perform a useful function. But they also contain a great deal of risk that must be carefully controlled. "Are derivatives here to stay?" asks Friedman of Goldman Sachs. "Certainly they are. Like many other instruments, they can be used to excess. But they can also be used for extremely beneficial purposes." It will be up to watchdogs in government and on Wall Street to ensure that the beneficial side of derivatives prevails, and that they do not follow pyramid schemes and savings and loan deals into the lexicon of American financial bubbles that burst.

(box)OUT OF THIS WORLD

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## COVER STORIES

# ATTACK OF THE DATA MINERS High-water pants alert! The quants have arrived, but does anyone know what they're talking about?

**BY JOHN SKOW - Reported by Massimo Calabresi and Sribala Subramanian/New York**

BACK IN THE PALEOCAPITALISTIC ERA, as long ago as 10 years, anthropologists studying the breeding, feeding and plumage patterns of Wall Street concentrated on carnivores - called gunslingers - grownup frat boys in yellow ties and red suspenders who peddled junk bonds, drove BMWs and bought \$2 million co-ops on Manhattan's East Side. Forget them: today they're fuddled old greedsters sitting around in their East Hampton beach houses wondering what happened.

What did? Well, yellow ties are out, but avarice remains popular, and the financial universe - Is anyone surprised? - still has masters. These new barbarians at the gates of international commerce may have the geeky, high-water-pants look of the typical math grad student, and they may caress their Sun Microsystems workstations rather than I-got-mine mobiles. But nearly everyone agrees that they are even scarier than the gunslingers. They are "math jockeys," "nerds," "pop eyes," "quarks," "techies." Call them quants, for quantitative analysts. They are odd birds indeed, the field biologist discovers, and . . . Hark, here's one now!

". . . European portfolio MITTS in a market-index, targeted-term security. It's an equity-link note. This one had 90% principal protection, plus equity upside in its European portfolio." The specimen is Jamie Greenwald, 30, managing director of global equity derivatives for Merrill Lynch. He reports, with satisfaction, that the Japan index "provides upside in the market in Japan in a domestic instrument, U.S. dollar-based, no currency risk, no downside risk: worst case you've got about a . . . ((pause)) . . . 2.34% yield. That was very applicable to pension funds, to insurance companies, to mutual funds."

There is a perilous impulse here to say, "Sure, if you say so." And not just outsiders are baffled by such impressively technical discourse. Older managers weren't taught this stuff. "The guy who heads your group, a head trader, he's never solved a quantitative problem before," says a 30-year-old Ph.D. at a leading brokerage house. "An important problem that could take you three weeks to solve properly, he'll want it done in two days. It's very difficult for a quant who thinks of himself as a Ph.D. from a top-notch school and comes to Wall Street, and a high school dropout screams at him and calls him an idiot." His colleague, an engineer, agrees: "Many times, what your boss is saying is just hilarious. It's wrong, you know; mathematically it makes no sense. You can't even say, 'Look, you don't know what you're talking about.'"

But Wall Street and the quants are stuck with each other. Stanley Diller, 58, an early quant who is managing director of fixed-income research at Paine Webber, left a job as an economics professor at Columbia in the mid-'70s to join Goldman, Sachs & Co.'s equity-research department. In those days, he says, "research was largely an image builder. It was something that brought in the customers." Now quantitative research "is the whole deal." If you don't have it, says Diller, you can't produce the new financial instruments, " 'cause you get crushed trying to hedge them." Meaning that Wall Street's new products are so complicated and interdependent that only the advanced number crunching of the quants can untangle the risks involved; without it, the market crushes you.

The result is that techies in large numbers - engineers who lost jobs at the superconducting supercollider, doctoral students bored with their computer-science dissertations - are heading for Wall Street. Says Diller: "The people who study science but are not themselves

weirdos - a small subset, people who can adapt to the real world - become aware that they can make a lot more money."

Wall Street as the real world is a concept that could raise eyebrows. But some financial experts wonder whether the quants are weakening whatever contact with reality the street may have had. Steve Barnett, an anthropologist who is a principal of Global Business Network, a think tank, says that in the pre-quant days, Wall Street was patriarchal, intuitive, much more related to the world as it was. But hard-core quants, he complains across the generation gap, "are almost idiots savants with numbers . . . There is an almost prayerful communion with the computer. They're intense and operate to a rhythm. If you ask them a question, they turn and their eyes are glazed, coming out of whatever cyberspace they are in." In this trance, he says, "they're not really in a world of other people. They think they're in a world of pure technical manipulation, like a chemist creating a molecule. It's as though there are no social consequences."

Quants, says Barnett, who has a Ph.D. in anthropology from the University of Chicago, tend to be bachelors (few are women) who live in apartments as messy as the room they left in grade school. Many of them drink hard after hours, mostly with fellow workers. They mate, if that's the word, mostly in one-night stands. When they air their lives out, it's with ski holidays and ecotourism, not yachting or casino crawling. With salaries for researchers that start at about \$90,000 and can climb well over \$500,000 for those who excel, they could afford to dress with the flash of yesterday's gunslingers. Most don't. An atypical Merrill Lynch computer jock keeps a 360-hp speedboat in Westport, Connecticut. This appears to embarrass him, and he blusters, "That's not who I am, and if you don't tell me right now that you're not going to put it in the article, I'm going to have to get serious and call our public relations people and have them call TIME."

It takes three to six months, says one quant who has made the transition, to change a shy, bookish type into a ruthless money-making machine. What's required, says this alumnus of the system, is "to lose your sense of decency. You have to be rude, brash, you have to be selfish. Also you have to start ignoring 90% of what you are told." He describes, perhaps admiringly, a vulnerable Ph.D. from Princeton University. This fellow wore \$50 suits and thick glasses. He was painfully polite. Transformed, he became the quant from Hell. "He's got this personality suddenly. He could eat these guys alive," says the quant. For someone like this, academia loses reality, and from Wall Street's viewpoint, a professor with a scholarly paper is "like a two-year-old coming with something he drew."

Anthropologist Barnett, reflecting on the brokerage business, says, "You can't do it intuitively anymore." He adds, "The next generation of computer architecture, be it massively parallel programming or 64-bit addressing or hyper- or meta-computing, essentially is going to be data mining where the data will be searched in even finer granularity to discover patterns that even this generation can't get at."

His somewhat glum conclusion: "So wait till the Generation Y quant people hit Wall Street." When this occurs, at least one Generation X precept is unlikely to be disproved. As one quant said last week, "If you make money, nobody calls you a geek."

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