Liabilities, Liquidity, and Cash Management

Balancing Financial Risks

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Balancing Financial Risks

Dimitris N. Chorafas

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Preface

In all fields of inquiry, whether financial, scientific, or any other, there is danger of not seeing the woods for the trees. Nowhere is this danger greater than in the analysis of assets and liabilities as well as in cash management, in a leveraged financial environment with derivative instruments that change from assets to liabilities, and vice versa, depending on their fair market value.

This book is for financial officers, analysts, traders, investment advisors, loans officers, accountants, and auditors whose daily activities are affected by the management of liabilities and the control of exposure. Senior executives have expressed the opinion that, for the next 10 years, the key words are: leverage, profitability, cash flow, liquidity, inventories, sales growth, and company size.

Many senior managers and financial analysts are of the opinion that, at the dawn of the twenty-first century, in an environment charged by credit risk, there have occurred some incidents that, although important in themselves, were even more important as part of a pattern of uncertainty and nervousness in the financial markets. Suddenly, and emotionally, earning announcements and profit warnings made investors and traders commit all their attention to stock market bears, *as if* in a highly leveraged environment this were a secure way of taking care of their liabilities.

The underlying thesis among many of the knowledgeable people who participated in my research is that at the present time, there is an overriding need for a focused process of *liabilities management*. The separate aspects of this problem acquire full significance only when considered in relation to one another, in an integrative way. Since a rigorous study of financial exposure is best done through pooled experience, it is clear that the acquisition, organization, and use of knowledge are essential factors in analysis. This process of meticulous acquisition, proper organization, and use of knowledge is often called the *scientific method*:

- Reaching conclusions against experience, through observation and experiment
- Operating on the principle of increasing certitude in regard to obtained results
- Being able, in large measure, to take effective action and proceed to new subjects of inquiry

These three points describe the principles underpinning choices made in the organization of this book, which is divided into four parts. Part One addresses liabilities management, taking as an example the market bubble of telecoms stocks and its aftermath. Chapter 1 explains why this has happened and what facts led to the credit crunch that crippled the ambitions of telephone operators.

Chapter 2 extends this perspective of telecoms liabilities toward the suppliers of the telephone industry and their woes, with a case study on Lucent Technologies and its huge loss of capitalization. The downfall of Xerox was chosen as an example of what happens when product planning snafus undermine rather than underpin a company's financial staying power.

Derivative instruments have a great deal to do with the mountain of liabilities—and their mismanagement—as Chapter 3 documents. Oil derivatives were chosen as a case study on leveraging power. Chapter 4 focuses on the reputational and operational risks associated with globalization. It also underlines the fact that certified public accountants face unusual circumstances when confronted by reputational risk.

It has been said that company size and the amount of resources under management are good enough assurance against turbulence. I do not think so. Size, measured by volume of output, capital invested, and people employed, is clearly only one aspect of managing a given entity and its projects. Size alone, however, is a double-edged sword, because the company tends to lean more on leverage and less on rigorous control.

Liquidity management is the theme of Part Two. Chapter 5 dramatizes the aftermath of liabilities and of a liquidity squeeze through two case studies: Nissan Mutual Life and General American. It also explains the role of sensitivity analysis, gap analysis, stress testing, and value-added solutions. The contributions of real-time financial reporting and virtual balance sheets constitute the theme of Chapter 6.

The lack of real-time management planning and control and of appropriate tools and their effective use increases the risks associated with liquidity management as well as the likelihood of default. Chapter 7 explains why this is the case; it also presents a family of liquidity and other ratios that can be used as yardsticks. Chapter 8 focuses on market liquidity, the factors entering into money supply, and the ability to mark to model when marking to market is not feasible.

The theme of Part Three is cash management. Chapter 9 focuses on the different meanings of *cash* and of cash flow. It also explains the development and use of a cash budget and how cash crunches can be avoided. Based on these notions, the text looks into factors affecting the liquidity of assets as well as on issues draining cash resources—taking Bank One as an example.

The next two chapters address the role played by interest rates and the control of exposure relating to them. The subject of Chapter 11 is money markets, yield curves, and interest rates as well as their spillover. Matters pertaining to the ongoing brain drain are brought under perspective because any analysis would be half-baked without paying attention to human capital.

Chapter 12 directs the reader's thoughts on mismatch risk profiles and how they can be analyzed and controlled. The canvas on which this scenario is plotted is the implementation of an interest rate risk control system among savings and loans by the Office of Thrift Supervision (OTS). The framework OTS has established for sensitivity to market risk and post-check portfolio value analysis is a classical example of good management.

The book concludes with Part Four which considers credit risk, certain less known aspects of leverage, and the action taken by regulators. Chapter 13 elaborates on credit risk associated with technology companies. It takes the bankruptcy of Daewoo as an example, and demonstrates how mismanagement holds bad surprises for all stakeholders, including those personally responsible for the company's downfall.

Because good sense often takes a leave, banks make life difficult for themselves by putting the rules of lending on the back burner and getting overexposed to certain companies and industries. Chapter 14 shows how yield curves can be used as gateway to more sophisticated management control solutions, and documents why creative accounting damages the process of securitization.

Chapter 15 explains why lack of integration of credit risk and market risk control is counterproductive, making it difficult to calculate capital requirements in a way commensurate with the exposure being assumed.

The last chapter brings the reader's attention to management blunders and technical miscalculations which lead to panics. It explains the risks embedded in turning assets into runaway liabilities; shows the difficulty in prognosticating the aftermath of mounting debt; presents a case study with British Telecom where money thrown at the problem made a bad situation worse; suggests a solution to market panics by borrowing a leaf out of J.P. Morgan's book; and discusses how the New Economy has redefined the nature and framework of risk.

As I never tire repeating, entities which plan for the future must pay a great deal of attention to the quality of liabilities management, including levels of leverage, liquidity thresholds, and cash management. These are very important topics because the coming years will be, by all likelihood, characterized by a growing amount of credit risk. A balance sheet heavy in the liabilities side means reduced credit risk defenses.

Credit risks, market risks, and reputational risks can be effectively controlled *if* management indeed wants to do so. But as a growing number of examples demonstrates, the current internal controls system in a surprisingly large number of institutions is not even remotely good enough. In many cases, it is simply not functioning while in others inept management fails to analyze the signals it receives, and to act. *This is bad in connection to the management of assets, but it becomes an unmitigated disaster with the management of liabilities.*

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To Dr. Henry Kaufman
for his leadership in the preservation of assets
and his clear view of the financial landscape

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PART ONE

Challenges of Liabilities Management

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CHAPTER 1

Market Bubble of Telecoms Stocks

The need for a sophisticated approach to assets and liabilities management (ALM) has been evident for many years. Volatile global markets, changing regulatory environments, and the proliferation of new financial products, with many unknowns, have made the management of liabilities and of assets in the balance sheet a critical task. Modern tools such as simulation, experimentation, and real-time financial reporting help in fulfilling this responsibility, but, at the same time, the whole assets and liabilities management strategy is changing under the weight of a fast-growing amount of debt.

Leverage[1] is often managed with easy money that typically is not invested in a prudent manner. AT&T, for example, bought high and sold low. Its chief executive officer (CEO) bought TeleCommunications Inc. (TCI) and MediaOne when valuations for cable TV assets were near their peak. He paid about $105 billion for these assets in the name of "synergy." The same assets were worth $80 billion when AT&T's spinoffs were contemplated in late January 2001[2]—another hit-and-run management decision.

What has really changed during the last decade in assets and liabilities management is that the pillar on which it rests has moved from the left to the right side of the balance sheet, from *assets* to *liabilities*. Since the invention of the balance sheet in 1494 by Luca Paciolo, a mathematician and Franciscan monk of the order of Minor Observants,

- The ledger was based on assets.
- Liabilities were there to balance the assets side.

Today, by contrast, the critical element of the balance sheet is *liabilities*.

- Assets are there to balance, it is hoped, the liabilities side.
- But, as was seen in the AT&T example, such assets may be melting away.

This turns traditional thinking about assets and liabilities management on its head. The old rules are no longer valid. Quite often the price of leveraged assets is justified only by the "greater fool theory"—the expectation that other investors would bid their value even higher, and they will come up with the cash. Debts that are due—liabilities—primarily fall into the following classes:

- Obligations to commercial banks and other entities in the form of loans, credit lines, or similar instruments
- Commercial paper, such as short-term "IOUs," of variable-rate, floating-rate, or variable-amount securities
- Unpaid invoices by suppliers, salaries, wages, and taxes
- Certificates of deposit, time deposits, bankers' acceptances, and other short-term debt
- Exposure assumed against counterparties through derivative financial instruments
- Repurchase agreements involving securities issues by commercial and industrial organizations
- Fixed income securities issued by the firm
- Equity that belongs to the investors

As the weight of the economy has changed sides, from the assets to the liabilities side of the balance sheet, companies inflated their liabilities and their market capitalization, which zoomed in the second half of the 1990s and the first three months of 2000. Since these securities are publicly traded, one company's inflated liabilities became another company's assets.

Over-the-counter derivatives deals and publicly traded inflated equities violated the basic notions behind the balance sheet concept. They also changed the nature of what a balance sheet represents. The economy became overleveraged from intensive borrowing from the capital markets and from banks, borrowing that was behind the big boom of 1995 to 2000. But unlike assets, which are the company's own, liabilities have to be paid when they become due.

Despite the equities blues of late March and of September to December 2000—and beyond that in 2001—overleveraging sees to it that credit risk far exceeds market risk. Hence everyone, from big and small companies to consumers, must be very careful about liabilities management. Solutions cannot be found in textbooks because they go beyond conventional thinking.

LEVERAGING MAKES THE GLOBAL FINANCIAL MARKET FRAGILE

In his book *On Money and Markets*,[3] Henry Kaufman laments: "The potential excesses and fragility of global financial markets" and brings into perspective "the consequent need for more effective international approaches towards regulation and supervision." He also points out "the lack of fiduciary responsibility displayed by many financial institutions in recent decades."

The change in weight from the left side to the right side of the balance sheet is not the only significant event of the last three decades, but it is the largest and most far reaching. It was predated by the inflationary spiral of the 1970s and the recycling of petrodollars by money center banks, which inflated the liabilities side; the killing of the inflationary spiral and the junk bonds and stock market boom followed by a short-lived correction in 1987; and fiscal policy excesses practically all over the world in the 1990s, which led to the rapid growth of liabilities in that same decade.

Eventually all these events converged into unprecedented liabilities leveraging, which was known as the virtual economy. Practically everyone was happy about the rise of the virtual economy and its overtaking of the real economy-–which is the assets side of the balance sheet. But as long as the euphoria lasted, hardly anyone thought of the consequences:

- Growing in the virtual economy is synonymous to carrying huge positions, therefore huge liabilities.

- Very few analysts have been clear-eyed enough to add total borrowings to total contingent liabilities in derivatives, repos, and other obligations, to measure exposure.

Yet, this exposure is real. Even if its origins are found in the virtual economy, someone will have to pay the debt. The leveraged positions just mentioned are adding up rather than netting out, thereby creating a mountain of risk individually for each entity and for the economy as a whole.

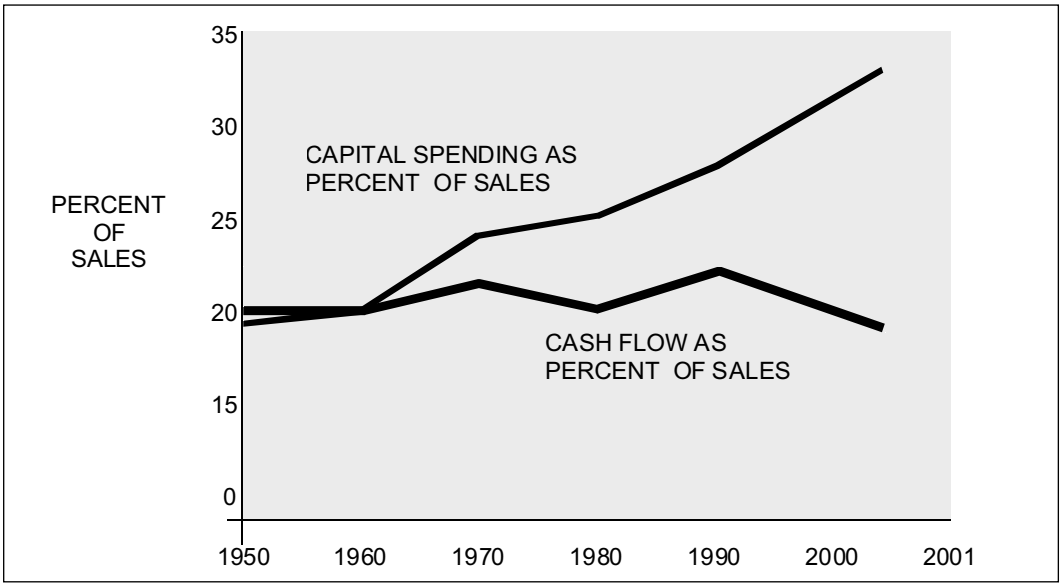
What is different about 2000 and 2001, conditioned to a considerable extent on liability management and therefore the focus of this book, is that it has been a period of excess correction. The central banks of the Group of Ten (G-10) increased liquidity for the transition to the twenty-first century, and this increased liquidity was used to finance a tremendous investment boom in technology.

The surge of technology stocks that started in the mid-1990s and greatly accelerated in February and March 2000 provided a euphoria in the financial markets. This euphoria translated into a surge in demand for consumer goods and capital equipment. The result was an exaggeration, followed by a correction in late March/early April and by another much more severe correction in September to December 2000–with the eye of the storm in mid-October 2000, roughly two years after the collapse of Long Term Capital Management (LTCM).[4]

The telecommunications industry (telecoms, telcos) in 1999 and 2000 and LTCM in 1998 had much in common: They both tried and failed to defy the law of gravity. Overcapacity, price wars, and low cash flows by telecom vendors exacerbated their liabilities. Capitalizing on the fact that advancing technology cuts the cost of a given level of telecommunications channel capacity by half every nine months, telcos and other channel providers have used the new facilities they installed to wage deadly price wars with one another. These wars hit their cash flow and profit figures at the same time, as shown in Exhibit 1.1.

British Telecom, Vodaphone, Deutsche Telekom, France Telecom, Telecom Italia, Telefonica, and Dutch KPN have among them an unprecedented amount of short-term debt. The debt of British

Exhibit 1.1 Lack of Balance Between Capital Spending and Cash Flow Led to the Global Crash of the Telecommunications Industry



Telecom alone is £30 billion ($44 billion). In one year, from March 2000 to 2001, France Telecom increased its debt by 400 percent to Euro 61 billion ($55 billion). AT&T and the other U.S. operators match these exposures. For the whole telecoms sector worldwide, $200 billion comes due in 2001.

The failure in interpreting the business aftermath of the *Law of Photonics* led to negatives at the conceptual and financial levels. The market has showed that plans by telecom operators were erroneous. While the telecoms did not have the cash to boost spending, they did so through high leveraging. Disregarding the growth of their liabilities and their shrinking cash flow because of intensified competition, the telecoms increased their purchases of equipment by nearly 30 percent in 2000.

- The telecom companies' cash shortfall amounted to $50 billion, most of which had to be raised from the capital market, the banks, and equipment companies themselves.
- By March 2001 total carrier debt has been estimated at about 93 percent of sales, compared with 29 percent of sales in 1997.

Theoretically, the telecoms capitalized on what they saw as capacity-enhancing advances in fiber optics, which allowed them to slash prices by 50 percent or more every year, in a quest to gain market share and build traffic. Price drops can be so dramatic because technology permits carriers to get into disruptive pricing. But what technology might make possible does not necessarily make good business sense. The telecoms could have learned from the failure of others who overloaded their liabilities and paid a high price:

- The Bank of New England in 1989 and Long Term Capital Management in 1998 were the first manifestations of a liability management crisis hitting the big financial entities one by one.
- The events of the fourth quarter of 2000 were different in that the crisis in liability management hammered many technology companies at once, with the whole capital market being the epicenter.

Making the liabilities side of the balance sheet the heavyweight is akin to specializing in the creation of debt. On its own, this is a strategy like any other—but it has to be managed in a rigorous manner. Major failures can come from lack of attention in liabilities management, augmented by the fact that both the methodology of how to manage liabilities and the tools needed to do so are still evolving.

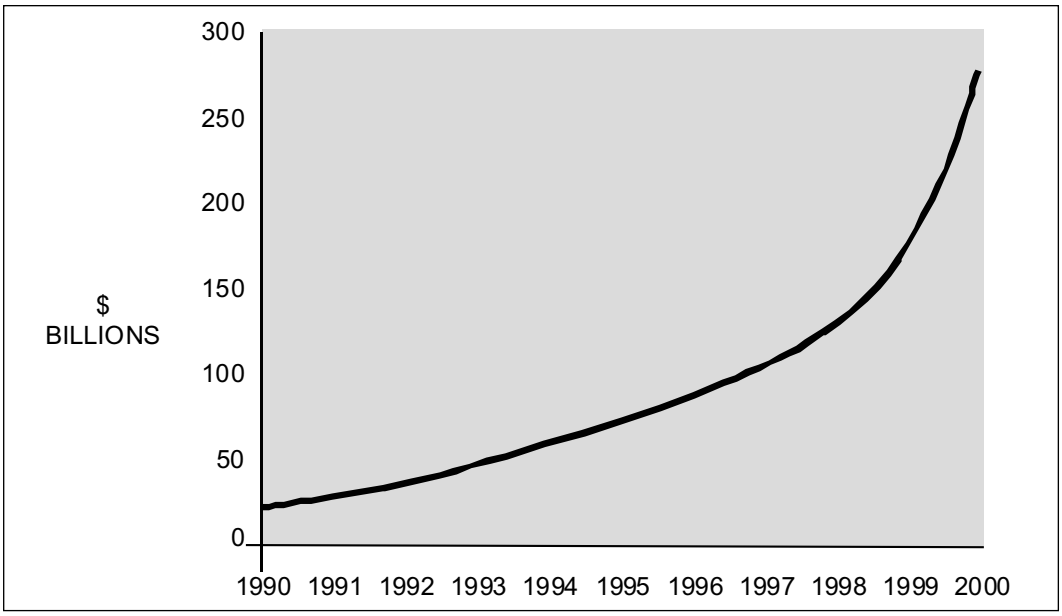
According to Henry Kaufman, in the 1980s the corporate leveraging explosion was accompanied by a severe drop in corporate credit quality. For eight years, downgrading in credit quality outpaced upgrading. The damage from credit downgrading is not so visible in boom years, but it becomes a source of concern in a downturn, as is the case in the first couple of years of the twenty-first century.

Today, both financial institutions and industrial companies have huge debts. The liabilities are made up of exposures through borrowing, repos, and derivatives as well as lending to other leveraged sectors of the economy such as corporate clients, households, businesses, and governments. Liquid assets, the classic security net, are tiny when compared to these exposures.

Take the household sector as an example of indebtedness. Exhibit 1.2 shows only a fraction of its exposure, which has been skyrocketing. From 1990 up to and including 2000, stock market margin debt has been unprecedented. In January 2001 private borrowing totaled a record 130 percent of gross domestic product (GDP).

Part of this bubble is due to the so-called wealth effect. From 1985 to 2000, Wall Street (NYSE and NASDAQ) reached a capitalization of about $20 trillion. This is 200 percent the gross national

Exhibit 1.2 Skyrocketing Stock Market Margin Debt, 1990 to 2000



product (GNP) of the United States. (An estimated $8.8 billion was lost in the stock market blues from late March 2000 to the end of May 2001.) Private households, companies, and states accumulated a debt of $30 trillion. That is 300 percent the GNP of the United States.

Besides showing overleverage, these statistics are also a source of major risk for the coming years, until the real economy takes care of this indebtedness. Faced with such exposure and the cost of carrying it, many consumers may decide it is time to pay off debt and digest those acquisitions. Since business investment, especially of high-technology items, has fueled half the growth in recent years, the expansion may lose one of its major motors.

Another development that has increased the downside risk for the U.S. economy is the run-up in energy prices, which has drained purchasing power from households and businesses. The Organization of Petroleum Exporting Countries (OPEC), which in 2000 hiked oil prices at an inopportune moment, was an accessory to other disturbing events, such as the problem of electricity prices and power blackouts hitting vital parts of the U.S. economy.

Liability management takes planning and a complete understanding of all the problems that may arise, including spillover effects and cross-border aftermath. Even a custom-tailored solution for the U.S. economy has to consider the slowing growth overseas. Where economists once assumed that pickups abroad would offset sluggishness at home, in a highly leveraged global economy each slowdown reinforces the other.

CREDIT CRUNCH CRIPPLES AMBITIONS OF TELEPHONE OPERATORS

Alert economists see the pyramid schemes of the 1920s as the predecessor to the wave of leveraged buyouts of the 1980s and 1990s. In the 1920s, the theme was real estate; in 2000–2001 the late

1990s, it was the high-risk debt financing of telephone companies and other entities. The gearing of telecoms is also being compared to the overleveraging of public utility holdings in the years preceding the Great Depression.

An example of early twentieth century overleveraging among construction companies and real estate developers are the *junior liens* by S.W. Straus & Co. of New York. In a way that parallels the loans to telephone operators in 1999 and 2000, 80 years ago the mortgage real estate bond business was considered to be too large, too important, and too well established to be affected by failures. Real estate mortgages have been one of the important factors in rebuilding the United States. But at the same time leveraging was overdone, and with junior liens the whole enterprise became a kind of Ponzi scheme.

The real estate mortgage bonds S.W. Straus and its kin sold were often construction bonds. In many cases, the collateral behind them was merely a hole in the ground. There was nothing to assure the project would succeed. Typically, if it did not succeed, the bond issuer forgot to inform bondholders but continued to pay the principal and interest from the money brought in by newcomers. As James Grant says: "Each new wave of investors in effect paid the preceding wave."[5] Eventually the bubble burst.

In the 1990s, 70 years down the line, the telecoms and the dot-coms of the United States and Europe repeated this tradition. Old firms and newcomers in the telecommunications industry relied more and more on external financing to fund their capital budgets. The dot-coms did not have much in the way of capital budgets to worry about, but they did get overleveraged to make ends meet for their operating budgets.

In 2000, internally generated cash from profits and depreciation of telecommunications companies covered no more than 75 percent of their capital budgets, which is the lowest level in the past two decades. The other 25 percent was raised from the financial markets and banks—which also advanced the flood of money for new-generation telecom licenses, the now-infamous sales of airwaves by governments in Western Europe.

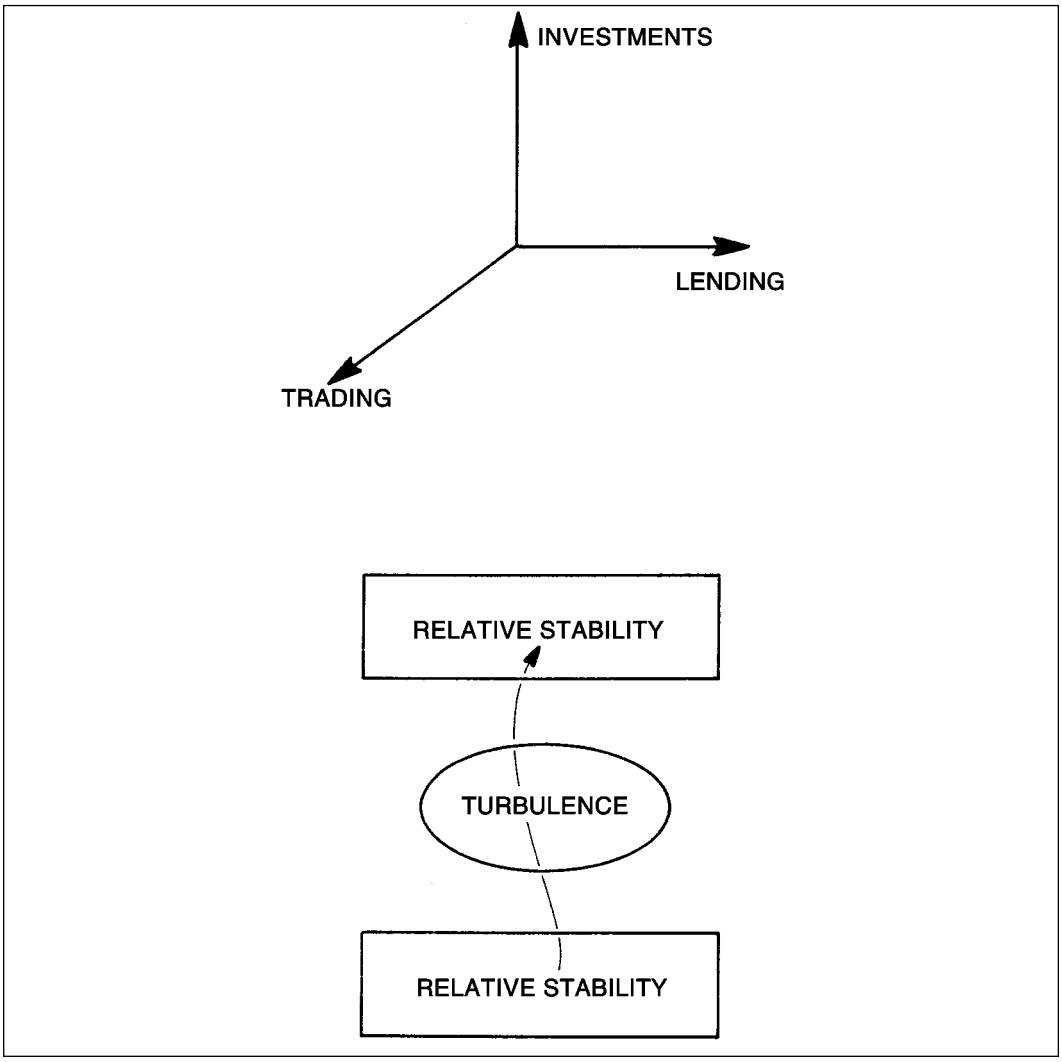
All these actions have been ill-advised and unmanagerial. Boards and CEOs should have understood that rapid capacity building leads to a glut. While the dot-com bubble ballooned, carriers and telecom equipment manufacturers failed to appreciate they were next in the list of autodestruction. The Nortels, Alcatels, Ciscos, Ericssons, Lucents and others lent money to customers to buy what they did not need, and sharply boosted capacity by an astounding 50 percent in 2000.

Now that the U.S. economy has slowed, both communications equipment vendors and their clients are suffering. Management went overboard and spent too much on a buying binge. What the market now hopes is that computers, communications, and software are productivity-boosting assets that depreciate rapidly and get replaced quickly—if for no other reason than because technology moves so fast.

It is surprising that highly paid chief executives failed to consider the fact that bubbles create turbulence in the financial market. This turbulence invariably happens as the economy goes from one state of relative stability to another, as shown in Exhibit 1.3. In the course of this transition, chaotic market reactions can be expressed in a three-dimensional framework of investments, lending, and trading.

In Europe and the United States, telecoms have been crippled by a pyramiding of loans in a manner resembling the S.W. Strauss experience. Analysts say that banks suddenly became prudent because telecom operators' exposure had gone out of control. Technically, it is doable to double and triple bandwidth in all regions of the world. Financially, doing so is a time bomb. Credit institutions

Exhibit 1.3 Markets Go From One State of Stability to Another Passing from Chaos, as Banks Act in a 3-D Coordinate System



failed to consider the risk embedded in their clients' overexposure and associated credit risk, and finally ran for cover.

Like the real estate magnates of the 1920s, in late 1990 telecoms thought of themselves as too large, too important, and too well established to fail. Bankers forgot that until recently telephone companies were regulated utilities in the United States and state-owned firms in Europe. As such:

- They had no culture and no tradition in risk-taking, associated to a free enterprise.
- Return on investment and discounted cash flow were, to them, alien concepts.
- Whenever they needed money, they asked the government, which took it out of taxpayers' pockets.

All this changed with privatization. The privatized telecoms themselves had to pay their debts, with a balance sheet too heavy in liabilities. A market sentiment against overvalued telecom stocks has compounded the credit crunch, as has the fact that European banking regulators expressed concerns that banks are overexposed to debt from this sector.

A string of profit warnings from telecom equipment and computer manufacturers, such as Lucent, Nortel, and Dell, made matters worse. While financial institutions suffer from bad loans and overleveraging through derivative instruments, the industrial sector is burdened with sluggish demand, excess inventories, and slower pace in investments. When production continues to contract, this weighs heavily on balance sheets.

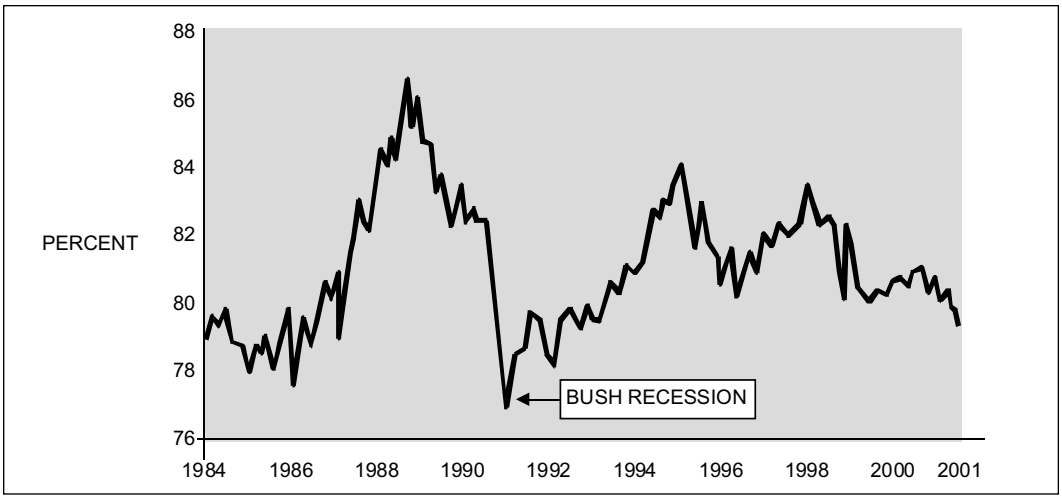
Exhibit 1.4 shows, as an example, the ups and downs in capacity utilization over a 17-year timeframe (1984 to 2001). What has been most interesting during the 1990s and early twenty-first century is that because of globalization, pricing power has been nonexistent. Because of this fact, earnings in the industrial sector are under pressure almost everywhere and this diminishes by so much the companies' ability to serve their liabilities.

What a difference a couple of years make. In the late 1990s telecom and network operators could raise a billion dollars just by asking. This is no longer the case. By late 2000 the market started to believe companies putting bandwidth in Europe would not recover their investment; and such feeling strengthened in the first months of 2001. Nor did the market fail to (finally) appreciate that telephone companies not only have the bug of overleveraging their balance sheet, but also that this is far easier to do at the liabilities side than through their questionable assets—such as the twisted wire plant.

Other reasons also underpin this major change in the way banks and the capital market now look at telecoms. For instance, a reason why the telecoms' lending was accelerating in the late 1990s is that the big operators were going aggressively on the acquisition trail. Alternative operators borrowed heavily to build new networks, and, most recently, practically every telecom—new and old—paid astronomical prices for third-generation (3G) mobile licenses.

Analysts say that as 2000 came to a close, telecom operators had borrowed some $171 billion (euro 202 billion) in that year alone. This is only part of the money telecoms must put on the table

Exhibit 1.4 Sixteen Years of Manufacturing Capacity Utilization in the United States, Excluding Technology



because funding 3G networks will require another $145 billion (euro 160 billion). With this huge debt swallowing the liabilities side of telecoms' balance sheets:

- The capitalization of telecoms and their suppliers collapsed.
- The whole sector has been sinking in a vast amount of debt.
- Credit ratings across the telephone industry have fallen and continue falling.

There were also some high-profile bankruptcies in 2000. Examples are Hamilton, Colorado-based ICG Inc., London-based Iaxis, PSI Net, Winstar, Viatel, Call-Net, 360 Networks, Globalstar, RSL, and 360 USA. These cases, and several others, give the stock market jitters and make bankers even more cautious, which leads to a credit crunch.

The sentiment at Wall Street was that in all likelihood practically every telecom company would be hurt by late 2000. Price-cutting, so far a friend of the boom, became an enemy because it hurts the bottom line. With bandwidth prices going down by around 95 percent in 1999 and 2000, pan-European operators have to make a return on investment with just 5 percent of previous income. It will take a miracle or two to achieve these sorts of financial results.

INVESTMENT BANKS ALSO PAID DEARLY FOR TELECOM COMPANIES' OVEREXPOSURE

Within three weeks, from September 22, 2000, when Intel lost $100 billion of its capitalization in 24 hours, to mid-October, the NASDAQ dropped 18 percent and paper values of nearly $500 billion evaporated. October 9 saw a full-blown crisis in the corporate bond markets, as reports surfaced that Morgan Stanley Dean Witter had estimated losses of some $1 billion on their business in underwriting corporate junk bonds.

In the fourth quarter of 2000, the debt of the formerly all-mighty telephone giants was not far from being reduced to junk bond status. The investment banks themselves were shaken up. In mid-October, Morgan Stanley issued a press statement denying the rumors of mega-losses triggered by a midsize U.S. telecom company (ICG Communications of Englewood, Colorado) with $1.9 billion in junk bonds outstanding becoming insolvent.

- Morgan Stanley lost some $200 million on ICG bonds, but more than that. The collapse of ICG signaled the fall of the entire high-risk corporate bond market.
- Other companies, too, were hit hard as this market had been the prime source of capital for telecom and other information technology firms that, in 1999 and 2000, expanded beyond their means.

Worst hit were the credit institutions with the greatest amount of exposure in telecom loans. At the top of the list was Citigroup with $23 billion, HSBC with $19 billion, Chase Manhattan (now J.P. Morgan Chase) with $18 billion, BankAmerica with $16 billion, Barclays with $13 billion, and Deutsche Bank with $11 billion.

Where have these billions gone? As of early 2001, the largest telecom borrower was London-based VodafoneAirTouch, with $46 billion of debt. Its highly leveraged balance sheet made it the second-largest corporate debtor in the world. Other large telecom debtors are British Telecom with

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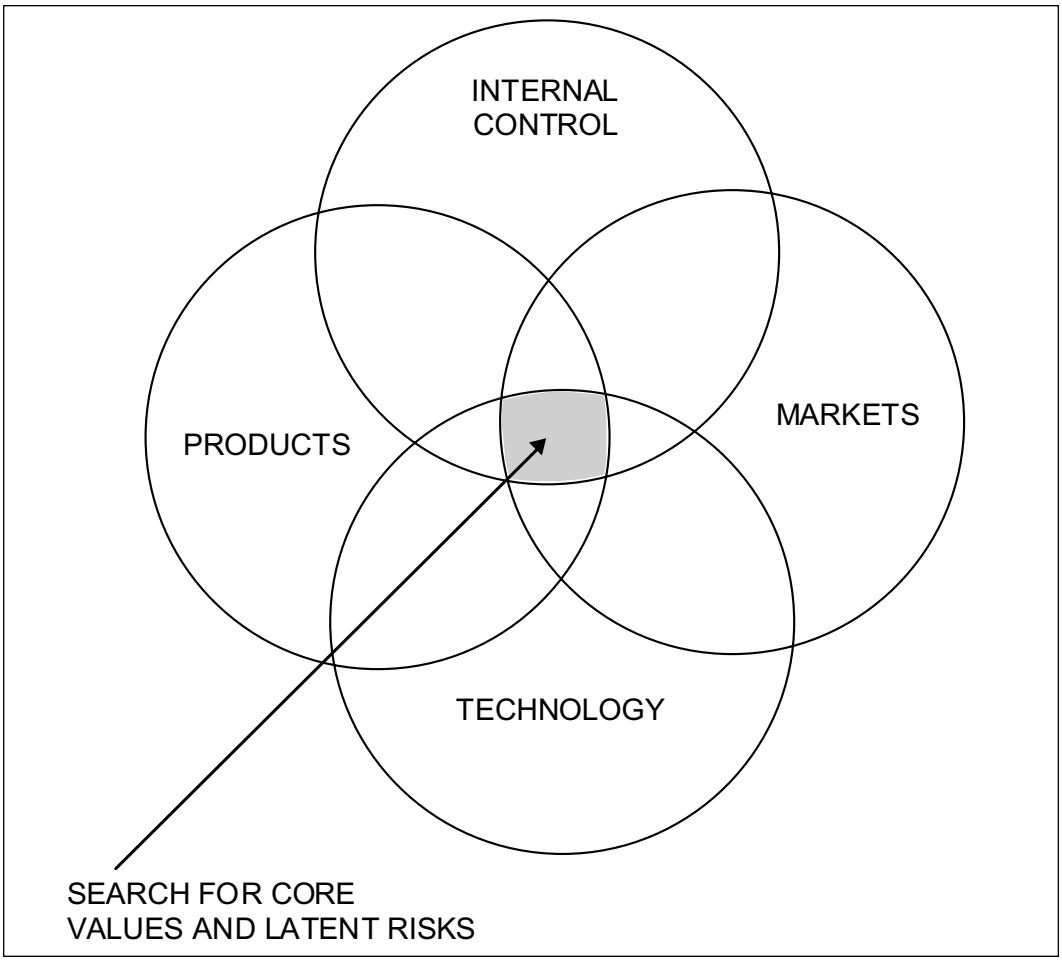
$45 billion debt (£30 billion); AT&T with $39 billion; France Telecom with $28 billion; and Dutch KPN with $26 billion in debt. Add Deutsche Telekom and one has, more or less, the "Who's Who" in telephony and in indebtedness.

The top brass in these former state monopolies failed to appreciate that the control of companies operating in a modern economy resembles, in its fundamentals, that of a streetcar going uphill and downhill. Acceleration and brakes must be applied in all four wheels, as Exhibit 1.5 shows. There is a synergy between them, and if one of the wheels is underserved—as it happened with internal control in the case of telecoms—the streetcar derails.

The conditions of reverse leverage prevailing in February 2001 were aptly characterized in a *Business Week* article: "The risks during this downshift are clearly great, especially since the quicker flow of information is speeding up the adjustment. With indicators falling fast, confidence measures are bound to reflect heightened concern."[6] The hope is that "imbalances in the economy [will be] cleared away in a manner that will allow growth to pick up later."

Exhibit 1.5 Synergy Among Products, Markets, Controls Infrastructure, and Risk Management



That former bureaucrats and those who followed them as CEOs derailed the companies they led is not surprising. What is surprising is that investment banks also fell into the same trap. As usually happens with the collapse of high fliers who pay hefty premiums for junk bonds, many major Wall Street and European bond underwriters outside of Morgan Stanley found themselves sitting on billions of dollars of debt they could not sell. Due to the mood in the capital market, prices were plunging daily. In two days in mid-October 2000, Morgan Stanley lost 20 percent of its capitalization, and Donaldson Lufkin Jenrette, the largest syndicator of junk bonds, was saved by a takeover from Crédit Suisse First Boston.

The Morgan Stanley and Donaldson Lufkin losses are significant because they triggered a panic sell-off in both corporate bonds and stocks, especially of the banks that have huge exposures to telecoms. Right after these events, Moody's Investors' Service reported that the junk bond market suffered from problems affecting the entire corporate bond issues.

Another market concern in mid-October 2000, which I see as the epicenter of the financial storm, was that of Universal Mobile Telecommunications Standard (UMTS) telecom license auctions in Europe. This business of high stakes that started in the United Kingdom and gained momentum added to the explosive growth of debt in the international telecommunications industry. These licenses for the airwaves of Third Generation Mobile (TGM) access are a high-stakes gamble with slim prospects for profits in the next few years.

Indeed, because the telecom debt situation suddenly became so alarming, bank regulators of European governments began investigating the degree of bank lending to the big telecommunications firms. They wanted to determine if certain credit institutions had taken undue risk because of too-great loan exposure in one sector of the economy, and rumors have it that supervisory authorities were upset by what they found out.

In London, Sir Howard Davies, chairman of the Financial Services Authority (FSA), remarked that the level of lending by U.S. and European banks to the giant telecom companies was a matter of great concern to regulators because of the extreme concentration of lending risks in one sector. These remarks were made during a special meeting of international financial regulators, whose concern was further fed by a Bank for International Settlements (BIS) report suggesting that:

- On average, in the United States and Europe, 30 percent of year 2000 international syndicated loans were for telecom debt.
- In Europe, in 2000, the loans to telecoms were 40 percent of total loans – a huge concentration violating the prudent principle of risk diversification.

In expressing its concern about this lopsided exposure, the Bank for International Settlements said that in Europe mergers of giant state-owned and private telecoms have broken all records, and big money was spent to buy UMTS licenses. The implication was that central bankers disapproved of this policy by lenders and borrowers, and were afraid of the possible disastrous effects on the lenders.

This case of spending borrowed money in a questionable way was beautifully reflected in an October 2, 2000, editorial in the *Financial Times*: "Just imagine, governments might be forced to use the receipts from their mobile phone license auctions to bail out the banks that lent to the winning telecommunications companies. It would be the ultimate irony if the only beneficiaries of third-generation auctions were the advisers in the auction process." The editorial goes a long way to explain the absurdity of high sums demanded for UMTS licenses in various European government auctions:

- Income from GTM is way out of line and most current estimates are a sort of hype, leaving the telecoms exposed to huge debt.
- UMTS technology on a mass scale is at least several years off, and to get going it will require an added telecom investment in Europe alone of some euro 160 billion ($145 billion).

Experts suggest that of these additional euro 160 billion, at least 100 billion ($92 billion) must come from bank loans, bonds, and other sources of credit, further increasing the telecoms' leverage and their unmanageable liabilities. The irony here is that those European governments that did not rush to cheat the telecoms with their UMTS license auctions have to forgo illicit profits, as the treasury of the telecom companies has been depleted and future income must be dedicated to servicing huge debts.

Statistics help one appreciate how high the servicing of ill-conceived debt is standing. From July 1998 to December 2000, as a group, the largest international telecoms have borrowed about $400 billion from international banks. In 1999 alone European telecoms added $170 billion in new bank loans to their liabilities. In 2000, financial analysts suggest, they would have exceeded that score—but they were saved from their appetite for liabilities by the credit crunch.

MESSAGE FROM THE BUBBLE IN THE FALL OF 2000

Bubbles created through leveraged business activity can best be appreciated from their aftermath, after they burst. Up to a point, and only up to a point, they might be predicted if one is to learn from past experiences and to project what we learn into the future. This ability to prognosticate is, to a substantial extent, a feeling and an art that often points to bad news. Therefore, not everyone likes hearing bad news.

Liabilities have to be managed, and the prognostication of trends and pitfalls is just as important as in the case of managing assets. In 2000 the huge debts incurred by European telecom companies, most of them still majority state-owned even if they are publicly listed,[7] set off a vicious cycle of high debt levels. These high debt levels led international credit rating agencies, such as Standard & Poor's and Moody's, to downgrade their formerly blue-chip credit ratings, and made it more difficult and more expensive to raise needed investment capital to make the UMTS pie in the sky even potentially profitable.

People blessed with the ability to predict the future suggest that the more one deals with uncertainty, the more one must take dissent into account. Organization-wise dissent often leads to difficult situations involving elements of tension and stress. Yet those who express disagreement might be better able than the majority opinion to read tomorrow's newspaper today—because usually majority opinions follow the herd.

I have generally painted a bright picture of the New Economy while making readers aware of its risks.[8] This positive approach to the forces unleashed by the New Economy is based on the prevailing view among financial analysts, but the majority opinion among economists is divided when it comes down to details. This is healthy because it suggests there is no herd syndrome:

- Some economists espouse the theory of the New Economy's bright future and suggest that hitting air pockets now and then is unavoidable.
- Others think that projected New Economy–type developments, and more generally unclear structural changes, highlight the limitations of our estimates.

- Still others have a more pessimistic attitude toward the potential of the New Economy's output growth, because they are bothered by the high leverage factor.

The plainly pessimistic view of the New Economy looks for historical precedence to boom and bust, such as the railroad euphoria of the late 1800s, the mining stocks of the early 1900s, and the 1930s depression. References from the remote past are the Dutch tulip mania of 1633 to 1637, the British South Sea Company bubble of 1711 to 1720; and the eighteenth-century French Louisiana adventure.

Economists and analysts who question the elixir of the New Economy suggest history has a remarkable way of repeating itself, morphing old events into new ways suitable to prevailing conditions but nerve-wracking to investors. They quote Thucydides, the Greek historian, who wrote ca. 425 BC: "Human nature being what it is, [we] continue to make the same old mistakes over and over again."

Are we *really* making the same old mistakes? If *yes*, what is the frequency with which we repeat past errors? and what might be the likely origin of a future disaster? According to some Wall Street analysts, in September 2000—two years after the crash of LTCM—a new systemic catastrophe threatened the financial system involving global short-term liabilities in a more vicious way than in the fall of 1998.

Economists who see more clearly than others, bring attention to the risks involved in liability management promoted by the New Economy. Dr. Henry Kaufman aptly remarks that: "The problem is that when financial institutions become strongly growth driven, they run the risk of losing their capacity to assess risk adequately . . . When leverage is generated off the balance sheet, the standard accounting numbers do not begin to describe the full extent of exposure."[9]

I subscribe 100 percent to Dr. Kaufman's opinion that without a thorough modernization in the collection, processing, and dissemination of all relevant financial data, including off–balance sheet information, potential investors are in the dark about the true creditworthiness of their counterparts. This is what has happened in the fall of 1998 with LTCM and in the fall of 2000 with other firms. As year 2000 came to a close, economists who tended to err on the side of caution predicted three major economic risks facing the new economy:

1. A change in market psychology, compounded by perceived technology slowdown. (See Chapter 2.)
2. An accumulated huge derivatives exposure compounded by oil price shocks. (See Chapter 3.)
3. Credit uncertainty leading to global monetary tightening, hence liquidity woes and some reputational risk. (See Chapter 4.)

To appreciate the change in psychology we should recall that technology, one of the two engines in the boom in the 1990s (the other being leveraging), is both a process and a commodity. Like any other commodity, it has its ups and downs. This is not too worrisome because even a slower pace of technology than the one experienced in the mid- to late 1990s is fast enough for sustained growth.

By contrast, exposure due to leveraging through huge contracted loans and derivatives is a real danger. Derivatives risk is a relatively new experience, full of uncertainties—and if there is anything the market hates, it is uncertainty. The number-one worry about the next systemic crisis is that a major financial institution, mutual fund, or other big entity, fails and the Federal Reserve (Fed) does not have the time to intervene as it did with Continental Illinois, the Bank of New England, and LTCM.

Year 2001 did not begin with a V-shape market recovery, or even a U-shape one, as several analysts had hoped. On Friday, January 5, 2001, both the Dow Jones and NASDAQ nosedived because of a rumor that Bank of America had some major liquidity problems. Nervous investors saw in the horizon another crisis of the type that had hit the Bank of New England (BNE) a dozen years earlier. Panics and near panics are a raw demonstration of market power.

What can be learned from the fall of BNE? The combined effect of bad loans and derivatives exposure brought BNE to its knees. At the end of 1989, when the Massachusetts real estate bubble burst, BNE became insolvent and bankruptcy was a foregone conclusion. At the time, BNE had $32 billion in assets, and $36 billion in derivatives exposure (in notional principal).

To keep systemic risk under lock and key, the Federal Reserve Bank of Boston took hold of BNE, replaced the chairman, and pumped in billions of public money. Financial analysts said this was necessary because the risk was too great that a BNE collapse might carry other institutions with it and lead to a panic. A most interesting statistic is that on *$36 billion* in notional principal, BNE had *$6 billion* in derivatives losses.

This would make the demodulator of notional principal equal to 6 (six) rather than 25, which I am often using,[10] and even 25 is criticized by some bankers as too conservative. Never forget the toxic waste in the vaults. The Bank of New England did not bother, and it was closed by regulators in January 1991—at a cost of $2.3 billion. At that time, its derivatives portfolio was down to $6.7 billion in notional amount—or roughly $1 billion in toxic waste, which represented pure counterparty risk.

A similar feat for Bank of America, or for that matter J.P. Morgan Chase, would mean a tsunami at least 10 times bigger than that of BNE—with results that might come as a surprise to many. Analysts who are afraid of the aftershock of such events are rewriting their predictions to make them a little bolder and a little more controversial. They are right in doing so.

Practically all big banks today are overleveraged with loans and with derivatives. Considering only pure risk embedded in derivative contracts, some credit institutions have a leverage factor of 20 times their capital. If notional principal amount is reduced to pure risk, their derivatives exposure is by now in excess of assets under their control—which belong to their clients. This exposure, which engulfs assets, calls for more attention to be paid to liability management.This is problematic in that liabilities management is a new art and its unknowns undermine the survival of even some of the better-known names in the financial world.

LIQUIDITY CRISIS TO BE SOLVED THROUGH LIABILITY MANAGEMENT

The risk underpinning credit uncertainty exposure is a liquidity crisis whose resolution might spark inflation. Liquidity has to be measured both in qualitative and quantitative terms—not in a quantitative way alone.[11] As Dr. Kaufman says, it has to do with the feel of the market. Liquidity is no real problem when the market goes up. It becomes a challenge when:

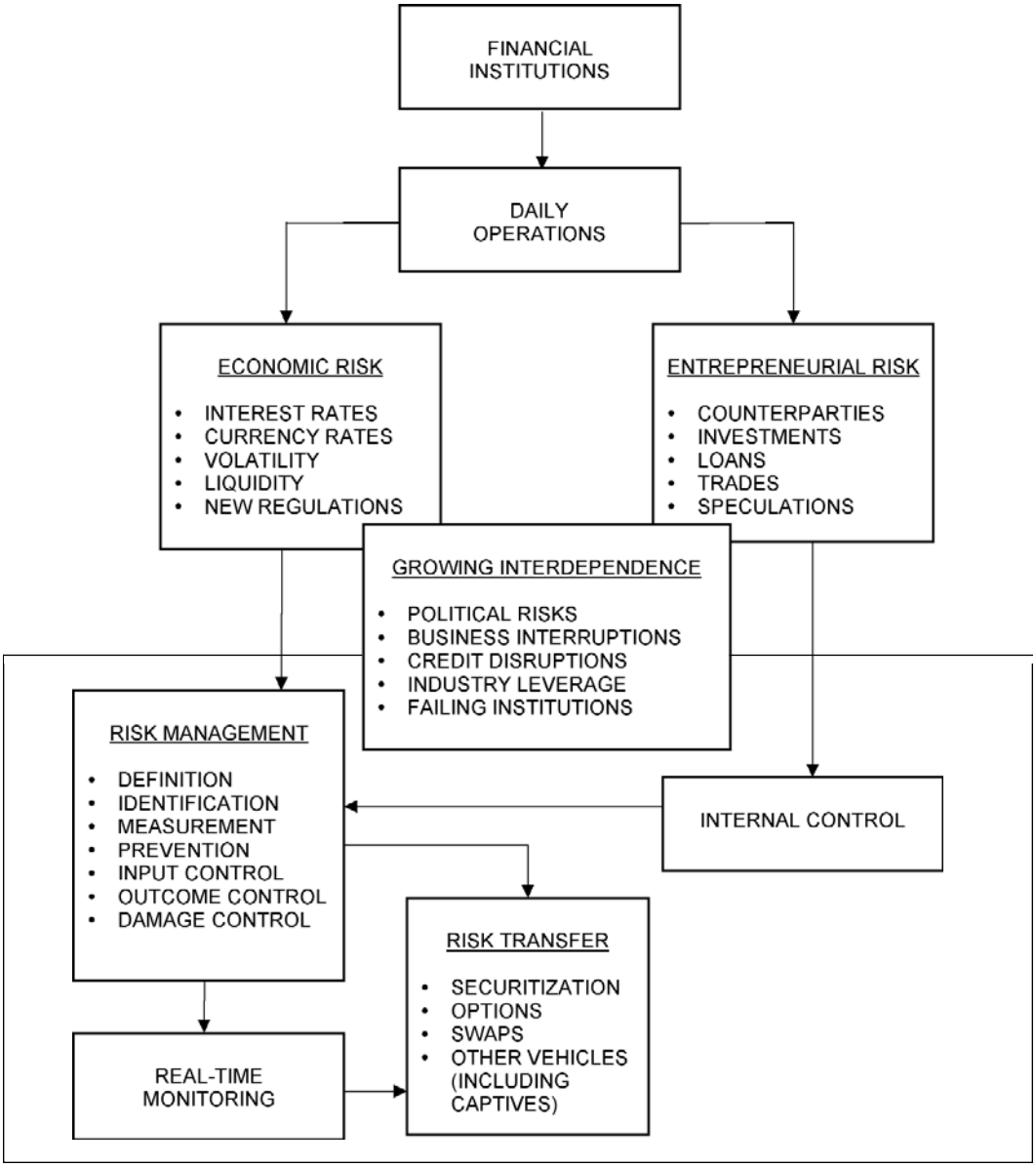
- The banking system gets destabilized, as in Japan
- Market psychology turns negative, with stock prices going south

The stock market plays a bigger role in the New Economy than in the Old, and no one has yet found a stock market elixir other than plain euphoria, which is short-lived. A rational approach to

liquidity management would look into the growing interdependence between economic risk and entrepreneurial risk. It will do so primarily on the basis of day-to-day operations, but without losing sight of the longer-term aftermath.

Exhibit 1.6 explains this approach in terms of growing interdependence of different risks. It also places emphasis on internal control[12] and advises real-time monitoring. The more proprietary products we develop and sell, the more unknowns we take over in credit risk, market risk, operational risk, legal risk, and other exposures. At the same time, however, the key to growing profits is to create and sell proprietary, high-value products.

Exhibit 1.6 Complex Array of Risk Sources and Means for Its Control



Novelty in financial instruments is, by all evidence, a two-edged sword. Therefore, derivatives traders, loans officers, and investment advisors have inherent liability management responsibilities. These are fairly complex. For instance, the liabilities of pension funds, workers' compensation, and disability insurance are linked directly or indirectly to inflation through pointers to salaries, pensions, and other income levels.

An example of this type of risk is the obligation of some pension plans on final salary or inflation-linked pensions of annuities, funding beneficiaries for fixed or indefinite periods. Because the liability in these cases is a function of actual inflation levels, fund managers carefully watch their cash flow and look favorably to inflation-indexed instruments.

Industrial organizations also can have a significant level of exposure to inflation levels, because of the link between expenses and price inflation, although when companies lose their pricing power, revenue is not necessarily adjusted to inflation. But there are exceptions. Industrial sectors with inflation indexation elements include utilities, healthcare, and some infrastructure projects. Liabilities management must be proactive to avert a liquidity crisis, matching discounted cash flow against forthcoming liability obligations, and finding alternative solutions when there is lack of fit:

- Matching cash flow against liabilities is a process not an event; and it should go on all the time.
- Different case scenarios are important, because events challenge classic notions and alter future prospects of financial health.

Gone is the time for debate among investors, bankers, economists, and policymakers over whether the economy has found a fifth gear, and, if so, if that is enough to override economic shocks. The events of 2000 have shown that the economy is not able to grow. The economy's elixir for long sustained life has not been found:

- Prudential supervision and regulation are all important.
- But high precision in regulation, the so-called soft landing, is difficult to execute.

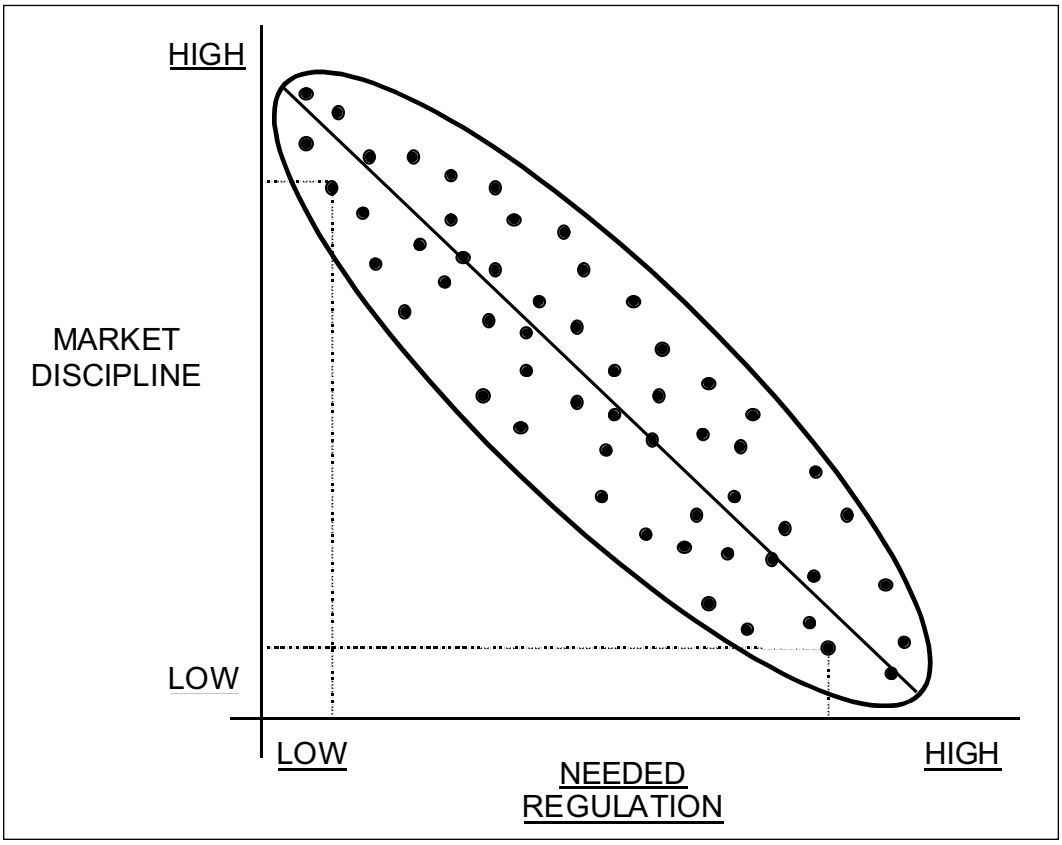
As Exhibit 1.7 shows, when market discipline breaks down, the economy needs a timely response by regulators, even if the ways and means we have available are essentially imperfect. Both in the new economy and in the old, their effect is heavily influenced by market psychology. Therefore, the three major risks mentioned in the previous section might converge to create a crisis that could manifest itself in several ways, including:

- A corporate-bond meltdown
- Failures of major institutions

A compound risk, for example, comes from mutual funds exposed in technology stocks. In mid-October 2000 there were rumors in New York that just before the late September combined euro intervention of the Federal Reserve, European Central Bank, and Bank of Japan, a large American investment fund that had invested primarily in Internet stocks and other technology equities was in trouble. Had this fund gone under, it could have carried with it the NASDAQ index with the shock wave hitting Tokyo and Hong Kong, then Frankfurt, Zurich, Paris, and London.

Since one piece of bad news never comes alone, the NASDAQ and mutual funds tremors of fall 2000 were followed by more stock market blues because of earning announcements. On September 21

Exhibit 1.7 Market Discipline and Amount of Needed Regulation Correlate Negatively with One Another



Intel said that it expected a drop of profits for the third quarter of 2000, which sent its shares plunging 22 percent within a brief time of electronic trading. Other tech stocks slid down 20 percent in New York, while South Korean technology titles were being bashed collectively. This negative market sentiment spread into 2001, past the breaking news of the Fed's lowering of interest rates twice, by 50 basis points each time, in the month of January.

For the record, Intel's woes wiped out $95 billion of the firm's capitalization, in the largest daily loss of a single firm ever recorded. Other American computer firms, including Compaq and Dell, rushed to assure the public that their earnings forecasts were good and investors should not allow themselves to be stampeded into a panic because of Intel's earnings problems. For their part, investors felt obliged to closely watch stock valuations, particularly of the large American technology titles, which in 2000 had lost a great deal of money. By the end of that year:

- Microsoft's capitalization had fallen from $616 billion to 35 percent of that amount.
- Cisco's had fallen from $555 billion to 45 percent of such capitalization, with a new shock in February 2001.
- Intel's had fallen from $503 billion to a little less than half of its former capitalization.

These were the lucky ones. Others, such as Lucent Technologies and Xerox, have been much worse off. (See Chapter 2.) Also behind the market's worries has been a gradual deterioration in credit quality with the fact that, as in the early 1980s, in 2000 corporate debt downgrades have outnumbered upgrades. To make matters worse, credit ratings blues have been followed by a drying up of liquidity because of the mergers and acquisitions wave.

- The ongoing consolidation in the banking industry sees to it that there are fewer bond dealers for investors to trade with.
- Investors wanting to sell bonds, particularly junk issues from smaller companies, are having trouble doing so given uncertainty in the market.

Credit institutions have been facing problems of their own. Losses from large syndicated loans held by U.S. banks more than tripled to $4.7 billion in 2000. At Wall Street, analysts said they expect this number to go up for a while. From March to late December 2000, investors saw some $3 trillion in paper wealth blow away, and the beginning of 2001 was no better. Economists say this is likely to hurt consumer confidence and spending, especially with personal savings rate in negative territory. The market fears a switch from wealth effect to the so-called reverse wealth effect, discussed in Chapter 3.

NOTES

1. *Leverage* is the American term for the British word *gearing*, both of which are straightforward metaphors for what is going on in living beyond one's means. In this text the terms *leverage* and *gearing* are used interchangeably.
2. *Business Week*, February 5, 2001.
3. Henry Kaufman, *On Money and Markets. A Wall Street Memoir* (New York: McGraw-Hill, 2000).
4. D. N. Chorafas, *Managing Risk in the New Economy* (New York: New York Institute of Finance, 2001).
5. James Grant, *Money of the Mind* (New York: Farrar Straus Giroux, 1992).
6. *Business Week,* March 5, 2001.
7. Deutsche Telekom, for example, is a private corporation whose main shareholder is the German state, with 74 percent. In terms of culture, nothing has changed since the time the PTT, Deutsche Telekom's predecessor, was a state-supermarket utility.
8. More recently, Chorafas, *Managing Risk in the New Economy.*
9. Kaufman, *On Money and Markets.*
10. D. N. Chorafas, "Managing Credit Risk," in vol. 2, *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
11. D. N. Chorafas, *Understanding Volatility and Liquidity* in *Financial Markets* (London: Euromoney Books, 1998).
12. D. N. Chorafas, *Implementing and Auditing the Internal Control System* (London: Macmillan, 2001).

CHAPTER 2

Downfall of Lucent Technologies, Xerox, and Dot-Coms

TEAM-FLY

In the second half of year 2000, sector rotation accelerated. Investors opted out of technology, media, and telecommunications (TMT) and bet on industries with less spectacular but more predictable earnings growth. Behind this switching pattern was a growing uncertainty about the extent of the anticipated economic slowdown and its effects on corporate profits. The drop in expectations hit valuations of technology firms particularly hard.

The irony about the switch in investments is that it came at a time when Old Economy companies had started adapting to the New Economy, and it was believed that Old and New Economies would merge and create a more efficient business environment by adopting enabling technologies. Historically *enabling technologies*, such as railroads, electricity, autos, and air transport, have helped the economy to move forward. In the mid-to late 1990s:

- Productivity was rising at 4 percent.
- There was a 5 percent GDP growth with little inflation with falling levels of unemployment.

Software, computers, and communications have been the engines behind this minor miracle. High spending on technology has meant big orders for TMT companies. High productivity and high growth for the economy are translating in impressive TMT earnings. The first quarter of 2000 wealth effect particularly favored TMT stakeholders. The Federal Reserve estimated that:

- About 30 percent of U.S. economic growth since 1994 was attributable to the technology boom.
- More than 50 percent of this growth came from consumer spending fueled by the wealth effect. (See also the reverse wealth effect in Chapter 3.)

Although in the second half of 2000 the growth of the technology supercycle receded, many analysts feel that the acceleration should be followed by deceleration. This is a necessary slowdown after a rare boom phase, with investors' interest in dot-coms put on the back burner while pharmaceuticals and food were in demand because their earnings are less affected by cyclical developments in the economy.

Team-Fly®

Investors should realize that technology is cyclical. The fast-changing nature of high technology itself creates an inherent type of risk. Like Alice in *Alice in Wonderland*, technological companies must run fast in order to stay at the same place. There is no room for complacency at the board level and in the laboratories.

Few CEOs, however, have what it takes to keep themselves and their companies in the race. For this reason, some tech firms would have failed even without the bubble mentality—as we will see with Lucent Technologies and Xerox, two of the better-known fallen investment idols. The very success of technology in so many aspects of life, and its pervasiveness, has also sown the seeds for a kind of saturation: PC growth has ebbed, sales of communications gear have decelerated, handset forecasts are falling, and it is believed that even demand for satellite communications and for photonics is growing less quickly while the liabilities of the companies making these products continue to accumulate.

Information on the aftermath of a growing debt load can be conveyed adequately only to a more or less trained receiver. Knowledgeable readers will appreciate that the growth of liabilities and their management should be examined in conjunction with another factor: Businesspeople and investors simply fell in love with the notion of *virtual*.

Virtual economies and virtual marketplaces seemed to be the solution for new types of commerce where cash flow is unstoppable—even if the profits also are virtual. The virtual office meant never having to commute; the virtual business environment, never having to waste time waiting in line at the mall. But what is now clear is that we do not really live a virtual existence. Our assets might be virtual, but our liabilities are real.

HAS THE NEW ECONOMY BEEN DESTABILIZED?

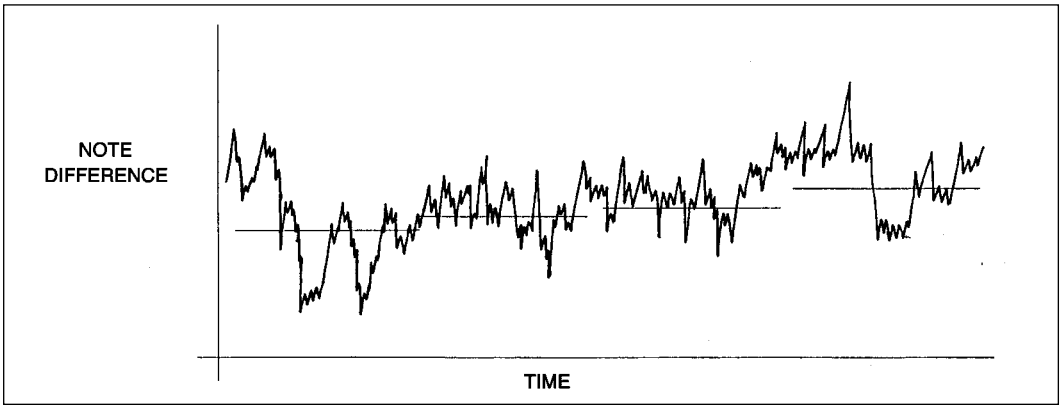
Every economic epoch has its own unique challenges, and there are woes associated with the transition from the conditions characterizing one financial environment to those of the next. For instance, challenges are associated with the process of replacing the Old Economy's business cycle, led by steel, autos, housing, and raw materials, by the New Economy's drivers: technology and the financial markets. At first, during the mid- to late 1990s, we saw the upside of the New Economy:

- A long, low-inflation boom
- Rapid innovation
- A buoyant stock market
- A flood of spending on technology

But eventually this cycle, too, was spent. As this happened, we started to appreciate that the result could be a deep and pervasive downturn, because the New Economy is more than a technological revolution, it is a financial revolution that makes the markets far more volatile than they used to be in the Old Economy. As Exhibit 2.1 shows, this means an amount of risk whose daily amplitude and monthly average value increase over time.

Stock market gyrations in the first months of the twenty-first century help in gaining some perspective. In the week March 27, 2000, the NASDAQ lost about 8 percent of its value. With the April 3 fever over the Microsoft verdict, the NASDAQ lost another 6 percent in one day while Microsoft's shares went south by 15 percent, as Exhibit 2.2 shows. The negative performance of the NASDAQ was repeated almost to the letter with a 500-point loss on April 4, 2000.

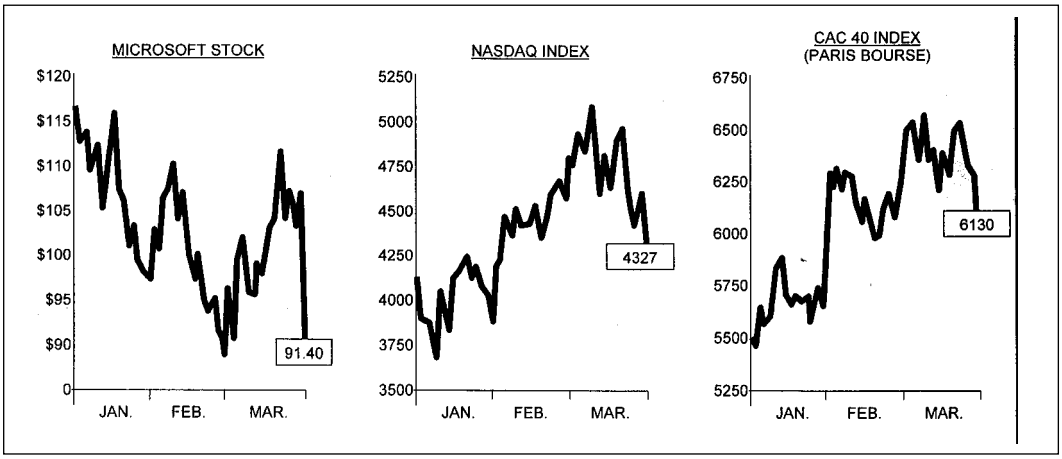
Exhibit 2.1 Daily Value At Risk and Monthly Average at a Major Financial Institution



The Dow Jones index of Internet stocks was not left behind in this retreat, dropping 31 percent on April 3 alone. In Europe, too, London, Paris, Frankfurt, Madrid, Milan, and Helsinki did not miss the March 3 plunge. In terms of capitalization, some companies paid more than others. While the different indices dropped 2 or 3 percent, worst hit were telecommunications firms: KPN, the Dutch telecom, lost 12 percent; Deutsche Telekom, 6 percent; Ingenico, 15.2 percent; Lagadère, 15 percent; and Bouygues, 10 percent. (The effect on the CAC 40 index of the Paris Bourse is shown in Exhibit 2.2.)

Other reasons also contributed to the bursting of the tech bubble in April 2000 and again in September to December of the same year. Stock market blues understood the tendency to believe that old rules of scarcity and abundance did not apply to the New Economy. Analysts came up with a new theory. In the early days of the Internet or of wireless, there were just a few companies to invest in and they became scarce resources compared to the more traditional firms of the economy (e.g., automotive companies).

Exhibit 2.2 The Stock Exchange Earthquake at the End of March 2000



With the ephemeral stock market notion that scarcity of supplies is forever, expectations for high returns in technology grew quickly. Since there was so much cash available to invest in equities, the capitalization of the few chosen suppliers zoomed—but at the same time the number of technology companies that could be invested in ballooned. In a very short period, this changed the scarce resource into an abundant one, and valuations of most of the leading companies turned on their head.

The market's questioning attitude started at a time when most technology companies had leveraged themselves beyond the level of prudence, putting particular strains on liabilities management where, to a large extent, skills were nonexistent. Stress in the financial system caused credit to be tightened. That happened in the second half of 2000, a repetition of fall 1998 when the LTCM debacle led the capital markets to briefly freeze until the Federal Reserve eased aggressively. (See Chapter 16.)

Suddenly the financial markets rediscovered that rating the counterparty with which bankers, insurers, and investors deal is important both in the short term and in the longer run. They also appreciated the old dictum that financial ruptures characterize virtually every downturn in the history of the economy, leading to defaults and from there to a credit crunch. The inability of "this" or "that" counterparty to face up to its obligations is a painful event even when it is limited to only a few companies, but it becomes most unsettling when it spreads in the globalized market.

As credit risk cases multiply, bank lending standards get more stringent, and loans to business and consumers do not grow at all. The aftermath is a slowdown in demand, leading to a rapid involuntary buildup of inventories at both the retail and the factory level. This, in turn, acts to depress growth. Investment-grade companies still have access to the bond market, and there may be no disruption to the flow of consumer credit, but even the likelihood of bankruptcy or insolvency of an entity makes bankers and investors who extended it credit look the other way.

The good news is that, so far at least, the New Economy has proven to be resilient. While the long expansion cycle has been punctuated periodically by problems—by the 1994 bond market meltdown (see Chapter 11); the 1995 Mexican peso crisis; the 1997 collapse of East Asia's emerging markets; Russia's 1998 bankruptcy and LTCM's blow-up—the New Economy's ability to weather such severe shocks reflects an increase in the efficiency and flexibility of financial management, which led to the market's ability to:

- Face shifts in boom and bust without a panic
- Absorb various shocks emanating from the global market without collapse, and
- Look at the 60 percent fall in the NASDAQ Composite Index as a major correction rather than as a cataclysmic event

The bad news can be summed up in one query: "Will this wise management of the economy and of financial matters continue?" Aptly, Michael J. Mandel compares managing the Old Economy to driving an automobile and managing the New Economy to flying an airplane. In a motor vehicle, Mandel says, if anything unexpected happens, the best response is to put on the brakes. But an airplane needs airspeed to stay aloft.[1]

The message is that the New Economy needs fast growth for high-risk investment in innovative products and processes. The advice Mandel offered to the Fed and other central banks is to learn to deal with a leveraged economy, just as pilots learn how to deal with a stalled and falling plane by the counterintuitive maneuver of pointing the nose to the ground and accelerating. Policymakers

have to find a way to go against their instincts by cutting rates when productivity slows and inflation goes up. In January 2001 the Fed seemed to heed that advice.

This can be said in conclusion. So far the New Economy passed five major market tests in 1994, 1995, 1997, 1998, and 2000 and came up from under. This is good news. Yet the frequency of these tests is high, with them coming just a couple of years from one another, while their severity has increased. Nor has the new financial environment been positive for all companies. The New Economy has not been destabilized, but the market is a tough critter.

MARKET FALLS OUT OF FAVOR WITH TECH STOCKS: APPLE COMPUTER'S BLUES AND THE DOT-COMS

Liabilities have to be paid. The best way to do so without creating new debt is to maintain a healthy income stream. New products help in keeping the cash flow intact, in spite of high volatility, the market's liquidity woes, and a toughening competition. Product innovation is a process, not an event. The market does not want to know why product innovation has been interrupted. If it is, a company's history of successes turns into a history of failures.

The 50 percent plunge in Apple Computer's share value on September 28, 2000, wiped out two-thirds of the gains since Steve Jobs returned as CEO in 1997 to rescue the company he had created two decades earlier. One reason for the market's harsh reaction has been that Apple itself fell behind in innovation, and sluggish sales confirmed investors' worst fears about weakening demand for personal computers.

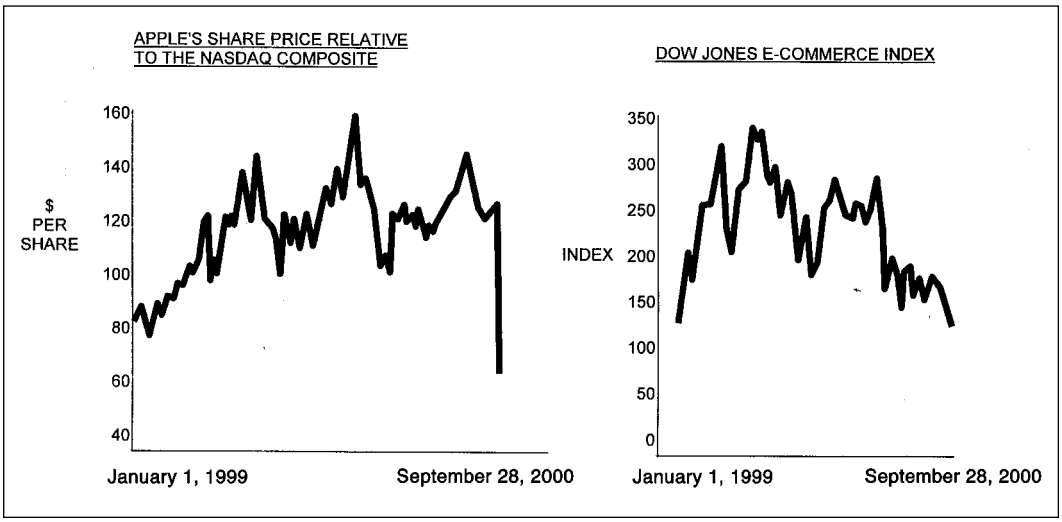
- Like Intel a week earlier, in that same month of September 2000, Apple was hit by a sudden deterioration in personal computer sales around the world.
- With lower economic growth adding cyclical weight to what looked like a structural slowdown in PC markets, investors were fleeing that sector at large and Apple in particular.

As Exhibit 2.3 documents with reference to the Dow Jones electronic commerce index, the whole technology industry has been in a downturn. Apple paid a heavier price because market analysts believed that its problems went deeper. The company's remarkable renaissance since 1997 raised hopes that a flurry of smartly designed new products, such as iMac and Power Mac, would allow it to break out of its niche in the education and publishing markets. But by all evidence most of Apple's growth in the late 1990s came from exploiting its original installed base of Macintosh, not from real innovation.

When the profits warnings came, they suggested that the process of rapid innovation that kept the market running had reached an end. With its older products no more appealing, and the new G4 cube too pricey to sell to consumers in volume, the market doubted whether Apple could continue to expand its market share. True enough, Apple's troubles were overshadowed by those of the big dot-com names that came down from cloud nine to confront a range of real-world problems, including:

- Liabilities as high as the Alps
- Grossly underestimated capital costs, and
- Lack of control over all sorts of business partners.

Exhibit 2.3 Investors Could Not Get Enough of Technology Stocks in 1999, but Market Sentiment Reversed in 2000



These problems also were present with other companies in the go-go 1980s, and they were solved through junk bonds. They also were around in the first half of the 1990s, and then the answer was leverage through fast growth in liabilities. But by the end of 2000, with easy financing no longer in sight, there have been questions as to whether companies living in the liabilities side of the balance sheet can survive. For instance, will Amazon run through its $1 billion cash horde before 2002, when analysts expect the company to break even?

Part of the market's concern has been that although the CEO of Amazon.com is a former investment banker, he has not yet figured out his company's short-term and medium-term profit and loss (P&L) strategy. In October 2000, financial analysts even concluded that when an online shopper orders several products at one time, Amazon loses on average $2.9 per order. Other dot-coms are managed even worse than that. Their promoters and owners are engineers who do not:

- Really have a business model
- Know how to choose a path to profitability
- Show a compelling consumer benefit – something people cannot imagine life without.

All told, the glamour era of the Internet has reached its low watermark. While the Internet era is not over, it is time to start doing things that make business sense. The problem is that a large majority of dot-coms are not positioned for that. They have been too busy running fast to figure out their next move and launch the new-new thing before adversity hits the single product or service they feature.

Other New Economy firms, as well as those of the Old Economy that tried to recycle themselves into the new, have had similar jitters. As we will see, Xerox is a case in point. While the shares of many top-tier technology stocks have been slashed by 50 percent or somewhat more, the stock of Xerox lost about 90 percent of its value. Yet Xerox is not a start-up; it is more than 40 years old.

Other established companies that had made an excursion into cyberspace pulled back. In January 2001, Walt Disney announced it would shut its Go.com Web portal, taking a $790 million charge to earnings, and redeem the Internet Group's separate stock.

- By early 2001 many Internet spin-offs had become an embarrassing liability to their owners.
- One after another, companies decided that money-losing spin-offs need to be cut back or reintegrated into the mother firm—turning spin-offs into *spin-ins.*

Even companies that retained tight control of their brand image spent plenty of money on research and development (R&D), or grew through acquisitions, had product woes or other sorrows. If the products of Lucent Technologies were obsolete, those of Cisco Systems and Nortel were first class. Yet at the end of February 2000, Cisco Systems was more than 65 percent off its 52-week high and America Online was down 60 percent. In just one day, February 16, 2001, Nortel lost more than 30 percent of its capitalization, over and above previous losses.

Together with Microsoft (down by more than 60 percent) and Yahoo! (80 percent down), the companies were the high fliers in the U.S. stock market, companies whose drop from grace exceeded the average by a margin. The performance of the Standard & Poor's (S&P) 500 sector in the fourth quarter of 2000 can be described in a nutshell: Worst hit were semiconductors, then software firms, communications technology, and computer hardware, which all dropped into negative territory. Even investment banks and brokerages lost 20 percent or more of their capitalization as investors started doubting that the expansion could continue.

With market blues persisting in the beginning of 2001, about four months after the NYSE's and most particularly NASDAQ's major retreat, there were good reasons for thinking that the old principle of buying on the dips was no longer a good strategy. The investors' momentum, which helped to push technology stocks up to unprecedented levels 10 months earlier, was running in the opposite direction.

Bargain hunters presumably require goods to be cheap. But even with the huge drop in price/earnings (P/E) ratios, "cheap" is a notion that could hardly apply to any of the prominent technology stocks. Something similar is true about the relationship between P/E and the company's projected earnings growth (PEG) rate, as big and small companies misjudged the direction of product innovation while they spent lavishly on mergers and acquisitions and got overleveraged with liabilities.

In addition, their management accepted risk for risk's sake, not as part of a new challenge. There was also difficulty in deciding whether to choose to live in the Old Economy or put everything into the new. Bad business sense and bad planning compounded the failures and brought formerly big-name companies into an unstoppable sliding track. That's the story of Lucent Technologies and Xerox.

The bubbles that contribute to the rise and fall of blue chips and any other equity have excessive debt as their common feature. The 1980s and 1990s saw an amazing explosion of liabilities, with the result that the virtual economy got unstuck from the real economy on which it was supposed to rest. This has been true of individual companies and of the U.S. economy as a whole. Speaking of averages:

- In the 1960s federal debt grew 2 percent per year, while the annual rise of GDP was 7 percent.

- In the 1980s, federal debt zoomed up at more than 13 percent per year, with the corresponding growth of GDP still a little over 7 percent.
- In the 1990s excesses in federal budget overruns were corrected, but companies and households specialized in the dangerous art of overgearing.

When it crashed in September 1998, Long-Term Capital Management had a derivatives exposure of $1.4 trillion in notional principal, with a capital of $4 billion. This means a gearing of 350. AT&T, Lucent, Nortel, Xerox, and the other big names were not that deeply indebted, although they, too, were highly leveraged; but many of the dot-coms had thrown financial fundamentals into the wastepaper basket. Analysts and investors imagined that the Internet entrepreneurs were wizards able to walk on water and failed to account for their weak credit quality.

LUCENT TECHNOLOGIES' HANGOVER

The graph in Exhibit 2.4 is not that of the fading fortunes of an initial public offering (IPO) but of the owner of the famed Bell Telephone Laboratories, the birthplace of many modern inventions from the transistor to lasers and optical fibers. From late August to October 2000 Lucent Technologies' stock lost more than 60 percent of its value. Then it hit an air pocket and went down another 20 percent or so. Ill-advised strategic choices, wanting product planning, and inordinate high costs have been in the background of the debacle suffered by the company's stakeholders.

- In the short span of five months, shareholders have seen over 80 percent of the stock's capitalization go up in smoke, as the market penalized this equity for its mismanagement.
- Executives and employees watched their stock options going underwater, and everyone knew that if the options stayed there a long time, the company would be forced to shell out precious cash to retain top employees.

Exhibit 2.4 February to October 2000, Lucent's Stock Price Tanks Like an IPO Bubble

This is a textbook case in mishandling one's fortunes. Product planning went wrong because the top brass slept too long on old technology laurels. Yet the company owns Bell Labs, the world's most renowned R&D center. For decades, Bell Labs had the magic formula that yielded some of the most important innovations of the twentieth century. But countless scientists and six Nobel laureates in physics cost money, and Bell Labs had no moneymaking culture.

As the capital market administered its punishment, a big, famous company found out that cash flow and profits are not fruits that grow on trees, while liabilities have the nasty habit of becoming a pain in the neck. Year in and year out, Bell Labs got 11 cents of every dollar Lucent generated in sales, a total of more than $4 billion in 1999. A tenth of that amount has been devoted to basic research, which is a normal practice. What was wrong was the product planning policies guiding the other 90 percent. After the debacle, Lucent said that it intends to reorganize the scientists and engineers into groups that would see a product from invention to production (and why not to sales?).

This is a huge change from a nearly 100-year-old practice where researchers work in their own world and on their own pace. Experts at Wall Street also suggested that Lucent may even let venture capitalists take a stake in and manage some projects to inject entrepreneurial drive and cash. Doing this will turn the old Bell Labs culture on its head.

Physicists, engineers, and other scientists at Bell Labs will now be under pressure to develop marketable products and to deliver them at a fast pace.

The board gave a sign that it wanted to see a better focus in the company's business and a new person at the steering wheel. It fired the failed CEO and chose Henry B. Schacht as chairman and chief executive officer. The 2000 annual report stated that Lucent's aim is that of lighting up a new kind of Internet: a broadband structure that will open the door to tomorrow's rich applications, allowing people and companies to communicate "without limits." There is nothing wrong with this concept, except that every other telephone equipment company targets the same market.

Lucent's new strategy increases the ranks of companies that tool up for mobile Internet, making it possible for users to tap the power of the Web from Net phones and other wireless devices. The new management wants to see Lucent become not only a revitalized company but also one capable of seizing the opportunities of the emerging Internet world through optical, wireless, and data-oriented networking services, enriched by advanced software solutions.

If this is the company's new core business, *then* there is no room for some of the more classical product lines, such as voice messaging, customer relationship management/call centers, company voice switching systems, structured cable products, and so on. In September 2000, Avaya was spun off (under the old management of Lucent) with some 78 percent of the *Fortune 500* as customers; 1.5 million user sites in 90 countries; and almost a half-million businesses with service agreements. In fiscal 2000, Avaya represented a $7.6 billion business.

Agere Systems was also spun off. Its product portfolio includes integrated circuits for wireless and wired communications; computer modems; network elements; and optoelectronic components for optical networking solutions. Its fiscal 2000 business was $3.7 billion, excluding sales to Lucent.

Lucent also let it be known that it will take a sharp knife to cut costs. This job fell on newly hired chief financial officer Deborah Hopkins. Starting in October 2000—too late according to most estimates—all spending has been governed by strict guidelines on *returns* after the cost of capital is subtracted. Gone are the days of budget allocation based on seniority and on individual connections or tastes.

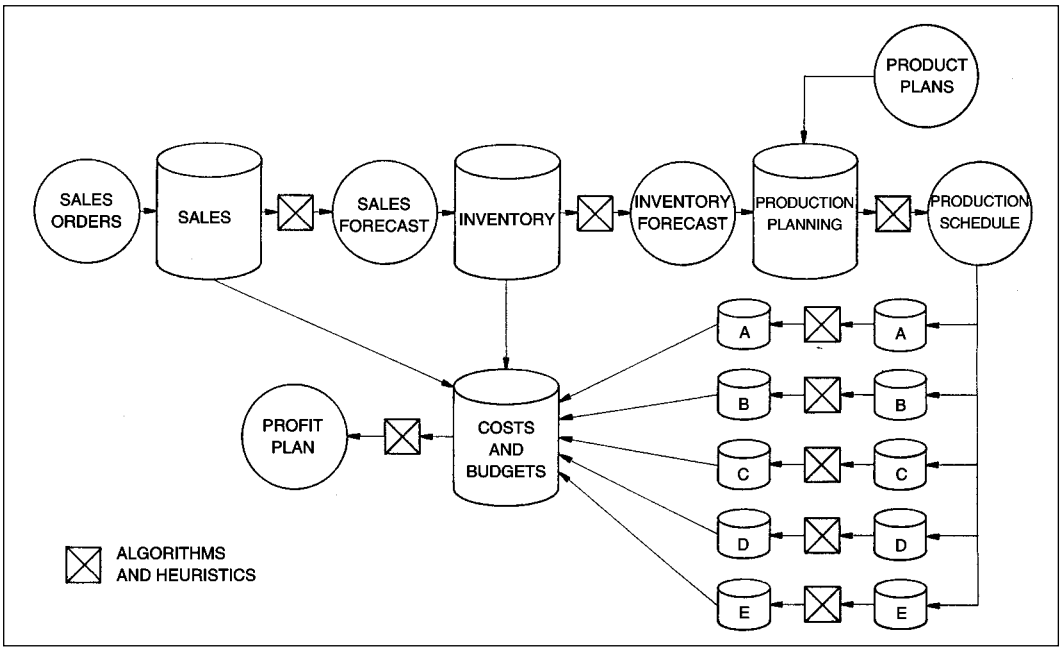
At long last, Lucent's top management seems to understand that liabilities cannot mount forever while the company continues being a big spender. Some cognizant people suggested that better days lie ahead *only if* the restructuring of Lucent's business operations changes everything from product planning to R&D programs, market thrust, supplier management, the way of closing books, means of speeding collection of receivables, and a policy for reducing inventories.

Lucent said as much by suggesting that each of its 95 product and service lines will be judged on its return on capital invested. Unbelievable as it may sound, until the debacle top management had only overall profit-and-loss statements from the company's two main divisions. So many of Lucent's products were sold internally to other departments that often it was impossible to distinguish how much revenue each generated, let alone the cost required to produce it.

Companies never learn from other entities' mistakes and misfortunes. I had a case very similar to that of Lucent in the 1960s as consultant to the board of AEG-Telefunken, which was at its time one of Europe's top five electrical/electronics firms. Salespeople were spinning their wheels internally, losing precious time and adding to costs. Finally, management understood that this was bad business. The solution was to establish a company-wide planning system that served all departments and divisions along the lines described in Exhibit 2.5. The pillars were:

- Sales forecasts
- Optimal inventory levels
- Interactive production schedules
- Standard costs

Exhibit 2.5 Referential and Concurrent Sharing in a Planning System



This did away with internal sales, since every department and division participated in the plans, the technical specifications, and the setting of standard transfer prices—which were tested for market competitiveness before being approved. This approach cut administrative costs most significantly, speeded up product development, and did away with a good deal of internal friction (agency costs).

Another result of AEG-Telefunken's technology- and business-based restructuring was that of mining the customer database in a cross-divisional way. Comparing P&L by transaction to standard costs also convinced senior management that many reps were giving away the store. The reason was perverse incentives. In the case of Lucent Technologies, also, the company's salespeople were rewarded for their ability to bring in revenue and profits at the gross margin level. By contrast, cost control was left on the back burner, and net margin did not seem to be a criterion.

Yet costs matter in all cases—and even more so when liabilities run high. Judging from the comments of Wall Street's analysts, Lucent's upside-down profitability algorithm had seen to it that hidden costs of installation, training, and interest on loans to customers were largely ignored. It was therefore not surprising that return on assets for the nine months ended June 2000 dropped to 4 percent from 10 percent a year earlier. That is plain mismanagement. The company said that after restructuring, salespeople will know about costs, and they will be compensated for their ability to bring marketing costs under control.

All the messages conveyed by these facts are like motherhood and apple pie. Management directives are important, but only actions tell if a company can turn itself around. Part and parcel of a good solution is a sweeping change in top management, as Lee Iaccoca did when he took hold of Chrysler after the company went in free fall. In Chrysler's case, at the end of the 1970s, not only was there a new CEO but of 35 vice presidents of the old regime, only one remained. By contrast, at Lucent, with a few exceptions the old tired hands stayed at the helm. The same is true of the people who orchestrated the downfall of Xerox.

DOWNFALL OF XEROX

To the untrained eye, the free fall of the stock price of Xerox, back in 1999, was one of the market surprises. Xerox was the first big name among technology companies to be hit by the market. The value of Xerox stock slid from a high-water mark of $64 in May 1999 to $7 in October 2000 and dropped to about $6 thereafter. The loss in capitalization is a cool 90 percent. In essence, the shareholders paid mismanagement's bill. The statistics are telling:

- The $6 or so level is just above the price at which Xerox listed in the New York Stock Exchange in 1961.
- In just one day, October 18, 2000, the company's shares plunged 36 percent.
- Altogether, the market took back some $40 billion from the hands of Xerox shareholders.

In October 2000 the immediate problem concerning investors was the fear that Xerox faced a credit squeeze. Such a squeeze was particularly dangerous because it did not seem that the company was able to manage its liabilities any more. In an October 10 Securities and Exchange Commission (SEC) filing, Xerox said that it had tapped into a $7 billion bank credit line. The market interpreted this statement to mean that Xerox management could not return to the credit markets to raise new funds and pay down previously floated debt that it had coming due.

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Profit and loss was dismal. Xerox lost $198 million in the last quarter of 2000, the largest quarterly loss in a decade. Even the company's own forecast did not suggest it would edge back into profits until the second half of 2001, at the earliest; this date seems to be too optimistic. With $2.6 billion in debt coming due in 2001 and the $7 billion bank loan looming in 2002, Xerox is cutting spending, firing workers, and trying to raise $4 billion by selling assets.

To beef up its extra thin cash-in-hand position, Xerox borrowed from GE Capital $435 million secured by European receivables. Expenses have been trimmed all over the firm. Management has even cut back on . . . xeroxes. Citing some indicators of the slowdown in the U.S. economy, the December 24, 2000 *New York Times* reported that "Xerox, of all companies, reportedly asked its employees not to make so many photocopies."

Other companies faced problems in the fourth quarter of 2000, but most of these were small potatoes compared to the Xerox debacle. With about $4 billion remaining on its credit lines and a BBB rating from Standard & Poor's, Wall Street did not believe the company was in imminent danger of declaring bankruptcy, but neither could analysts forget that, at the same time, Xerox was faced with a:

- Mismanaged portfolio of liabilities
- Long list of operational problems
- History of management snafus with its product line

Dr. Louis Sorel, a professor of business policy at UCLA, would have put the third item first. Sorel believed that product line failures are the most frequent salient problem of industrial companies. (A *salient problem* is the one to which top management must address its immediate and undivided attention, because left to its own devices the salient problem kills the firm.)

From the time of its acquisition of the computer firm of Max Palevski, back in the 1960s, which it mismanaged in the most flagrant manner, Xerox had difficulties handling any technology other than pure xerography. This did not matter much as long as xerography had plenty of sex appeal, but it became a liability when that appeal faded.

In the 1960s, other companies had used xerography as a way to reinvent themselves. When Rank teamed up with Xerox in the United Kingdom to form Rank-Xerox, Rank was mainly a cinema company, complete with starlets, accommodating couches, and the famous gong whose bong was a Rank film's trademark. To this it added photocopying, which proved to be one of the best products of the twentieth century. The Xerox deal extended Rank's life beyond its natural span. That is how:

- Evolution works in a market economy.
- Resources move from failing business lines to rising ones.
- Extinction comes when a company runs short of brilliant ideas on how to move ahead.

The last bulleted item tells, in a nutshell, the story of Xerox and of so many other companies that let themselves age—and then they faded. In a way closely emulating Lucent's failure to get value out of the immense human resources of the Bell Telephone Laboratories, Xerox was incapable of commercializing breakthroughs made in its avant-garde Palo Alto Research Center (PARC) in the 1970s and 1980s. Speaking in business terms, it got no mileage out of such breakthroughs as:

- The Ethernet in local area networking[2]
- Human interfaces to the personal computer
- The inkjet printer for desktop document handling

3Com, Digital Equipment, and many other companies capitalized on the Ethernet; Apple and other computer vendors did the most with the mouse and other interface breakthroughs by Dr. Alan Kay; Hewlett-Packard built a profitable division on inkjet printers, larger now than all of Xerox. These are the facts. As Aldous Huxley so aptly suggested, "Facts do not cease to exist because they are ignored."

As if these persistent and severe product failures were not enough, the last few years also have seen a large amount of executive-suite discord, infighting, and musical chairs. The main players in the Xerox version of musical chairs have been the company's two CEOs: the elder Paul A. Allaire, who became board chairman, and the newer G. Richard Thoman, who rightly or wrongly was fired by the board after a relatively short stint at the helm.

The story of Allaire and Thoman is that of the insider and outsider, and it resembles in many ways that of Simon Knudsen—the General Motors executive vice president who parachuted as president of Ford to find a wall of resistance by the insiders. In Xerox's case, Thoman, the outsider, and a small group of like-minded executives were newcomers to the company. Allaire and those executives he supported were the insiders; they were the senior management team Allair had assembled since he was first named CEO in 1990, and they stayed loyal to him.

Thoman came to Xerox from IBM, like Armstrong, who brought AT&T to its knees. (Armstrong also had had a stint at Hughes.) Thoman and his small team shared the belief that Xerox needed to reinvent itself to succeed in the New Economy. But "reinventing" means pain and bold action—it is not done only through words or good intentions. The outsiders were not able to convince the insiders that for Xerox, change was a do-or-die proposition.

According to an article in *Business Week*, Allaire insists that he did nothing to impair Thoman's authority. "There can only be one CEO, and I respected that," he said, adding that Thoman erred in forcing a pace of change on Xerox that it simply could not withstand. "The problem Rick had was he did not connect well enough with people to get a good feel of what was going on in the organization and what was and wasn't possible."[3] This statement in itself is wrong because of its contradictions.

Either because of management infighting or plain inability to run a technology firm, Xerox could not adapt to the challenge of the Internet, which shifted much of the work formerly done by copiers to desktop printers. At the same time, the company alienated customers through an ill-conceived reorganization of its sales force that seems to have solved practically none of the problems it targeted in the first place while creating some new ones.

No doubt, transforming a company when the underlying technology changes rapidly is in itself a great challenge. But that is why top management is paid such high salaries, bonuses, and options. The challenge can be faced with excellent management skill, able to wholly appreciate that companies can be crippled by the very things that made them strong:

- Serving their core customer base in an increasingly competitive manner
- Keeping profit margins high, even when if they face disruptive technologies and predatory pricing

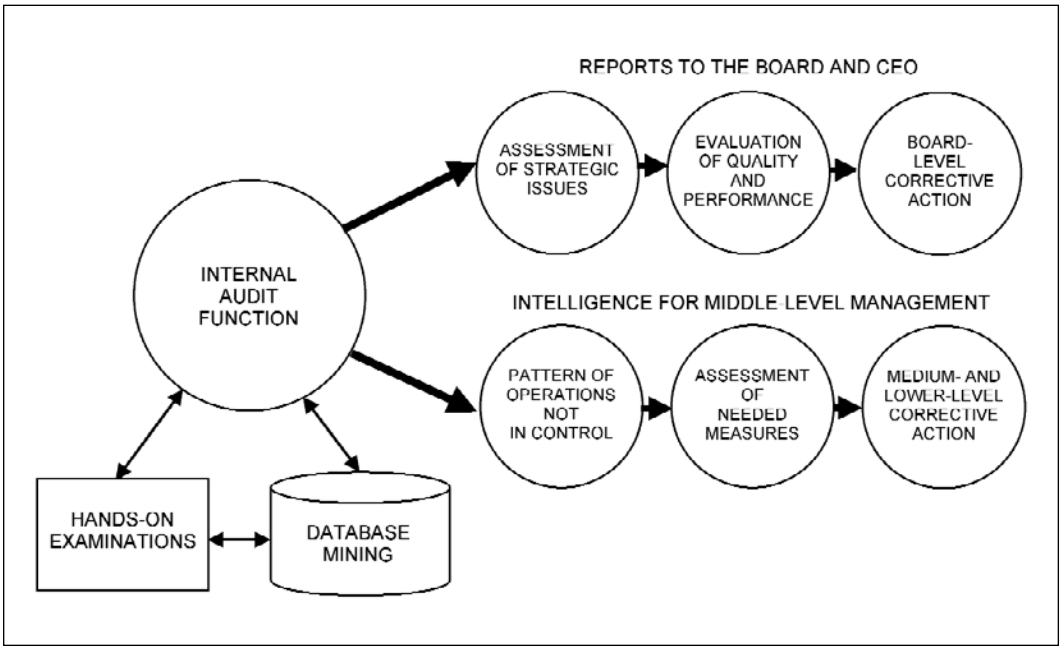
Rapid innovation cycle aside, the net result of disruptive technologies is that mismanaged companies are having a growing amount of trouble making money in a market more and more characterized by low profit margins. Without a major paradigm shift, short product cycles make the search for a solution even more elusive than it has been so far—while the liabilities portfolio weighs very heavily on the company's future.

Management excellence is served through a rigorous internal control and auditing function along the lines described in Exhibit 2.6. The rapid pace of technological change sees to it that in the case of technology companies, such as Lucent and Xerox, auditing should not be limited to the accounting books. It should be feeding the internal control system with reasonable and logical answers to queries about timetables, deliverables, quality assurances, and costs. Anything short of that is a commonsense bypass with disastrous consequences.[4]

SHIFT FROM REAL TO VIRTUAL ECONOMY AND THE CHALLENGE OF THE SERVICE INDUSTRY

Earlier I made reference to the shift from the real to the virtual economy. This shift of economic activity to the virtual world is an event for which there exists no precedents, and therefore no pragmatic evaluations can be made regarding its extent and aftermath. What could be said is that, by all evidence, the New Economy is likely to give rise to business cycles characterized by swings

Exhibit 2.6 Bifurcation in Self-Assessment Through Internal Control and Auditing



in volatility. Both credit volatility and market volatility will likely reach new heights that, at the present time, are unfamiliar to investors—all the way from questionable loans to disruptive pricing and stock market swings. Many years down the line, people looking back may even say that 2000 was a relatively calm period compared to financial events taking place in, say, 2020.

There are many reasons for growing volatility in the financial markets. At the top of the list is the switch from assets to liabilities as a basic frame of reference. But this is not the only reason. Another reason is that the New Economy still contains many practices from the Old Economy that act as roadblocks, red tape, or points of friction. Labor relations between companies and unions is an example.

At Verizon Communications, the merged entity of Bell Atlantic, GTE, and some other firms, Communications Workers of America (CWA) and the International Brotherhood of Electrical Workers (IBEW) still represent some 53 percent of the approximately 250,000 workers. The CWA seems determined not to repeat its experience with AT&T, where the union share shrank to about 25 percent as AT&T merged with cable and wireless companies. With the Verizon strike, labor unions won the right to unionize nonunion divisions once 55 percent of employees sign union cards. The practice of unionization, which dates back to the nineteenth-century Industrial Revolution, is poison to both the concept of leveraging that characterizes the New Economy and the mechanics of the service industry, which depends on labor flexibility to grow and survive.

In Euroland (the 12 countries which make up the euro zone), financial research institutes produce dismal statistics demonstrating that the European Union (EU) is overexposed to the disruptive effects of labor union strikes, overregulated, and overtaxed as compared to the United States. Nor are bankruptcy laws up to date. It takes a bankrupt company in the EU more than eight times longer than one in the United States to be free from its creditors' demands and able to try again.

In short, labor unions are too strong, governments too immobile, while costs and taxes are too high. Another problem is the relatively lower quality of Europe's information and communications technologies, which are unfit in a New Economy setting. The cost of access to the Internet is more than double compared to the United States. Inventiveness and the funding of R&D are another casualty. The rate of applications for new patents runs at half the American rate and a third of Japan's.

The traditional economic concept of services as a tertiary sector or set of economic activities greatly undervalues their actual role. In today's economy, services need to be viewed as functional components of the value chain associated with all products and business activities. The contribution of sophisticated services must be properly acknowledged and measured.

- Innovation in services is proceeding rapidly, and it increasingly poses challenges to the traditional way we have looked at the design of services and their control.
- In all their emerging forms, the Internet and digital wireless technology are transforming the manner in which a wide range of services are being produced, consumed, and intermediated.

There is also the fast-developing concept of knowledge-based services, such as the design of custom-made derivative instruments and personalized risk control systems. The concepts behind them are critical to the New Economy, emphasizing the fact that production and consumption of many services increasingly require an advanced base of knowledge and skills available to a growing proportion of the population in developed countries. This introduces new notions of

intermediation and disintermediation, whereby established intermediaries are displaced; as well as reintermediation, where new intermediaries are introduced through new technological advances.[5]

Largely written in the nineteenth century at the time of the Industrial Revolution, labor laws are out of place and out of date in a knowledge society. European companies complain that current laws to protect workers are 14 times stricter than in the United States, where the hire-and-fire principle dominates. The largest resistance to change comes from French and Italian politicians of both left and right and their labor union leaders, who are keen to promote a European social agenda—whatever this means:

- Guaranteeing workers' rights but not their obligations
- Unwilling to negotiate social clauses that no longer make sense
- Stressing the fight against social exclusion, at whatever cost

When she was the French labor minister, Martine Aubry said: "Economic growth and social cohesion are mutually reinforcing. When society is more inclusive, it performs better." Business leaders responded that the opposite is true: "When an economy performs well, society is more inclusive."[6] Too many rights and too few responsibilities poison the entrepreneurial future, and nowhere is this more true than in a service economy.

No one should ever forget that services are at the very core of the New Economy. They are both connected to and distinct from the Old Economy systems of production, distribution, consumption, and intermediation. Experts believe that the New Economy is essentially a Net economy, including Internet commerce that, in spite of the setbacks we have seen, is fundamentally transforming current society into a different services mesh by combining technology, knowledge, and capital markets.

If we leave aside the forces released by booming liabilities and derivative financial instruments, we will see that the forces of this on-line global economy are instrumental in generating new products and new types of services. Featherbedding can kill them. Because this risk of interference by the past is always present, both believers and nonbelievers in the shift from the Old Economy to the New have major queries:

- Is there *really* a New Economy and, if so, how does it differ from the old?

Surely, as we just saw with Verizon, the answer is not in new forms of labor relation. Neither, as demonstrated with Lucent and Xerox, could the answer be in getting rid of mismanagement—which is a nearly impossible task. But there should be a response to this query, and the capital markets have had thrust upon themselves the role of watchdog of corporate efficiency.

- Are services being created, provided, and used in a different way in the New Economy from in the past?

To answer this query we must first define in fairly concrete terms what role new services play in the different economic sectors of the New and the Old Economy. Also, we must define the key factors upgrading and downgrading them. Part and parcel of this last reference is the question of whether a horizontalization of services is taking place, and how far it goes—which brings up another query:

- What implications will the horizontalization of services have on national and global economic and business activities?

For instance, in the PC industry, the horizontal model sees to it that personal computer manufacturers get software from Microsoft and chips from Intel rather than use their own resources to cover every type of supply. Transition from the vertical model—where the same manufacturer makes the chips, the computer, and the software—to the horizontal model can be painful. IBM found that to its dismay when in the early 1980s it adopted Microsoft's DOS for its PC.

- Because of horizontalization, services are no longer represented in the form of discrete activities as banking, insurance, or travel.
- Instead, they show up in horizontal integrated forms, like all-banking, a practice encouraged by the Internet, wireless solutions, and nomadic computing.

Horizontalization does not relieve a company from taking responsibility for product innovation and the whole user experience, but it does away with the monopoly a company exercised in the market. Similar issues may be raised about many other subjects that have so far benefited from rather limited research in regard to their economic and social aftermath, as contrasted to lavish money spent on technology's side, such as money spent on discoveries in genetic engineering and nanotechnology (molecular-level engineering).

Molecular-level engineering may lead to vast transformations in the way industry works. Indeed, experts believe that molecular-level engineering will oblige some companies to renew their business practices well beyond their technological base. It might also enable terrorists to unleash mayhem far more dangerous than the nuclear threat. As Bill Joy, one of the better known technologists, has suggested: "These technologies are going to create a quadrillion dollars of wealth . . . but we do have to deal with the risks. The future is rushing at us at incredible speed, and people just haven't thought it through."[7] Think of this when you contemplate whether the New Economy might be just a passing fancy.

FINANCIAL STAYING POWER AND BUSINESS TURF

In the very competitive, capital-intense, globalized environment created by the New Economy, companies that care for their survival run their businesses on a sound financial footing. They use financial strength to accelerate growth while continuing to dominate the markets they serve. They also build quality products at competitive prices and see to it that their facilities are furnished with the best equipment and tools available, so that their staff can be productive and effective.

- The first law of capitalism is healthy cash flow (see Chapter 9) and good profits.

Prerequisite to cash flow sales is performance. Well-managed firms may lower prices to enter new markets or to keep a competitor from getting a foothold in their customer base, but to do so they are careful to revise downward their costs. They also may use pricing as a tool to buy market share. (This is typically done when the firm has financial staying power, because price wars require

large sums of cash.) Running out of money or of the ability to borrow it means that the company cannot maintain its image or protect its business turf.

- The second law of capitalism is Darwinian: survival of the fittest in all walks of business.

One of the characteristics of the environment we call "the New Economy" is that it does not allow any sector or any company to become less efficient than its competitors- and survive. Management must not only have clear strategic directives but also must know how to mine its data, how to spot productivity payoffs, how to be ahead of the curve, and how to foresee bottlenecks in the pipeline.

If management fails in this mission, the company's stock gives back its gains during the last couple of years, or even more than that. One big difference with the Old Economy is that, in the New Economy, the penalties are swift. Companies can lose 50 or even 90 percent of their capitalization at lightning speed, as Compaq, Xerox, and Amazon.com (among others) found out the hard way. Just rest on your laurels for a while and you are out of the running.

- The third law of capitalism is that nothing is really predetermined.

Although each epoch has its principles, these change over time as the economic and financial system adapts to new drives, new inventions, and new challenges. Our epoch's principle is to keep costs low, very low, to make business innovation instantly available to everyone, at any time, everywhere -–and to do so while making good profits in spite of featuring rock-bottom prices.

The Internet has cast itself into this role of market push and pull. It is promoting *emerging industries* but also leveling the global playing field by speeding the flow of information and communication. Throughout the world, small local economies take advantage of this rapid succession of opportunities, which would have been impossible without technological prowess. But emerging industries and *emerging markets* also have risks, and with the New Economy such risks involve many unknowns.

As we have seen in this chapter through practical examples, some of these unknowns come by surprise, and they do so with increasing frequency. The disruptions and uncertainties the New Economy experienced with the two major corrections of the NASDAQ and of the New York Stock Exchange in 2000 have sent organizations scrambling for professional guidance. This guidance is not forthcoming because major financial institutions as well as the technology companies responsible for the changes taking place are themselves struggling to make the right guesses on the course they should follow.

Precisely because there is no precedence to the twists of the New Economy and to the fact that governments, companies, and consumers focus more and more on the liabilities side of the balance sheet, both bulls and bears can make a point that is difficult to refute. One thing that can be said with relative certainty is that together with globalization, the New Economy has a deflationary effect:

- Globalization not only provides worldwide markets but also gives companies one more incentive to shift labor-intensive tasks abroad.
- The virtual economy adds to this by igniting a race to shift formerly complex jobs such as purchasing to the World Wide Web, aiming at sharp reduction in costs.

Within less than a month after the three big U.S. automakers got together to exploit the tremendous savings in the supply chain through i-commerce in March 2000,[8] six tier-1 auto parts suppliers—Delphi Automotive, Dana, Eaton, TRW, Motorola, and Valeo (of France)—joined forces to examine potential Internet commerce initiatives to accelerate cost savings; they know that for their principal clients, cost cutting of up to 10 percent will have to come from further down the food chain.

For the six, cost reduction by 10 percent represents an estimated annual $25 billion per year. Let's not forget that the $25 billion to be saved by motor vehicle manufacturers will be missing from the pockets of other entities. If the auto parts suppliers are successful in cutting by that much their procurement costs, the $25 billion will be a shortfall to their suppliers. It is a basic Old Economy and New Economy principle that there is no free lunch.

The impact of the weight of big companies on the suppliers market is both global and local; it has a major impact on the economies of many countries. A good example is the weight of the U.S. economy in a globalized, technology-driven business landscape. Technology policy and the management of change helped in creating the conditions for faster growth with little inflation. These are important competitive advantages because the New Economy does not eliminate the normal constraints of the business cycle, as the events of 2000 and 2001 document.

Even in the United States, where the forces of the New Economy are on the move, it is wise to take notice that despite talk of a consumer-led boom, business investment is outrunning consumption. In the first quarter of 2000 consumer spending rose at a 12 percent annual rate, while business investment in equipment, software, and other technological infrastructures rose at a 21 percent rate. This brings the question of leveraging into the picture again.

- Business investment rises by a double-digit number because businesses project a growth in profits from great efficiency and capacity expansion.
- But the cash flow is in the future. In the short run, the money comes from loans and commercial paper, increasing by so much the liabilities side of the balance sheet.

A salient question with the New Economy is when supercharging becomes critical. Attempts to fine-tune a company's decisions (as well as the economy) can miss their marks by a margin, since it is hard to know just what the true speed limit of the economy is. Very low interest rates, practiced in the 1990s and even today in Japan, bring with them lots of negatives—among them the feeling that money is free of cost. Equally bad is raising rates too high. This can smother the incentives for business investment that help sustain business confidence.

NOTES

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2. D. N. Chorafas, *Designing and Implementing Local Area Networks* (New York: McGraw-Hill, 1984).
3. *Business Week*, March 5, 2001.
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5. R. Brian Woodrow, "An Applied Services Economic Center (ASEC) Seminar," Progress No. 32, The Geneva Association, December 2000–January 2001.
6. *The Economist*, July 22, 2000.
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CHAPTER 3

Liabilities and Derivatives Risk

Companies are getting more sophisticated in managing the leverage inherent in their way of financing expansion in the New Economy. This sophistication is particularly true of entities that realize that managing financial risks is key to their survival, as the focus shifts from the stock of goods sold to financial well-being. The problem is that they have to master all matters involving exposure in a globalized economy: not only credit risk, interest-rate risk, and currency risk but also equity risk, operational risk, legal risk, insurance risk, and cross-border counterparty risk.

Solutions targeting a polyvalent approach to risk management are made more complex because of the compound effect of liabilities created through an inordinate amount of lending and by derivative financial instruments. This process involves many unknowns, because the entire financial market, its products, and all of its players are in a sea of change. Today's dynamic environment will continue being fairly unpredictable in the near future, as new instruments come onstream.

In the last two decades, off–balance sheet financing has come out of nowhere to become a top market challenge.[1] Derivatives have brought to industry as a whole, and most particularly the financial sector, both new business opportunities and a huge amount of risk. They have injected liquidity into the market, which is welcome. But they also have inflated the liabilities side, apart from creating a new concept—that of balance sheet items that one moment are assets and the next liabilities, depending on how the market turns.

One reason why the derivatives business boomed in the 1990s was that increased volatility in world financial markets pushed investment managers toward hedging instruments. Derivatives do serve to fine-tune exposure to a particular market or sector in the economy. An investor who has confidence in an emerging market, but not in the local currency, can obtain exposure to the equities while hedging away the currency risk by using foreign exchange derivatives.

The problem is such hedges can go overboard. Derivatives trading generates compound risk because of the tendency to go well beyond pure hedging into some sort of speculation. The contractual or notional amounts of hedging changes and instruments reflect the extent of involvement a company has in particular classes of derivative financial products. Until recent regulation changed off–balance sheet reporting practices, the maximum potential loss could greatly exceed any amounts recognized in the consolidated balance sheet.

Experience from past bursts of market activity suggests that eventually the system defined by derivative financial products will settle down. No one, however, projects that this will happen in the immediate future, as new exotic instruments continue to pop up. Research carried out during 2000

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and the early part of 2001 reveals that banks tend to allocate about two-thirds of their credit line toward counterparties to off–balance sheet operations and one-third to loans. This tells a lot about accumulated exposure.

Derivatives are used to trade and speculate in practically every commodity, magnifying both risk and return. This chapter discusses the price of oil, but practically any other commodity would do, such as an equity index or an individual stock price. Derivative financial instruments also help to create tax havens and serve as a vector for switching from the real to the virtual economy and back. How this is done will be explained through case studies, but first we must explain where the risks lie with derivatives.

RISK AND RETURN EMBEDDED INTO DERIVATIVES CONTRACTS

Although there are a number of exchange-traded derivative instruments, the bulk of derivatives contracts is found in bilateral accords. Most trades are concluded over the counter (OTC) between two counterparties that are supposed to know what they are doing as well as the amount of exposure they assume. Neither is necessarily the case because many bankers and other investors decide not on the basis of cause and effect but on perceptions.

An example is the perception that cost differences between cash and future markets are a justification for dealing in derivatives. An asset allocation program might seem to be more cost-effective using derivative instruments, but in reality what is at play is leveraging, hence liabilities. Lack of rigorous risk management tilts the scales on the liabilities side, even if money managers perceive some trades as fine-tuning between the use of debt and the use of equity derivatives.

- In the fixed-income markets, derivatives often are used for customization reasons.
- On the equity side, derivatives are favored as a means to increase liquidity and to act as proxy.

These are no riskless trades; as a general rule, however, the only unsuitable investment is the one the investor or trader does not understand in terms of its nature and its risks. To make profits, bankers must learn more about hedging techniques using futures, options, and the cash market. They also must appreciate that portfolios laden with debt derivatives are hard to trade and consequently carry greater risks in adverse markets, liquidity being one of them. Derivatives might help to lower risk only if they are used properly. The list of instruments includes:

- Interest-rate swaps of less than two years
- Interest-rate options, caps, floors, collars
- Interest-rate currency swaps
- Interest-rate or currency swaps linked to a bank loan
- Interest-rate or currency swaps linked to a debt issue
- Cross-currency swaps
- Some types of swaptions

Other examples are interest-rate futures; exchange traded options; forward interest-rate agreements (FRA); equity derivatives such as warrants, index options, and futures; commodity futures

and commodity swaps; credit derivatives, including junk bonds and bank loans swaps; as well as certain customized packages of derivatives products.

Exhibit 3.1 and Exhibit 3.2 show the evolution of the on-balance sheet and off-balance sheet portfolio of a major financial institution over five consecutive years. While both derivatives-based assets and derivatives-based liabilities have grown rapidly, the liabilities increased faster, exceeding the corresponding assets. This talks volumes in terms of risk.

Derivatives contracts typically specify a notional principal amount. Notional principal is a term borrowed from the swaps market, where it signifies the quantity of money never actually paid or received but used as the basis for calculating the periodic payments of fixed or floating rate interest. *If* notional principal is taken as the frame of reference, *then*:

- Each of the 30 largest banks in the world—American, European, and Japanese—will have on average the equivalent of $3 to $4 trillion in off-balance sheet exposure.
- The top three financial institutions most exposed in derivatives will have in excess of $10 trillion notional exposure each.

Notional principal amounts are no monkey money, but they are not a real level of exposure either. To turn notional amounts into real money, the notional principal has to be demodulated by a certain factor, which typically varies between 6 and 30, depending on a number of circumstances.[2] These include volatility, liquidity, cash flows, market nervousness, and the type of instrument being traded or in the portfolio.

Even demodulated, potential liabilities resulting from derivatives exposure are huge. Prior to their merger, both J. P. Morgan and Chase Manhattan had a demodulated derivatives exposure in

Exhibit 3.1 Assets with the Results of On-Balance Sheet and Off-Balance Sheet Operations

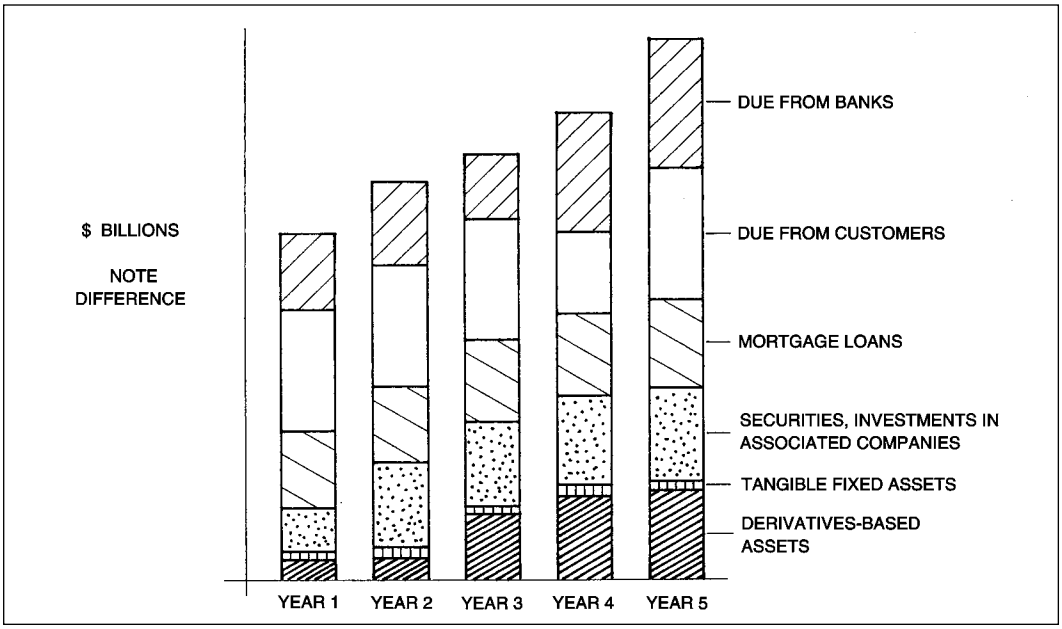
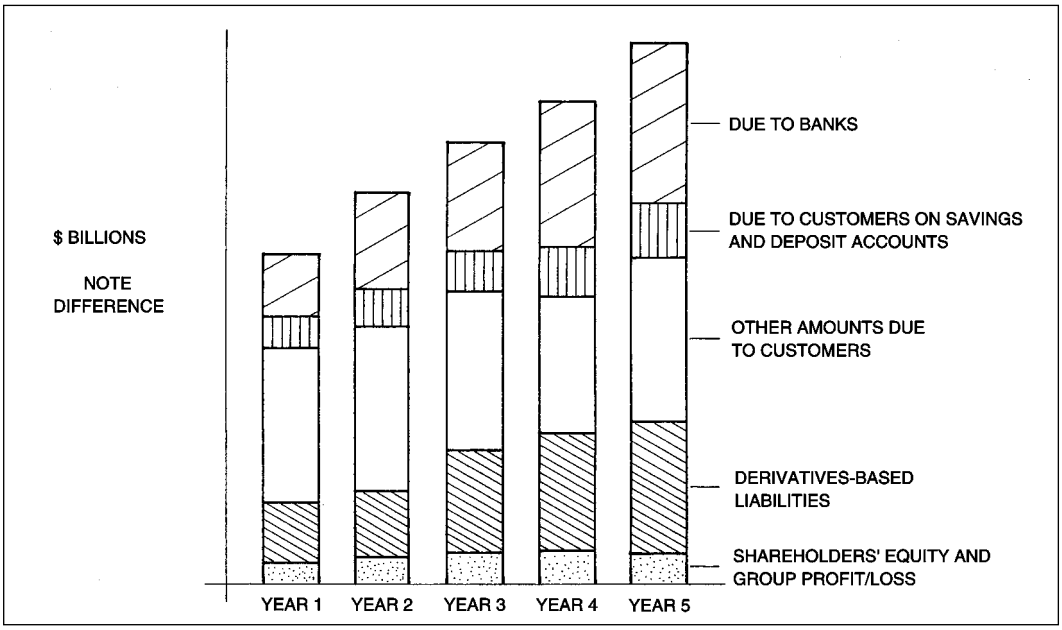


Exhibit 3.2 Liabilities with the Results of On-Balance Sheet and Off-Balance Sheet Operations



excess of their assets and greater than their equity by more than an order of magnitude. According to a report by OCC, by mid-2001 the notional principal exposure of the merged JP Morgan Chase had hit $24.5 trillion.

Monitoring such huge sums is difficult. It requires a top-notch infrastructure, models, massive real-time risk management systems, and a board always ready to take corrective action. However, most financial instutions are not tooled to do such monitoring, and most lag behind in nontraditional financial analysis and in risk management systems.

Because many derivatives trades are large and of a global nature, they can be supported only through cutting-edge technology, which very few financial institutions and industrial companies really master. Both risk control and nontraditional financial research are very important, as currently fashionable off–balance sheet trades and portfolios are rarely examined objectively in terms of possible repercussions when the market turns against the investor.

Keep this in mind when reading the next section about the effect of derivatives on oil prices. If mammoth financial institutions are not able to keep under lock and key their derivatives exposure, think about oil traders and other commercial companies trying to corner the market by inflating the liabilities side of their balance sheets. Through derivatives, the familiar domain of stocks and bonds has given rise to an impressive range of new financial instruments. Many of these instruments are understood imperfectly by bankers, traders, and investors, and practically all are computer-generated, databased, and handled through networks.

Because they are designed and promoted through advanced software, these instruments provide the basis for sophisticated investments whose implications are not quite appreciated by even their developers. Only a few people realize that, in terms of value assessment, they are marked to model

rather than marked to market–if for no other reason than because OTC-traded instruments have no secondary market.

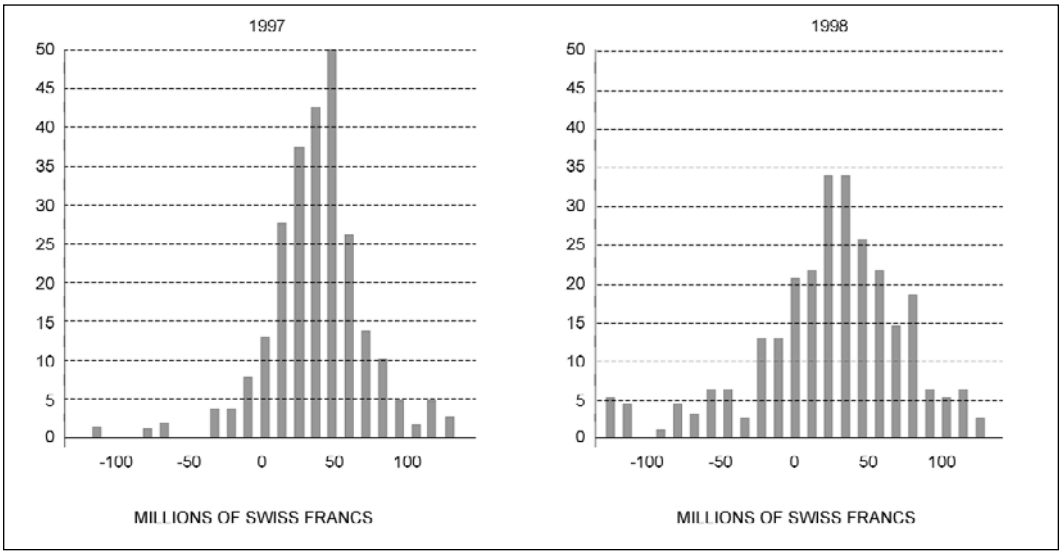
This lack of understanding is compounded by the fact that despite the efforts of the Financial Accounting Standards Board (FASB) and of the Securities and Exchange Commission (SEC), financial disclosure has often been wanting. Until quite recently the reporting convention for derivatives was a footnote to financial statements, although all over the globe derivatives' use was mushrooming. Statement of Financial Accounting Standards 133 (FAS 133) put financial reporting on derivatives on a reliable basis.[3]

Well-managed financial institutions not only comply with regulations regarding reliable financial reporting but also carefully plot trading revenue and upkeep this plot intraday in real time. Published with the permission of Crédit Suisse, Exhibit 3.3 explains what is meant, albeit on a daily profit and loss basis. For management control reasons, graphical presentation should cover:

- Every financial instrument being traded
- Every major counterparty
- Any place in global operations
- Any time of day or night

Here is an example of what happened before reliable financial reporting on derivatives exposure became the law of the land and real-time systems the way of tracking exposure. In March 1994 the managers of a big hedge fund that used derivatives to speculate were caught in a vice; they had bought bonds heavily with borrowed money, betting that their prices would stay high. When prices dropped, however, 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. This led to a torrent of red ink.

Exhibit 3.3 Distribution of Daily Trading Revenue (P&L) at Crédit Suisse First Boston



Source : Credit Suisse Annual Report, 1998.

All of this is relevant in a book on liability management because derivatives result in huge liabilities that can turn an entity—be it a financial institution, industrial company, commercial enterprise, or any other—on its head. Corporate treasurers also have joined in the game. Derivatives now form a basic component of the portfolios of thousands of corporations, even if the dealers themselves comprise a relatively small number of lead players, including:

- Big commercial banks
- Better-known investment banks
- Some major securities firms, and
- An occasional insurance company.

These lead players and their followers trade off–balance sheet not only with manufacturing companies, insurance firms, mutual funds, hedge funds, and pension funds but also among themselves. One of the major risks facing the financial system today is that more than 50 percent and, in some cases up to 80 percent, of the derivatives trading is bank to bank. One bank's liabilities have always been another bank's assets; but with derivatives these exchanges are denominated in gigabucks.

WHY AN INDUSTRIAL COMPANY IS INTERESTED IN DERIVATIVES

Not only banks but also industrial companies have a need for hedging credit risk and market risk. They have to account for exposure to credit loss in the event of nonperformance by the counterparty. For this reason, they establish limits (see Chapter 8) in connection to financial guarantees and commitments to extend credit.

Managers should not believe in pie-in-the-sky statements, such as the ability to reduce credit risk by dealing only with financially secure counterparties. There is plenty of scope in continuously monitoring procedures that establish limits to credit exposure and ensure appropriate reserves for losses. (This topic is discussed in more detail later.)

Similarly, all financial instruments inherently expose the holders to market risk, including changes in currency and interest rates. Currency risk is most relevant when a company conducts its business on a multinational basis in a wide variety of foreign currencies. Companies enter into foreign exchange forward and option contracts to manage exposure against adverse changes in foreign exchange rates.

Foreign exchange forward contracts are designated for firmly committed and properly forecast sales and purchases that are expected to occur in less than one year. The notional amounts for foreign exchange forward and option contracts must be designated in accordance with such commitments and forecasts.

According to FASB 131, gains and losses on all hedged contracts for anticipated transactions must be recognized in income when the transactions occur and are not material to the consolidated financial statements. By contrast, all other gains and losses on foreign exchange forward contracts must be recognized in *other income* as the exchange rates change. Therefore, they have to be reported.

The line dividing legitimate currency exchange derivatives from speculation is often very thin. It is legitimate when the company engages in foreign currency hedging activities to reduce the risk that changes in exchange rates will adversely affect the eventual net cash flows resulting from:

- Sale of products to foreign customers
- Purchases from foreign suppliers

Hedge accounting treatment is appropriate for a derivative instrument when changes in the value of the derivative we deal with are substantially equal, but negatively correlated, to changes in the value of the exposure being hedged. The last sentence defines the concept of achieving risk reduction and hedge effectiveness.

Because nothing is static in business, hedge effectiveness must be measured steadily by comparing the change in fair value of each hedged foreign currency exposure at the applicable market rate with the change in market value of the corresponding derivative instrument. This steady monitoring is as necessary for currency risk as it is for interest-rate risk. A company may enter into certain interest-rate swap agreements to manage its risk between fixed and variable interest rates and long-term and short-term maturity debt exposure.

A similar statement applies to monitoring credit risk, which may come from different sources, such as letters of credit, commitments to extend credit, and guarantees of debt. Letters of credit address a company's creditworthiness. They are purchased guarantees that assure a firm's performance or payment to third parties in accordance with specified terms and conditions.

Commitments to extend credit to third parties are conditional agreements usually having fixed expiration or termination dates as well as specific interest rates and purposes. Under certain conditions, credit may not be available for draw-down until certain conditions are met.

Guarantees of debt rest on a different concept. From time to time, a manufacturer may guarantee the financing for product purchases by customers and the debt of certain unconsolidated joint ventures. Generally, customers make such requests for providing guarantees, and these requests are reviewed and approved by senior management. Such financial guarantees also might be assigned to a third-party reinsurer in certain situations.

Good governance requires that senior management regularly reviews all outstanding letters of credit, commitments to extend credit, and financial guarantees. The results of these reviews must be fully considered in assessing the adequacy of a company's reserve for possible credit and guarantee losses. Exhibit 3.4 presents credit exposure of a technology company for amounts committed but not drawn down and the amounts drawn down and outstanding. The former may expire without being drawn upon. Hence, amounts committed but not drawn down do not necessarily represent future cash flows.

Exhibit 3.4 Commitments to Extend Credit to Customers by a Major Telecommunications Equipment Vendor (in millions of dollars)

	Amounts Drawn Down and Outstanding		Amounts Committed But Not Drawn Down	
	2000	**1999**	**2000**	**1999**
Commitments to extend credit	$4,300	$4,500	$4,600	$4,700
Guarantees of debt	$800	$310	$700	$100

While between 1999 and 2000 there was little change in the amounts committed to extend credit, guarantees of debt zoomed. Amounts drawn down and outstanding increased by 258 percent; those committed but not yet drawn down increased by 700 percent. This demonstrates the vulnerability of vendors to credit risks associated to their "dear customers."

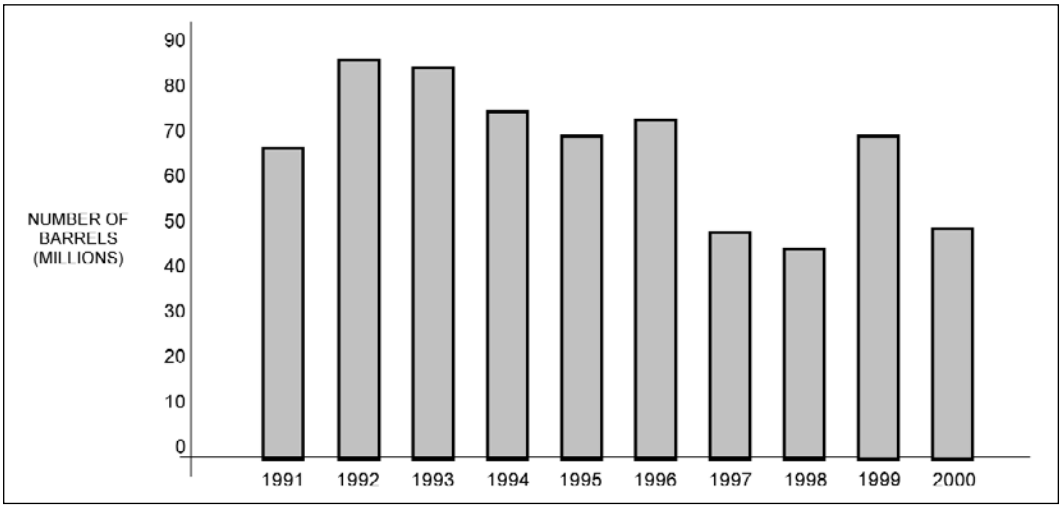
In 2000 and 2001 severe credit risk losses hit Nortel, Lucent, Qualcomm, Alcatel, Ericsson, and other vendors of telecommunications equipment. To extricate themselves somewhat from this sort of counterparty risk related to their product line, manufacturers resort to securitization. Vendors can arrange with a third party, typically a financial institution, for the creation of a nonconsolidated Special Purpose Trust (SPT) that makes it possible to sell customer finance loans and receivables. This can happen at any given point in time through a wholly owned subsidiary, which sells the loans of the trust.

Financial institutions do not like to take credit risk and market risk at the same time. Therefore, in the case of foreign currency– denominated loans and loans with a fixed interest rate, they ask the manufacturer securitizing its receivables to indemnify the trust for foreign exchange losses and losses due to volatility in interest rates—if hedging instruments have not been entered into for such loans. As has already been shown, it is possible to hedge these risks.

OIL DERIVATIVES AND THE IMPACT ON THE PRICE OF OIL

Today oil accounts for a much smaller part of the economy than it did in the past, yet no one would dispute its vital role and the impact of its price on business activity and on inflation. In year 2000 the part of the economy represented by oil stood at about 1 percent. This percentage compared favorably to 1990, when oil represented 2.5 percent, and the end of the 1970s, when it stood at 6.5 percent. The economy, however, grows and, therefore, as Exhibit 3.5 documents, the number of barrels of Brent oil produced over the previous 10 years has not appreciably diminished.

Exhibit 3.5 Number of Barrels of Brent Oil Produced per Year (Millions)



While we often think in terms of greater efficiency in the use of energy sources, the surge in demand for oil because of economic growth is often forgotten. When this happens, analysts reach mistaken conclusions. For example, in a meeting at Wall Street in mid-2000 I was told there was scant sign of the oil price rise feeding into the rest of the economy. I was given the example that:

- Energy prices soared 5.6 percent in June 2000, outstripping food and direct energy costs.
- By contrast, the core consumer prices rose just 0.2 percent, the same as in May 2000.

Other analysts also suggested that if companies offset rising energy prices by becoming more efficient, then the New Economy would not be in trouble. But in late 2000, when the NASDAQ caved in, this particular argument turned around full circle. A new consensus has been that soaring energy prices were one of the major reasons for worry about the future of equity prices—because such increases eventually filter into the consumer price index.

Not to be forgotten, however, is the effect of oil derivatives, which contribute a great deal to the manipulation oil price. Financial analysts now say that the increased use of oil derivatives to bid up the price of petroleum has succeeded in changing the price structure of oil and oil products, much more than OPEC has ever done. As has been the case with gold contracts:

- Speculators are active in trading oil futures, which represent a sort of *paper oil*.
- These futures are greatly in excess of the volume of oil that is produced and actually delivered at oil terminals on behalf of such contracts.

As happens with other derivative instruments, oil derivatives accelerate the pace of trading. To appreciate how much acceleration occurs, keep in mind that each barrel of oil represented by a given contract is traded up to 15 times before the oil is delivered. This trading creates a great deal of leverage, as paper oil snows under the real oil.

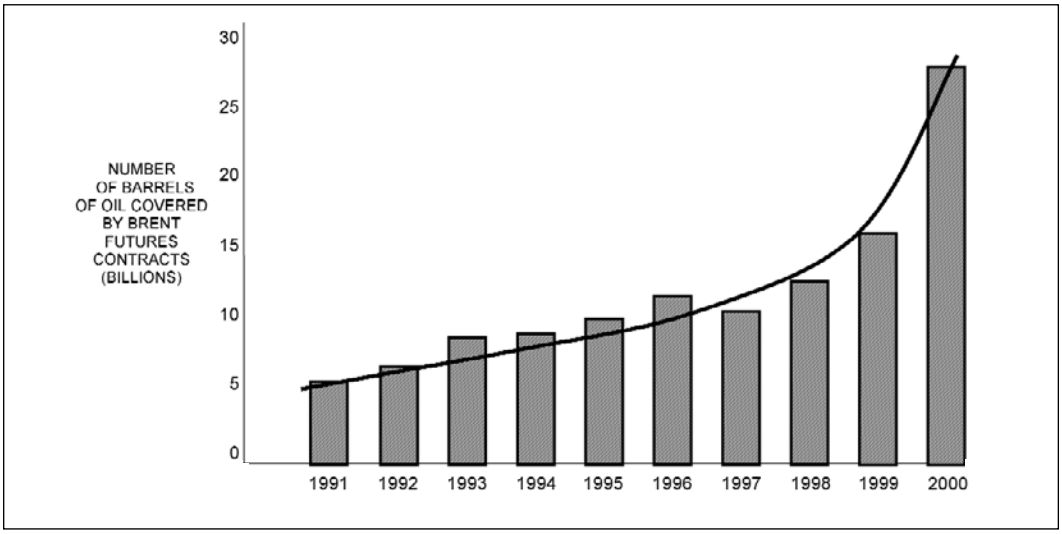
The trend curve in Exhibit 3.6 is revealing. To better understand its impact, we should note that a crude oil futures contract entitles its owner to put down, as the margin cost of the purchase, only 2.5 percent to 5 percent of the underlying dollar value of the oil covered by the futures deal. The gearing, therefore, is more than 20 to 1. (More precise statistics are provided later.)

The reason why one is well advised to be interested in potential liabilities connected to paper oil lies precisely in the multiplication factor in trading. Because of it, the Brent crude futures contract determines the price of actual Brent crude oil, just as the West Texas Intermediate (WTI) crude futures contract determines the price of actual West Texas Intermediate crude oil. Derivatives change the benchmarks.

This example also speaks volumes about the interdependence between the virtual economy and the real economy. Gearing makes a snowball effect. Brent crude oil and West Texas Intermediate crude oil constitute the basis against which more than 90 percent of the world's oil is priced. *If* we account for the fact that each traded contract of paper oil represents 1,000 barrels, *then*:

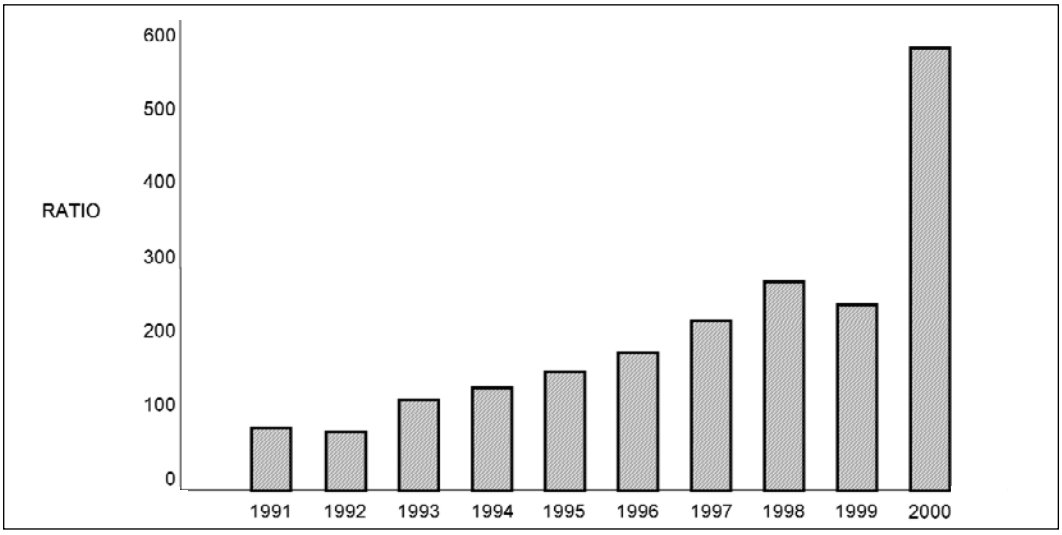
- The annualized 18 million or so contracts traded in 2000 amounted to 18 billion virtual barrels of oil.
- Such "billions" are a big multiple of the total annualized production of Brent North Sea oil, the reason being three orders of magnitude in leverage.

Exhibit 3.6 High Gearing of Brent Through Oil Futures, 1991 to 2000



A different way of looking at statistics conveyed through geared instruments is that the ratio of barrels of oil traded annually through Brent Futures contracts to the number of barrels of real oil brought out of the North Sea went from 78.3 in 1991 to 596 in 2000—the oil derivatives boom year. This rapid progression is shown in Exhibit 3.7.

Exhibit 3.7 Ratio of Barrels Covered By Brent Futures Contracts to Barrels of Brent Oil Actually Produced



- Already high in 1991 because of derivatives, in 10 years the leverage factor increased by 762 percent, and there is nothing to stop it from growing.
- Oil futures derivatives build a huge amount of gearing into the oil market, with the result that a relatively small amount of money has a great effect on oil prices.

This effect impacts all oil production and oil sales in the world because, as mentioned, other oils are deliverable against the International Petroleum Exchange (IPE) Brent Crude Futures contract. For instance, Nigerian Bonny Light or Norwegian Oseberg Blend is priced on this comparative basis. A conversion factor aligns these other oils to a basis equivalent to Brent crude, attaching either a premium or a discount in price comparable to Brent but incorporating the leverage.

It is not that greater efficiency in oil usage does not matter. It does. It is good to know that the economy is far better prepared to handle an oil shock this time around than it was in the 1970s, because businesses and consumers use oil much more efficiently than they did a few decades ago. It is also proper to appreciate that over the past five years, real GDP is up by more than 20 percent while oil consumption has increased by only 9 percent.[4] But this 9 percent is minuscule compared to the gearing effect of oil derivatives.

Oil derivatives, not real demand, are the reason why the volume of crude futures contracts traded on the NYMEX has shot up, particularly in 1999 and 2000. During this two-year period, the volume of speculative NYMEX West Texas Intermediate crude contracts trades increased by 6 million. Typically the contract is for 18 months, but most trading takes place in the last 45 days before it expires.

At NYMEX, between 1998 and 2000, the volume of crude oil futures rose from 43.2 million contracts to 54.2 million contracts, an increase of 11 million contracts or 126 percent, representing an underlying volume of oil of 11 billion barrels. By contrast, between 1998 and 2000, the volume of world oil production increased by only 183 million barrels. In these three years, derivatives represented 325 new paper barrels of oil for every new barrel of oil produced.

Fortunes are made and lost by the fact that the margin to be paid for a futures contract is very low compared to the commodity's value. For instance, at London's International Petroleum Exchange, the margin a trader must put down to buy a Brent Crude futures contract is $1,400. With this, he or she has a claim on an underlying value of oil of $37,000. The margin is just 3.8 percent. This allows traders a tremendous amount of leverage because when they buy a futures contract, they control the underlying commodity.

The downside is the risk the speculator takes of betting in the wrong direction. For every practical purpose, risk and return in the financial market are indistinguishable and the outcome largely depends on the market's whims—particularly in times of high volatility. This interplay between leveraged deals and market prices has the potential to further increase volatility in both directions: whether the price of the barrel moves up or down, for or against the best guess of imprudent investors.

RISKS TAKEN BY INTEL, MICROSOFT, AND THE FINANCIAL INDUSTRY

In the telecoms industry, in a number of deals, the credit risk counterparties are the clients. Companies such as Lucent Technologies, Nortel Networks, Cisco Systems, Qualcomm, and

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Ericsson extended credit to small high-tech outfits that bought their products. These same outfits used these equipment contracts to borrow and leverage even more. (See Chapter 14 on credit risk.)

A growing number of big high-technology companies partnered with smaller outfits that used their relationship on Wall Street for leveraged financing.[5] Such tactics boosted demand and profits for all on the upswing; but they are doing the reverse on the downswing. A similar statement is valid about the use of the derivatives market for profits by some of the better-known companies. They issue options on the price of their stock.

In the second quarter of 2000, Intel's results included $2.4 billion operating income as well as a massive $2.34 billion of interest and investment income. The latter was eight times the corresponding 1999 figure and almost equaled Intel's income from engineering. Yet Intel is a semiconductor company, not a derivatives speculator.

Over roughly the same timeframe, for the fourth quarter of its fiscal year, Microsoft's earnings also benefited from strong investment income: $1.13 billion in the quarter, or more than 30 percent of taxable income for this three-month period. Superficially one may say "Why not?" Serious analysts, however, suggest this is a worrying reminder of the Japanese bubble of the late 1980s, when financial engineering, or *zaitek*, by industrial companies was so prevalent and finally led to the deep hole credit institutions and industrial companies dug for themselves. They are still in this hole in spite of the Japanese government's efforts to jump-start the economy.

Both vendors Intel and Microsoft refute such comparisons. But can it *really* be refuted? Intel Capital, the chipmaker's investment arm, says it is a strategic investor backing companies that help advance the group's overall aims of expansion of the Internet, computing, communications infrastructure, and so on. This is venture capital investing, and it should not be confused with derivatives trading.

Microsoft used its cash from operations to make 100 investments totaling $5.4 billion in the year ending June 30, 2000. Its management suggests that as long as the company has strong operating cash flows, significant investments of a similar type will continue. The target is windfalls not only in the aforementioned two cases, but also in many others—for instance, Dell—which change the basic engineering nature of many corporations.

No one should ever think that the track of financial engineering that industrial companies follow is free from bumps in the road. In 2000 Intel alerted analysts ahead of its financial results to expect a much higher investment gain than usual, mainly because of sale of its equity in Micro Technology. Microsoft pointed out that it is sometimes obliged to take a profit because the company in which it has invested is bought out.

The bumps in the road come when derivative financial instruments turn sour or the NASDAQ caves in, as happened twice in 2000; or when the market otherwise turns against the investor and instead of a windfall of profits the result is a huge hole of liabilities. Analysts are evidently aware of the likelihood of such events. Therefore, in general a company's shares would suffer if analysts began to apply a similar yardstick to an engineering firm's investment earnings as they do for pure high-tech investment companies and institutions known to specialize in derivative instruments and their risks.

Top management should not only be aware of the exposure an engineering company takes with risk capital and with derivatives but also should learn from the depth and breadth of the board's responsibilities the way they are now being established through new regulation in the financial industry. As a recent example, in September 2000, the Office of the Comptroller of the Currency (OCC) issued an advisory letter reminding the boards of directors of credit institutions and their senior management of their fiduciary responsibility to manage and control potential risks with third parties such as vendors, agents, dealers, brokers, and marketers. Board members of industrial companies also should heed this advice.

To substantiate its new directive, the OCC cited examples of third-party arrangements that have exposed institutions to senior credit losses. Other examples provided were associated with operational risk.[6] These examples included engaging a third party to monitor and control disbursements for a real estate development project without checking the background and experience of that party, or without monitoring whether that party actually was performing the services for which it had been engaged. Still other examples by OCC have been financial:

- Purchasing loan participations in syndicated loans without performing appropriate due diligence
- Entering into an arrangement with a vendor to market credit repair products without understanding the high risk of credit losses associated with the program
- Purchasing factoring receivables with recourse to the seller, without analyzing the financial ability of the seller to meet its recourse obligations

As a regulatory agency, the OCC emphasized that banks, as regulatory agencies, should not rely solely on third-party representations and warranties. I would add that the same should apply to engineering companies. At a minimum, management of third-party relationships should include factual and documented front-end risk planning and analysis, with appropriate due diligence in selecting instruments and counterparties, real-time monitoring of performance, and the documenting of management's efforts and findings—including post-mortems.

Members of the board are responsible for the outcome, whether or not they understand what leveraging does and whether or not they appreciate what financial engineering is. "I did not know that" is no excuse for serious persons.

Dr. Gerard Corrigan, the former president of the Federal Reserve Bank of New York, has aptly suggested that regulators can handle almost any problem if they can wall off a troubled financial institution from the rest of the world.[7] But because of their labyrinth of interconnections, derivatives have made that job nearly impossible.

These interconnections frequently lead to securities firms, other nonbanks, and industrial companies to which government safety nets might have to be extended in order to protect the banking establishment. Increasingly, the distinction among banks, nonbanks, and corporate treasuries is hardly relevant.

Some years ago, in Japan, the accounting director of Nippon Steel leapt to his death beneath a train after he lost $128 million of the company's money by using derivatives to play in the foreign exchange market. In Chile a derivatives trader lost $207 million of taxpayers' money by speculating in copper futures for the state-owned mining company. These sorts of failures can happen anywhere, at any time.

One of the misconceptions with derivatives—which is sometimes seen as a fundamental advantage although it is in fact a liability—is that they let the counterparty "buy the risks it wants" and "hedge the risks it does not want." Whether made by bankers or corporate treasurers, such arguments conveniently forget that derivatives can be highly speculative investments and that, by boosting the liabilities risk, the entity's portfolio could well one day become damaged goods.

USING DERIVATIVES AS A TAX HAVEN

Those who think that the New Economy is only about the Internet and technology firms are missing something of great importance. The leveraging effect is all over: in loans, investments,

trades, equity indices, debt instruments, even the optimization of taxes, which is one of the latest derivatives fads.

Let us start with a dual reference to loans and to the fact that some banks tend to derive about 75 percent of their nonfee income from derivative financial instruments. Even what is supposed to be loan money finds its way into derivatives. This happens every day with hedge funds and other high-risk takers.

When the German company Metallgesellschaft crashed in early 1994, largely due to badly hedged derivative trades by its U.S. subsidiary, both Deutsche Bank and Dresdner Bank, which had lent it money, found themselves obliged to come to the rescue—a situation that arises time and again with other financial institutions. As one brokerage executive who deals in derivatives suggested: "You can't pass a law that prevents people from taking the wrong risks"—hence the need to qualify, quantify, and manage exposure more effectively than ever before.

The hedge of Metallgesellschaft, which was legitimate but poorly designed, failed. Others that are not so legitimate but have done well succeed. Frank Partnoy, a former trader at Morgan Stanley, mentions in his book that the investment bank with which he was working had assigned him to half-dozen different Tokyo deals designed to skirt regulations.[8] Sales and trading managers, he says, tend to think business ethics is an oxymoron.

One of the 10 commandments of the derivatives business, Partnoy suggests, is "Cover thy ass," and Morgan Stanley was careful to obtain from each client a letter saying that the trade was not a sham and that the investment bank had not done anything illegal. Yet some deals are dubious at best, such as derivatives trades designed to do away with liabilities and turn a bad year into one that was very profitable. Creative bookkeeping (read: "fraudulent bookkeeping") also helped.

- In the United States, fraudulent financial reporting is subject to liability.
- But Japanese law is different, and a dubious deal has good chances to pass through—particularly so if it is "creative."

The turning of liabilities into assets through derivatives for financial reporting purposes is usually done by deals so complex that regulators do not have an easy time untangling them, let alone comprehending their details. This higher level of sophistication in instrument design has been used by certain hedge funds, and it also has invaded tax reporting.

"Creative tax evasion" through derivatives is quite evidently an issue that should be of interest most particularly to the Internal Revenue Service (IRS). In the United States, the IRS is concerned about the growth of foreign trusts that consist of several layers. One layer is distributing income to the next, thereby reducing taxes to a bare minimum. This creative organizational system works in conjunction with a concentration of tax havens, such as the greater Caribbean, which accounts for 20 percent of nearly $5.0 trillion in offshore assets.

That the offshores are tax loopholes is news to no one. It is also the reason why the Group of Ten (G-10) has targeted them as engaging in "harmful tax practices." The policy followed by most governments is that unless offshores agree to revamp their current tax systems and accounting methods, the G-10 nations will hit them with sweeping sanctions that include

- Disallowing the large tax write-offs offshore companies typically take for business costs
- Ending double taxation accords, by which companies avoid paying taxes at home if they pay them at the offshore address.

Financial institutions and other companies using tax loopholes are, however, inventive. The heyday of the bread-and-butter type offshores is now past, not so much because of G-10 restrictions as to the fact that institutions discovered that the use of derivative financial instruments is itself a tax haven. Sophisticated derivatives manipulate the liabilities side of the balance sheet and can lead in nonapplication of certain tax provisions that might otherwise have a major tax impact if a traditional investment formula were used. Here is a practical example:

- Taxation of derivative transactions depends on their particular legal form and on the underlier to which they relate.
- Withholding tax obligation is triggered upon the payment of interest but not a swap payment.

Profits from deals with payments made under swap agreements may be computed by reference to the notional principal amount. They are not regarded as interest for tax purposes, as no underlying loan exists between the parties. Even if certain swap payments may have some characteristics of annual payments, authorities do not look at them as annual payments.

A similar argument pertains regarding regular swap receipts and payments that relate to interest on trade borrowings. Trade borrowings are typically tax deductible in computing trading profits. For tax purposes, profits derived from the use of financial derivatives in the ordinary course of banking trade tends to be regarded as being part of trading profits.

Permitted accounting treatment plays an important role in determining the recognition of trading profits and their timing. The tax side, which is now being exploited by a number of firms, promises good gains. The risk is that a bank failure or trading collapse could cause a panic orchestrated by other derivatives players including federally insured banks and the financial system as a whole. But the taxpayer has deep pockets.

The opportunities to make money with derivatives are many, the latest being tax optimization. This new notion can be added to the vocabulary of derivatives trades, along with hedging and convertibility of risk. The tax loophole through swaps seems to be better than the one provided by plain-vanilla offshores, and, for the time being, it is less controversial. But at the same time, there is plenty of derivatives risk. Even for tax avoidance purposes:

- Sound risk management requires that exposure is aggregated through appropriate algorithms and is controlled in real time.
- Bad loans and sour derivatives have a compound effect, especially when much of the derivatives activity is carried out with borrowed money.

Because a very large part of what enters a derivatives trade is essentially a book entry, in some cases everyone may win. At the same time, when things go wrong, it is quite possible that everyone loses, with the derivatives trades creating among themselves a liabilities bubble that bursts. The compound effect can be expressed in a pattern, taking account of the fact that:

- Past-due derivatives carry a market risk similar to that of loans traded at huge discounts.
- Past-due derivatives and sour derivatives (because of the counterparty) can lead to major exposures.
- Sour derivatives and bad loans are related through an evident credit risk, hence the wisdom of converting notional principal amounts to loans equivalent.[9]

Risks are looming anywhere within this 3-dimensional frame of reference shown in Exhibit 3.8. The effects of the bubble bursting can be so much more severe as off-balance sheet financial instruments produce amazing growth statistics. Some types of derivative instruments, for example, have had growth rates of 40 percent a year—and they are metastasizing through crossovers rather than simple mutations. Up to a point, but only up to a point, this creates a wealth effect. Beyond that point sneaks in a reverse wealth effect of which we talk in the following section.

MARKET PSYCHOLOGY: WEALTH EFFECT AND REVERSE WEALTH EFFECT

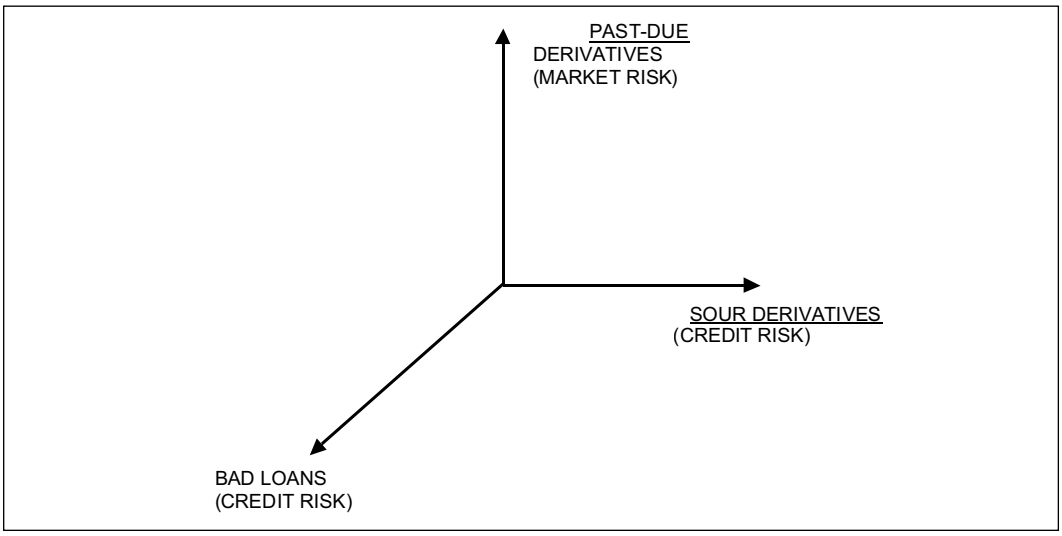
With nearly one out of two U.S. households owning stocks, a historic high, consumer spending is increasingly sensitive to ups and downs on Wall Street. Indeed, as the market rose during the 1990s, consumers felt richer and spent away their paper gains. Since any action leads to a reaction, the other side is the reverse wealth effect, which can occur quicker than the original wealth effect, if investor psychology changes, confidence wanes, and everyone runs for cover.

At the time this text is written, in March 2001, it is difficult to assess whether market psychology has actually changed or investors are simply fence-sitting. Economic indicators point to a recession, but the definition of a recession is not the same as it used to be. In fact, it is even more difficult to quantify the magnitude of any change in financial and economic conditions. As a matter of principle, however, when it is suspected that such change may be occurring, it is important:

- To take account of all relevant sources of information, and
- Gauge the extent to which they may support such a conjecture.

Economists suggest that these days investors may be especially vulnerable because they have financed their stock purchases with near-record levels of debt, in many cases through home mortgages. The New York Stock Exchange reported that in September 2000 margin borrowing jumped

Exhibit 3.8 Risk Framework Associated with Liabilities Exposure Because of Derivatives Trades



to $250.8 billion, the highest level in five months, and this was still going up at the end of the year. A so highly leveraged investors market could exacerbate a decline.

The gold rush of the New Economy via the NASDAQ is not pure greed. The sophisticated person in the street, who by and large is the average investor, understands that technology is the motor of the New Economy and wants to be part of the action. Many experts assume that what we experienced in the 1990s is only the tip of the iceberg in technological developments. They see broadband, photonics, and biotechnology as:

- Being in their infancy, and
- Having still a long way to go.

The challenge is one's financial staying power, and it confronts both people and companies. High leverage is the enemy of staying power—and the market is a tough evaluator of equity and of debt. Take corporate bonds risk as an example. In early 2001 spreads of corporates versus credit-risk-free Treasuries were wider than they had been since the Asian crisis of 1997. At the same time, the U.S. corporate debt, other than bank debt, was at a record 48 percent of gross domestic product.

This reference is best appreciated if the polyvalence of the debt challenge is kept in mind. With the economy and earnings slowing and the stock market uncertain about its next step, the lack of a first-class liabilities management may turn out to lead to a dangerous storm. In October 2000, Wall Street analysts whom I interviewed saw the worst deterioration in junk bonds. For example, the spread between Merrill Lynch high-yield (junk) index and 10-year Treasury bonds widened to 7.13 percentage points. This is larger than in 1998, at the height of the financial meltdown that followed Russia's default and LTCM's near bankruptcy.

At Wall Street, analysts also were worried by the fact that top-quality bonds also took a hit. By late October 2000, triple-A 10-year U.S. industrial corporate bonds were yielding about 6.96 percent, which is 123 points more than U.S. government bonds. The spread was only half that at the close of 1999. Some analysts took this as an indicator that the U.S. economy shifted out of overdrive. Others saw in it an ominous signal.

In fact, during mid- to late October 2000, in the center of the financial storm and more than 40 days into the bear market, financial analysts were far from unanimous on when the turbulence might end. Some were more worried than their colleagues, believing that, as corporate earnings continued to slow down and credit quality deteriorated, certain weaknesses in the underbelly of the financial system would become apparent.

Yet Wall Street was not lacking in analysts who were more upbeat. Abby Joseph Cohen, of Goldman Sachs, publicly stated that, in mid-October 2000 levels, she considered the Standard & Poor's 500 index to be about 15 percent undervalued, although she conceded that war and peace developments in the Middle East were a significant wild card. In early November 2000, right after the U.S. presidential election, to these Middle East jitters were added the uncertainties associated with an unprecedented legal battle between Al Gore and George W. Bush.

The market survived these uncertainties, and the feared reverse wealth effect did not show up. Yet well into February 2001 many cognizant Wall Street analysts believed that the ebbing of the New Economy's euphoria occurred at the worst possible moment because it compounded the global political threats. Fears were eased when in January 2000 the Federal Reserve lowered interest rates twice by 50 basis points each time; but the turnaround some analysts expected was not to come.

The fact that the Dow Jones index of common stocks, the NASDAQ index of technology stocks, and other metrics of equity values rise and fall is nothing unusual. But events in September to December 2000 and the early months of 2001 have shown that these indices can shrink even further than most experts expect, while volatility is king. Surely as 2000 came to a close the market offered the least attractive buying opportunity since 1998, despite the repeated assurances of some analysts that the market had found a bottom.

More significant than stock market gyrations is the fact that by mid-2001, the prevailing market psychology led to reassessment of credit risk. This reassessment has been particularly pronounced in some sectors, such as telecom companies and dot-coms, which were imprudently overexposed with loans. Their superleveraging left regulators with a tough decision between easing monetary policy and keeping quiet until the storm passed by—except that no one knows when this might happen, as liabilities of the largest debtors in the world have been growing at an annual rate of 140 percent.

NOTES

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CHAPTER 4

Reputational and Operational Risk

An old Greek proverb says: "Better to lose your eye than your name." This saying encapsulates the essence of reputational risk, which is like a barrier option: all or nothing. Just as there is no such thing as being a little pregnant, there is no way of losing only some of one's reputation. The slightest signal that a bank or any other company is regarded as a liability has to be taken seriously and this piece of news must immediately alert top management.

The lessons to be learned from Long Term Capital Management (LTCM), Barings, Orange County, and so many other crashes or near bankruptcies is that in the financial world, reputation is based both on ethical behavior and on standards of responsibility and of reporting. Failure to face up to one's obligations is essentially reputational risk. Some organizations would rather dent their reputation than pay the losses resulting from the contracts they have signed with a counterparty.

Financial incapacity bears on an entity's ability to perform and directly affects senior management's accountability. Financial incapacity should not be confused with unwillingness to perform, which may arise if the counterparty feels that it has been ill-advised on a hedging, lost too much money, or was misled. Examples connected to litigation in the aftermath of derivatives trades are Procter & Gamble, Gibson Greetings, Air Products, Sinopec, and Unipec:

- Both inability to perform and unwillingness to perform lead to reputational risk, because they amount to breach of contract.
- But some cases of unwillingness to perform were tested in court, and the judges' decisions were not altogether negative to the nonperformers.

Up to a point, bankruptcy laws might protect a party from reputational risk. Take Chapter 11 as an example. In principle, it is wise to give a company or a person a second chance. But in practice this process is abused not only by companies but also (and most particularly) by individuals. Today in the United States an estimated 2 million people have sought protection under Chapter 11—most, to avoid paying what they overspent with their credit cards. In this connection, it is worth noting that:

- In principle, reputational risk is an operational risk faced by all credit card issuers, and it is mounting.
- In essence, what happens is that the people who pay their dues also pay for the others, by being subject to higher interest rates.

Some people consider moral hazard as being part of reputational risk. I am not of this opinion, because the underlying concepts are different. It is, however, true that moral hazard can contribute to increasing reputational risk because it bends ethical principles and bypasses values of financial responsibility.

In the United States, George Shultz, a former State and Treasury secretary, Anna Schwartz, an economic historian, and editorial writers on the *Wall Street Journal* argue that today's financial woes are caused by bailouts of countries and investors by the International Monetary Fund (IMF), hence public money. The analysts consider such bailouts to be a moral hazard, because they induce investors and borrowers to behave recklessly in the belief that, when trouble hits, the IMF will pull them out of the mess that they themselves created.

The IMF, these experts argue, generates moral hazard in two ways: It rescues governments from the consequences of rotten policies, thereby encouraging them to repeat their high leverage and their mistakes, and it also shields greedy investors, even rewarding their recklessness. This criticism has gained considerable voice because of the frequency and size of IMF bailouts. But is not this also true of so many other rescue deals and support packages?

DISTINCTION BETWEEN ABILITY TO PERFORM AND WILLINGNESS TO PERFORM

The growing emphasis on the liabilities side of the balance sheet, derivative instruments, and other leveraged financial products have helped to redefine corporate and personal responsibility toward counterparties. Along with this, during the 1990s a curious topic surfaced. It is "curious" when examined under classic banking criteria regarding financial responsibility. This topic concerns the distinction between:

- A counterparty's ability to perform, and
- Its willingness to perform according to contract.

In principle, the likelihood of default by a counterparty on any obligation, including derivatives, is assumed to be the responsibility of the credit division. Normal credit division duties, however, do not necessarily include willingness to perform, which is a different matter altogether. More than anything else it has to do with the legal department, since invariably lack of willingness to perform leads to court action or to a settlement out of court.

There is nothing new about the fact that financial incapacity has a direct bearing on ability to perform. This is the essence of credit analysis, which should take place before signing up a financial obligation. Every credit officer must consider a counterparty's future ability to deliver when considering whether to extend credit to a client or correspondent bank. But willingness to perform has different characteristics, although its consequences are just as severe.

When the South Korean economy crashed in late 1997, one of its investment banks found it to be the excuse not to perform on its obligations concerning derivatives losses. SK Securities' financial responsibility towards J. P. Morgan, its counterparty, amounted to a whopping $480 million, but the Korean investment bank preferred to lose its reputation than face up to its obligations. J. P. Morgan sued in court.

It is indeed curious that financial institutions fail to appreciate that the bilateral, over-the-counter nature of most derivatives trades brings with it a most significant potential for losses. Frank Partnoy states that banking regulators warned that American banks had more than $20 billion exposure to Korea. Even half that amount would have been way too much, but no one seems to have put a limit to this ballooning derivatives risk.

Leaving it up to the experts to police themselves amounts to nothing. Partnoy mentions the case of Victor Niederhoffer, who managed more than $100 million of investments. For some years his record was good, with his investments earning something like 30 percent per year for more than a decade. Then in 1997 he made his mistake in risk taking by way of a big bet on Thailand's baht. When in August 1997 the Thai economy crashed, Niederhoffer lost about half his fund—a cool $50 million.[1]

Niederhoffer paid his dues at the altar of speculation, but others refused to do so. It is not so easy to assign a precise definition to the concept underpinning willingness to perform—and its opposite: unwillingness to perform. Generally, willingness to perform is taken to mean a counterparty's desire to deal in good faith on the obligations into which it has entered. *If* it is not in bankruptcy but still it is not facing up to its financial obligations, *then* it is unwilling to perform.

Carried out in due diligence by the bank's credit division, a classic financial analysis aims to provide answers regarding the other party's ability to perform. The assumption is made that if a counterparty does not perform on its obligations, the reason is financial difficulties. But with derivatives and other leveraged deals, the magnitude of losses ensures that some counterparties may choose not to honor their obligations for reasons other than illiquidity or financial difficulties.

Because of ability-to-perform reasons, senior securities officers are very careful when addressing stretched maturities or when they consider weakening covenants. Where ability to perform is questionable because the other party's financial standing is not so dependable, the credit officer may decide not to extend any credit at all, even on a secured basis. Matters are different in the case of willingness to perform. Yet failure to address this type of risk may result in severe economic losses and/or may involve protracted legal action. Ironically, in several cases the counterparty was never before subject to reputational risk; Procter & Gamble is an example of this type of case. The claim of having been misled stuck, and Procter & Gamble won an out-of-court settlement from Bankers Trust. Gibson Greetings did the same.

The most recent list of instances of unwillingness to perform started in the 1990s and keeps on growing. These cases primarily concern derivatives obligations and have led to suspension of payments as well as subsequent suits. Not only is the spreading of unwillingness to perform by counterparties troubling because in many cases it represents financial irresponsibility, but also there seems to be no real solution to the challenges it poses. Although the lending bank may be vigilant in determining:

- The financial strength of the counterparty, and
- Its projected ability to perform under normal operating conditions.

there is little evidence to suggest whether some time in the future the counterparty will be unwilling to perform on its obligations for noncredit reasons, if it finds itself at the loser's end. Caution will invariably help lenders to avoid entering into contracts where counterparties might be unwilling to perform on their financial obligations. But it is no less true that:

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- There exists no financial instrument effectively stripping out all economic exposure to the underlying asset or to the holder.
- Until all obligations derived from a transaction are fulfilled, operational risk may aggravate the other risks.

As cases of reputational risk accumulate, past history of unwillingness to perform can be determined to be vital in the process of understanding the motivation of counterparties for entering into a given type of transaction, particularly a leveraged one. Is it for speculative reasons? Do ill-conceived hedges generate losses? Or is the counterparty's management unreliable, which may lead it to be unwilling to perform? The results of an analysis of reputational risk might provide a pattern; the challenge of personalizing these results to a specific counterparty and of keeping track of the reputational score follows.

TROUBLES FACING CERTIFIED PUBLIC ACCOUNTANTS IN CONNECTION WITH REPUTATIONAL RISK

When a certified public accountant (CPA, chartered accountant) audits a company's books and gives a written opinion based on this audit, he or she is essentially taking a position on compliance of findings to existing rules and regulations primarily connected to accounting functions. In many Group of Ten countries—the United Kingdom, Germany, and Switzerland being examples—bank supervision authorities base their examination of credit institutions on findings included in the CPA's report. With few exceptions, their regulators do not employ their own examiners, as the Federal Reserve does.

During the mid- to late 1990s, several supervisory authorities of G-10 countries added another requirement to the classic mission of CPAs. The evaluation of internal control became an integral part of external audit functions. No longer is it sufficient for auditors to review the institution's books in an investigative manner. They now also have to examine an entity's reporting practices and most specifically its internal control system:

- *If* operational risk comes under the internal controls authority, as some of the banks have suggested, *then* auditing operational risk should be part of the mission assigned to chartered accountants.
- *If* auditing of operational risk is part of the CPA's responsibility, *then* it is unavoidable that reputational risk also should become part of his or her duties.

Auditing reputational risk is by no means a linear business. During meetings in London, chartered accountants made a similar statement about auditing internal controls. The issue associated with auditing an entity's internal controls become even more complex if one considers that sometimes external auditors expose themselves to reputational risk and to substantial fines.

To a significant extent, this exposure is connected to event risk. Prior to proceeding further with the specifics, it is important to consider a few event risks that during the 1990s hit CPAs for allegedly not having done the job they were paid to do.

Barings' Liquidators versus Coopers and Lybrand (now PriceWaterhouseCoopers)

Following the bankruptcy of the venerable bank Barings, the court appointed joint administrators of the bank. Shortly thereafter, the administrators started proceedings against the accounting firms

of Coopers & Lybrand in London and Singapore and against Deloitte & Touche in Singapore—to the tune of $1 billion. The Bank of England also criticized and questioned the actions of both firms of auditors in exercising their duties.

The claim by the administrators was "in respect of alleged negligence in the conduct of audits for certain years between 1991 and 1994." Right after this claim was made public, a spokesman for Coopers and Lybrand in London said the writ was a complete surprise: "We have not been provided with the details of the claim. However, we are not aware of any grounds for any claim against us."[2]

The chartered accountants' spokesman added that Coopers was not responsible for the collapse of Barings, which was "a result of management failures and fraud" (therefore, of operational risks). The claim against his firm, he suggested, was unjustified—and it was "another example of suing the auditors because they are perceived to have deep pockets."

As far as the other CPA was concerned, Po'ad Mattar, senior partner in Deloitte & Touche in Singapore, said: "The writ comes as a surprise. We are satisfied that the audits of Barings Futures Singapore in 1992 and 1993 were conducted with all required professional skill. We are also mystified by the claim since none of the activities that caused the failure of Barings and the consequential losses occurred while we were auditors. In any event, the writ will be successfully defended."

But the administrators did not change their mind because of these responses. Their thesis was that they reviewed the position in respect to the auditors and believed that proceedings should be brought on behalf of the Barings companies that remained in administration. Creditors included bondholders owed £100 ($145 million) who were not repaid by ING, the Dutch financial conglomerate that bought Barings. Perpetual note holders were owed another £100 million. Deloitte & Touche, called in to wind up the Bank of Credit and Commerce International (BCCI), allegedly overcharged by 40 percent their services. This is what was reported in the press.[3] The information that came to the public eye was based on a confidential report claiming that creditors were overcharged by £1 million ($1.45 million) in the immediate aftermath of BCCI's collapse. The report was commissioned by a court in Luxembourg, where the Bank of Credit and Commerce International was registered.

The court asked for the report from a panel of three independent experts, after prolonged arguments over the level of fees charged by the liquidators between the collapse of BCCI and January 1992. The CPA firm contested this report in a series of court hearings, claiming that the experts who wrote it had no knowledge of the costs involved in a global liquidation of a bank with branches in 69 countries.

This dispute marked another low point in relations between the external auditors and the Luxembourg authorities. Deloitte & Touche sued the Luxembourg banking regulator for allegedly failing to regulate BCCI properly, obliging its management to make financial results reliable and transparent. Deloitte & Touche also resisted any attempt to use the report to drive down fees due elsewhere.

These cases, which came in the aftermath of the bankruptcies of Baring and BCCI, are not the only ones involving reputational risk on behalf of certified public accountants. Many challenges have taken place whether the associated claims were or not justified. A high court judge in London found an accounting firm liable for negligence in permitting a loss-making Lloyd's (the insurer) to close its accounts.[4]

In the mid-1990s in Germany, Price Waterhouse sought an out-of-court settlement with the creditors of Balsam and Procedo, two failed companies. German banks, which faced losses of

DM 2.3 billion (at the time $1.3 billion) as a result of the Balsam and Procedo collapse, claimed that Price Waterhouse auditors were guilty of intentional misconduct.

These cases are important for two main reasons. First, the arguments advanced by administrators and liquidators challenged the core business of CPAs: auditing the books. If internal control and operational risks are added to the responsibilities of CPAs, then claims for damages will in all likelihood be much higher—and they will concern rather fuzzy matters for which CPAs have not yet developed auditing skills.

Second, the auditing of reputational risk is a particularly involved exercise, especially as CPA firms are themselves subject to reputational risk. This is true even when they live in a world of hard numbers, which has been their traditional business. Think about having to give some off-the-cuff opinions that in no way can be backed by a solid body of evidence even if it is known in advance that they will be contested by the losing party. Since the auditing of internal control is necessary, it is imperative to develop better tools. Statistical quality control charts are a good solution.[5]

CORRUPTION AND MISMANAGEMENT UNDERPIN THE FAILURE TO CONTROL OPERATIONAL RISK

Most of the literature on operational risk still deals with issues encountered way down the food chain. Solving problems like secure payments is important, but most often this can be done by means of better organization and technology. Attacking the operational challenges that exist at senior management levels requires:

- Board-level policies
- First-class human resources
- Very efficient internal control
- An inviolable code of ethics

One of the merits of a broader perspective of operational risk is that it addresses in a more accurate manner today's globalized environment, in which all sorts of business risks multiply at an alarming rate. Exhibit 4.1 shows what constitutes the top four operational risk factors, factors that partly overlap and partly complement one another. At the center of all four is the board's and CEO's accountability. The whole list of operational risks is, however, broader. Based on the responses I received in my research, I compiled the following 12 factors[6]:

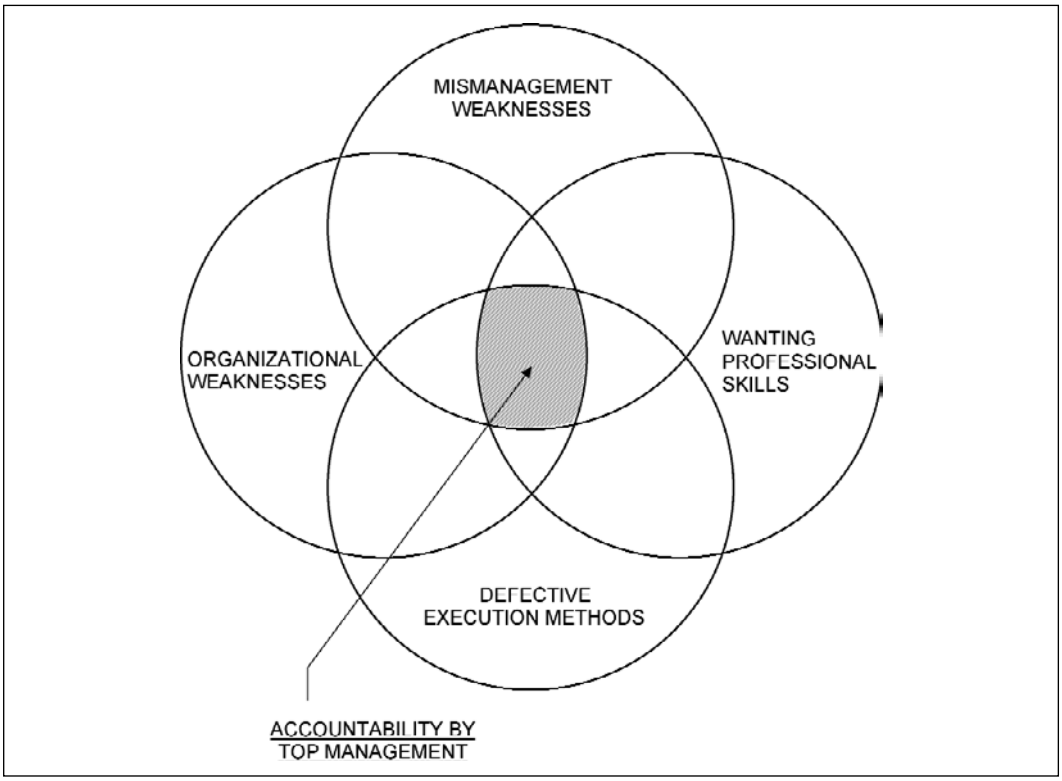
1. Mismanagement at all levels, starting with the board and the CEO
2. Quality of professional personnel (staffing) and its skills
3. Organization, including separation of responsibilities between front office and back office
4. Execution risk, including the handling of transactions, debit/credit, and confirmations
5. Fiduciary and trust activities throughout supported channels
6. Legal risk under all jurisdictions the bank operates, and compliance to regulations
7. Documentation—a cross between operational risk and legal risk
8. Payments and settlements, including services provided by clearing agents, custody agents, and major counterparties

9. Information technology risks: software, computer platforms, databases, and networks
10. Security, including ways and means to unearth rogue traders and other fraudulent people—internal or external
11. Infrastructural services, including clean utilities: power, telecom, water
12. Risks associated with less-well-known or appreciated factors, present and future, because of novelty and globalization

Legal risk, like the examples we have seen, can be examined on its own merits or as an integral part of operational risk. Payments and settlement risk are embedded into execution risk. Each one of these dozen operational risks can be analyzed in greater detail. Board risk and senior management risk include wrong or incomplete policies, poorly explained guidelines, and failure to put in place a rigorous internal control system with personal accountability. Just as frequent are deficiencies in supervisory activities and the lack of timely control action.

The way losses are incurred and dealt with says a great deal about mismanagement. A most interesting case study is that of Crédit Lyonnais in France[7] and its salvage operation, which cost French taxpayers about $45 billion. A similar reference is more or less applicable to all institutions that think that the taxpayer has deep pockets. An example is the twelfth-hour salvage operation of the savings and loan institutions in the United States in the late 1980s. Corruption and mismanagement tend to be endemic in tightly knit establishments that are:

Exhibit 4.1 Top Four Domains Creating the Origin of Operational Risks



- Highly secretive
- Too hierarchical, and
- Acting with scant regard for the rights of others

These "others" may be counterparties, shareholders, or regulators. While plain mismanagement plays a significant role in operational-type failures, fraud and corruption also tend to be present. These, too, are operational risks. In G-10 countries, many businesspeople consider corruption to be as much of a threat to efficiency as bureaucracy. It is also an operational risk because it distorts the market.

A growing number of people in industry and finance believe that the time has come for renewal and for clean-up of corrupt practices. The call for cleaning house becomes louder as corruption scandals come to light after two free-wheeling decades of greed and loose business ethics.

There is no trend yet toward what Aristotle referred to as moral virtue, which he said was taught by repetition and was learned, if at all, at a very early age. Nor do we see a conscientious effort to upgrade business ethics and underline financial responsibility, by putting a lid on leverage and stamping out flagrant operational risks. An example of lack of moral virtue in the year 1994 can be found in the following cases.

- Bernard Tapie was fined by France's stock exchange regulator for filing false data on scale-maker Testut and challenged for the loans he took in connection to his yacht. He was arrested after a parliamentary probe of his Credit Lyonnais borrowings ended in the removal of his parliamentary immunity. Eventually Tapie resurfaced as an actor.
- That same year, 1994, Didier Pineau-Valencienne, chairman of Schneider, an electrical equipment maker, was arrested in Belgium after shareholder complaints on acquisition prices led to charges of financial fraud by Belgian authorities. Subsequently he was released from jail on bail of $437,000.
- In May 1994, Pierre Berge, president of fashion house Yves Saint Laurent (YSL), was charged by prosecutors with insider trading for selling YSL shares before the 1993 takeover by Elf Sanofi.
- In early July 1994, Pierre Suard, then chairman of the electrical/electronics manufacturer Alcatel Alstom, was arrested on charges of forgery, fraud, and corruption.

As these references show, within the same year there was a series of judicial attacks on big names in French business. Italy also went through a wave of prosecutions. Caught in the judicial scrutiny were four top officers of Mediobanca, the powerful Milan bank with major holdings in all key Italian industries; the country's blue chips.

On May 31, 1994, Ravenna magistrates issued writs of investigation into Mediobanca's ties with the scandal-ridden Ferruzzi Group, which subsequently went into Italy's version of Chapter 11. Former Ferruzzi officials claimed that Mediobanca was privy to Ferruzzi's political slush funds and phony balance sheets. This action was a blow to 86-year-old Enrico Cuccia, then an honorary chairman of Mediobanca and Italy's most powerful banker. Cuccia was under investigation along with three other officers for financial irregularities.

In Spain also, Mario Conde, formerly chairman of Banesto, one of the country's major banks, was accused by the Bank of Spain of using questionable accounting practices to inflate Banesto's

profits. There also have been other investigations into other institutions for improper wheeling and dealing, leading to unreliable financial reporting.

It should come as no surprise that in terms of corruption, some countries and some companies fare worse than others. A recent study identified Denmark as the least corrupt country in the world; it had the honor of being classified at the bottom of the corruption scale. Indonesia and Nigeria shared the top position. For once being at the head of a list brings with it no honors.

- Because corruption is so widespread and it comes in so many shapes and colors, legislators and regulators will be well advised to set up rigorous financial reporting standards.[8]
- Internal controls and financial reporting standards should account both for reputational risk and for event risk as well as for the fact that organizations are made of people.

Attention should be paid to a report by the Technical Committee of the International Organization of Securities Commissions (IOSCO)[9], which aptly suggests that a control structure can only be as effective and reliable as the people who operate it. Therefore, a strong commitment to ethics by all managers and professionals within a financial institution is a prerequisite to the good functioning of a control system. Corruption is sometimes promoted by devaluation, bailouts, and meltdowns.

"*If* we can understand the laws, *then* we can understand the universe," says a proverb. This is true not only of the cosmos but also of the life of an organization. In developing the lines of authority and accountability for internal control, a primary consideration should be the separation of responsibility for the measurement, monitoring, and control of risk from the execution of transactions that give rise to exposure. As I never tire repeating:

- There should be a very clear segregation of duties.
- Personnel must never be assigned conflicting responsibilities.

Quite similarly, a sound organizational practice is that goals are explained through their most quantifiable form. If wiping out corruption and fraud is one of the goals, as should be the case, then checkpoints should be included in the operational plan so that it is much easier and clearer to follow any breakdown.

For its part, the internal audit function must be independent of trading, lending, and other revenue-side business. The role of internal audit (like that of external audit) is to analyze accounts, evaluate qualitative business aspects, and express an opinion on the institution's financial statements. In executing these functions, the auditors should form a view on the effectiveness of the system of internal control and report their opinion to top management, in spite of all the constraints that have been discussed in connection with the CPA's job.

CASE STUDY ON OPERATIONAL RISK AND REPUTATIONAL RISK WITH ORANGE COUNTY

In December 1994, Orange County, California, was responsible for the most spectacular municipal bankruptcy in American history. Its heavily leveraged investment fund, which was positioned on the

assumption that interest rates would stay steady, suffered a loss of $1.9 billion (some say $2.1 billion) when the Fed increased U.S. interest rates in six consecutive moves during 1994. The county, one of America's largest and wealthiest, defaulted on several bond issues, and its investment fund managers were forced to borrow more than $1 billion to pay the bills.

This was a blatant case of reputational risk involving not only the county itself but also financial institutions that sold leveraged derivative financial instruments to people who did not understand the risks they were taking. Much more than market risk and credit risk, it is a case of operational risk because one person alone, 70-year-old Robert Citron, Orange County's treasurer, was the boss, dealer, risk taker, and controller of runaway investments.

The bankruptcy filing by Orange County, followed by threats of debt repudiation by some county officials, helped cast a shadow over the entire U.S. municipal bond market in the months following December 1994. But by mid-September 1995 it seemed that at least some of the troubled county's creditors could make out better and faster than anyone dared imagine at the time of the crash.

The turnaround came as the California Legislature voted on a comprehensive package, backed by the county and many of its constituencies, that formed the cornerstone for the debt-repayment plan. The plan used existing county revenue to back new Orange County securities planned to repay most of the obligations that had defaulted.

Anything that removed the cloud from Orange County was good news for holders of $800 million in short-term notes, who were to be repaid when the blow-up came but agreed to a one-year extension in exchange for an extra 0.95 percent in interest. Rescheduling was the only way to deal with the situation.

The U.S. Congress also moved into action by opening hearings. Critics say that the proceedings turned out to be a forum for agents of the Wall Street financial crowd: Standard and Poor's, Moody's Investors Service, law counselors to investors, guarantors, and so on. What these agents essentially demanded was that Congress guarantee their interests at stake in municipal finances—and, in their way, they were right.

As the Congressional Research Office described the financial investors' concerns in a July 12, 1995, prehearing memorandum to the subcommittee on the implications of Orange County's December 1994 declaration of bankruptcy: "The concern seems to be that many local governments will decide that stiffing one's creditors, even when one has the capacity to pay, will become a preferred policy of local governments."

Wall Street witnesses to the congressional hearings asked for legislation to require mandatory disclosure by municipalities of their financial condition, heretofore not as stringently required as for nongovernmental entities. This demand was well founded. Secrecy feeds operational risk, while transparency starves it. Another demand was for measures to prevent localities from voting down taxes with which to pay bondholders and other creditors.

No financial witness used the term debt moratorium, but some said that under no account must citizens be given powers over the validation of their debt(s). As revealed in these hearings, in the United States there are approximately 80,000 state and local governments, about 50,000 of which have issued municipal securities. This market is unique among the world's major capital markets, because the number of issuers is so large.

Issuers include states, counties, special districts, cities, towns, and school districts. When the hearings were held (mid-1995), total municipal debt outstanding was approximately $1.2 trillion. This amount of money is roughly equal to 30 percent of all savings in the United States, and the

debt represents municipal securities issued to finance capital projects such as transportation, education, hospital, housing, public power, water, and sewer systems.

The capital markets were upset with the Orange County bankruptcy because municipalities are not supposed to speculate. Their general obligation bonds is debt secured by the full faith and credit of an issuer with taxing power. That's why in the twentieth century such bonds have been considered to be the most secure of all municipal issues: Governments have the power to levy taxes to meet payments of principal and interest.

In the past, state-created agencies have allowed troubled municipalities to work out their financial problems under state supervision while assuring bondholders that they will be paid any amounts owed to them. But no one can ensure this policy will continue forever in the future. In the Orange County case, bankruptcy proceedings put off the consequences of its debt burden but did not erase it. Also, as it emerged from bankruptcy, in mid-1996, Orange County immediately had to put aside money to navigate the uncharted waters of welfare reform.

There were also some positive signs associated with this bankruptcy. Paying off more of the debt ahead of schedule sent a positive signal to the bonds markets. It took, however, more than that to rebuild confidence in Orange County finances. Eventually time erased the memory of the 1994 debacle and proved that the debt-repayment plan approved by the bankruptcy court worked.

Rescue operations made in the past helped to provide a frame of reference. When in 1975 New York City was unable to meet its short-term obligations, it was also unable to market its debt. The state created a financing authority, the Municipal Assistance Corporation, which was designed to have a dedicated source of revenue that could help in the payout.

The City of Philadelphia also faced severe financial problems in 1991. With a large long-term operating deficit and short-term notes about to mature—notes that the market indicated could not be refinanced—Philadelphia faced the prospect of declaring default. The State of Pennsylvania stepped in to save the day.

In appreciating the risks involved with twelfth-hour rescue operations, one should remember that both New York and Philadelphia had gotten near the precipice by overspending, not by *betting the bank*. By contrast, Orange County has shown that a county government can get itself into a mess through leverage that runs wild because of operational risk. While financial leverage and the use of derivatives might be acceptable for high-risk portfolio managers, a gambling strategy has no place in cases involving public tax money.

Many people wondered how the senior governing body, the five elected supervisors of Orange County, could have allowed this foolishness to take place. The answer is that they did not exercise their supervisory duties. As paper profits started rolling in during the good years, responsibility took a leave and, with it, accountability.

In April 1995, Robert Citron, the former Orange County treasurer, pleaded guilty to six felony counts of securities fraud and mismanagement in connection with his tenure. In November 1996, two years after the debacle, Robert Citron, the man responsible for the largest municipal bankruptcy in U.S. history, was sentenced to one year in county jail and fined $100,000 for his role in events leading up to the debacle.

Besides the county's declaration of bankruptcy, the massive operational risk caused by five elected supervisors exercising defective internal control and by the treasurer's gambles resulted in massive layoffs of county workers. To save himself from due punishment, the treasurer-turned-derivatives-speculator portrayed himself as an unsophisticated local government official who relied on advice from a broker.

FALLOUT FROM OPERATIONAL RISK HITS BOTH THE FUND AND THE BROKER

The portfolio of Orange County had two curious characteristics for a public fund:

1. It was leveraged three times over.
2. Much of it was invested in inverse floaters.

Inverse floaters are risky structured notes that deliver high yields when interest rates are low, but their yields fall and their value crashes as interest rates rise. Inverse floaters are definitely not recommended investments for a public fund.

Citron started buying inverse floaters for Orange County in 1991 because he bet interest rates would fall. In the early 1990s, he was getting such good returns on his risky investments that public authorities, such as the City of Irvine water authority, issued a short-term investment pool. With the profits came greed. To make ever larger bets, Citron leveraged his $7.5 billion portfolio, borrowing to the point that he controlled a total of $21 billion in paper assets. Much of the difference of $14 billion was made through reverse repurchase agreements.

In July 1994 Orange County floated a one-year bond, raising $600 million, which went to the investment pool, whose securities had an average life of much more than one year. This procedure essentially amounted to borrowing short term to invest long term—a sort of voodoo economics. Such upside-down logic, taking deposits at high interest rates to service loans given years ago at low interest rates, turned the savings and loans belly-up in the 1980s.

When the Orange County crash came, taxpayers were asked to foot the bill, but they were not the only victims in the county's bankruptcy. Buyers of its double-A rated bonds thought they were safe, but they also were left high and dry. Independent rating agencies were taken largely by surprise. As the director of one such agency commented: "In the past we have looked mainly at how a city raises money and how it spends it. Now we will pay attention to how they invest it."

Many executives whom I questioned felt that the Orange County affair was not just a matter of the lack of internal controls but also of a lack of internal discipline. "People knew what was going on," said Susan Hinko of the International Securities Dealers Association (ISDA), "and there were plenty of controls in place. One comes up with rules but people don't obey them. You need discipline rather than new rules." Hinko qualified her statement by adding: "I am not saying there should not be controls—but they don't always work. Classically, the board of directors did not consider it its business to know what the deals are. Only after the Procter and Gamble case were boards told that they are responsible for the derivative trades the company does and for assumed exposure."

Other cognizant executives suggested that as far as financial institutions are concerned, cases of overselling leveraged financial instruments to a client should be covered through customer-centered limits. At least one broker said that if his main responsibility for risk management is market risk, he cannot be held responsible for the customers' exposure—nor for operational failures. But another broker insisted that the Orange County case was serious. This experience should induce investment banks to:

- Know the profile of the client.
- Do appropriate consulting.
- Exercise prudential supervision.

Some Wall Street analysts said that the fact that Merrill Lynch paid an out-of-court settlement to Orange County meant that it accepted a certain responsibility, even if the broker was careful to state it did not. They also added that the more complex the instruments sold to a client, the more difficult it is to distinguish among advisable and inadvisable transactions.

Precisely for this reason, banking associations in several counties have written to their members about responsibilities regarding client information and client consultation, particularly when products are beyond simple bonds and shares. Standard explanations printed on paper help, but usually they are of limited value. While a better approach is personal meetings and oral explanations, it is important to recognize that:

- Oral presentations leave no trace, and they provide no evidence.
- When the instrument is complex, an oral discussion may not fully explain the risks to the customer.

Many experts said the repo agreements Merrill Lynch had sold to Orange County were not only geared but also very complex. But others felt that the financial products Merrill Lynch offered the county were rather straightforward. Problems arose because the county officials borrowed excessively to buy the products.

To recover some of the money that went down the drain, Orange County got involved in a court action against Merrill Lynch. On June 2, 1998, the county settled with the broker. The settlement involved more than $400 million in an out-of-court deal. This cash payment came on top of other substantial payments from KPMG, the county's auditor; Credit Suisse First Boston, which had also sold the county leveraged securities; and others. Outstanding cases against 17 more Wall Street firms brought into the county's treasury another guesstimated $200 million. Orange County even sued independent rating agencies for rating its bonds too highly.

In Orange County, Robert Citron's successor made the deliberate choice to engage in another type of operational risk: legal action. With this he succeeded in recovering a good deal of lost money. Wall Street analysts suggested that the total recovered was around $800 million. Adding to this the $700 million in profits Citron made before his strategy went wrong, the county had recovered a good deal of the money lost in late 1994.

What is the lesson to be derived from this case other than the fact treasurers should not gamble with other people's money? It is the strategy of Citron's successors in managing the county's liabilities: When a big investor who knows how to play weeping boy loses money through trades, he can sue the bank that sold him the derivatives products for an amount equal to or greater than his losses. Then he should settle out of court, provided that he recovers the biggest chunk of lost capital. This at least would make bankers and brokers think twice about what they sell in leveraged instruments—and to whom they sell it.

SCANDALS BECOME PART OF REPUTATIONAL RISK WHEN THEY COME TO THE PUBLIC EYE

Anything less than perfect execution of operational controls leads to malfunctioning in the organization, with a direct result being the financial scandals discussed in the preceding sections. In the case of rapid economic expansion, huge potential losses may be hidden for a while because everyone

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thinks that he or she wins no matter the amount of assumed exposure. Despite this belief, risks are sure to hit one on the head in case of economic downturn or other adverse market conditions.

Take as an example Banco Latino, which in the 1980s was one of Venezuela's growth banks, considered by investors to be a sure bet. In the mid-1990s the country's financial industry was shaken by the fallout from a persistent banking crisis; 1994 was the fatal year. On June 19, 1995, Banco Latino, the nation's second-largest bank, filed suit against its former president, Gustavo Gomez-Lopez, and 33 others, including former directors and officers, with charges worse than mismanagement.

A 170-page-long document alleged that the defendants contributed to the bank's 1994 collapse by engaging in "massive fraud and racketeering."[10] The plaintiffs were seeking about $700 million in damages as Banco Latino lost $2 billion in a crisis that led to the collapse of more than half of Venezuela's domestic banking industry.

A little over a year later, in September 1996, the Morgan Grenfell scandal raised many questions about the safety and suitability of unit trusts (mutual funds) as an investment vehicle for millions of customers. It all started on September 2, when Morgan Grenfell issued a statement that simply said that dealings in three of its investment funds had been suspended following the discovery of potential irregularities in the valuation of unquoted securities. That is full-fledged operational risk. These irregularities concerned three of the bank's flagships:

- Morgan Grenfell European Growth Trust, with 70,000 investors
- Morgan Grenfell Europa, with 20,000 investors, and
- Morgan Grenfell European Capital Growth Fund, a Dublin-based fund with 1,800 investors.

Peter Young, one of the executives in charge of the valuation of the funds, appears to have used a large chunk of the £1.13 billion ($1.75 billion) invested in them to circumvent rules governing how mutual funds are managed. This high-handed twist steered investors' money into financial instruments of exceptionally high risk, using a complex web of shell companies set up by Young with the help of Wiler & Wolf, a Swiss law firm. Young seems to have bent established rules that forbid trusts from:

- Investing more than 10 percent of their portfolios in unquoted securities, or
- Holding more than 10 percent of any one company—a regulatory prudential measure.

As much as 37 percent of the funds' cash was invested in unquoted companies; although this amount was later reduced to 23 percent, it still broke the rules. As in the case of Barings, also in 1995, Morgan Grenfell had failed to implement internal controls. So much of the investors' money was in obscure unquoted companies that it became impossible to value the portfolios properly and therefore to publish an accurate price for buying and selling units in the funds. Despite this, Morgan Grenfell went on selling the funds even though the prices given may not have been accurate, thus misleading investors.

To save the day, Deutsche Bank, Morgan Grenfell's parent company, had to pump into its British investment banking subsidiary and its trusts DM 240 million (under then prevailing exchange rates £180 million, $293 million) to make good any misvalued holdings in unquoted stocks. In essence, the parent bank bought the offending stocks from the unit trusts for cash, therefore paying a high price for the operational risk it had incurred. Arthur Andersen was appointed to calculate compensation, and to do so it had to:

- Track back transactions to the point where the portfolios began to deviate from the rules.
- Value them on each subsequent day, by recalculating unit prices.
- Compare these prices with the unit prices published at the time by the investment bank.

In most cases that end in court because of reputational risk and financial losses, it is a lose-lose situation both for the bank and for the investors. Mismanagement is the rule in these cases. Either the board, the CEO, and the senior executives were part of the ploy, or they were incapable of controlling irregularities. When operational risk hits in a big way, the best thing that can happen is that the board (or the owners) fire the current management and put the company in the hands of people who know what they are doing and can get things done.

The surgical knife must excise the rot. Sometimes it does. In 1998, 20 BankBoston employees were either fired or reprimanded for negligence tied to a $73 million loan scandal, according to chairman Charles Gifford. Ricardo Carrasco, an executive in the bank's New York office, was accused of embezzling the money. Carrasco and the money had been missing since February of that same year, but it took six months to implement corrective action.[11]

Reputational risk fallout arises in cases of whitewashing of drug money from racketeering ventures. A 1999 example involved funds handling at the Bank of New York (BONY). Billions of dollars were channeled through this credit institution in 1998/1999 in what is believed to be a major money-laundering operation by Russian organized crime through the intermediary of another financial institution.

The banking relationship between the Bank of New York and Russia's Inkombank seems to have started in March 1992, with Natasha Gurfinkel, head of the Bank of New York Eastern Europe division and directly responsible for the Inkombank account. This dual function was an organizational failure of BONY. Konstantin Kagalovsky, her future husband, had been Russia's representative to the International Monetary Fund since 1992.[12] Gurfinkel was suspended from her functions after different findings.

As far as this reputational risk is concerned, an estimated minimum of $4.2 billion was allegedly whitewashed in more than 10,000 transactions passed through one account by means of an ingeniously conceived scheme. No one exactly knew the high end of the cash flow, but based on information collected by U.S. federal authorities, it has been estimated that as much as $10 billion may have flowed through BONY in this one and related accounts. Investigators publicly said that vast sums of money were moving into and out of the bank on a single day, and these transactions added up to one of the largest money-laundering operations ever uncovered.

Like many other major operational risks, the BONY affair had its roots in a time of stress. Since the collapse of the Russian financial system in August 1998, the flight of money out of the country accelerated, and this served as cover to suspected money-laundering operations. That is another reason why internal and external auditors must be willing and able to do a rigorous analysis of transactions and of their patterns. One of the major duties of the board and the CEO is to lead in such investigations and to ensure that the institution they manage does not become an accomplice to organized crime.

In conclusion, the best is the enemy of the good only if the good is good enough. But as a growing number of examples demonstrates, the current internal controls systems in a surprisingly large number of institutions are not even remotely good enough. In many cases, they are simply not functioning; in others, inept management fails to analyze the signals it receives and to act. This is bad in connection with the management of assets, but it becomes an unmitigated disaster with the management of liabilities.

NOTES

1. Frank Partnoy, *F.I.A.S.C.O.* (London: Profile Books 1997).
2. *The Times*, January 24, 1996.
3. *Financial Times*, March 23/24, 1996.
4. *The Economist*, November 4, 1995.
5. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley, 2000).
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7. D. N. Chorafas, *Managing Credit Risk,* Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
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11. *USA Today*, July 6, 1998.
12. *EIR,* September 24, 1999.

PART TWO

Managing Liabilities

CHAPTER 5

Assets, Liabilities, and the Balance Sheet

Assets and liabilities management (ALM, A&L management), as we know it today, was originally developed in the 1970s to address interest-rate risk. Because of the two oil shocks and the abandoning of the dollar's convertibility into gold during the 1970s, devastating inflation followed by skyrocketing interest rates occurred in the late 1970s and early 1980s. Better ALM tools were therefore necessary and welcome.

Over the years, the use of A&L management methods and increasingly sophisticated tools became important because many companies suffered from a mismatch between their assets and their liabilities. For example, because of an often stipulated short-term redemption clause, funding agreements had the potential to behave like short-term liabilities, while the proceeds from such funding agreements were invested in less liquid, longer-term assets.

Board members, chief executive officers (CEOs), chief financial officers (CFOs), independent actuaries, internal auditors, and regulators must be fully aware of the aftermath of the redemption feature and other characteristics of legal contracts. They also should appreciate the need to take corrective action when imbalances develop. Some spectacular failures, like the savings and loan meltdowns, made evident the need to control on a steady basis interest-rate mismatch (see Chapter 12) and generally approach the management of assets and liabilities in an analytical way—preferably in real time. (See Chapter 6.)

During the late 1980s and the 1990s, most companies came to appreciate that if they did not study and coordinate decisions on assets and liabilities, they would be courting disaster. This disaster hit not only retail banks and commercial banks but also industrial companies that were not careful in A&L management. Insurance companies also suffered greatly. Nissan Mutual Life, a formerly prosperous Japanese company with 1.2 million policyholders and assets of $17 billion, will be discussed as an example.

Analytical accounting is key to an effective ALM. While general accounting is based on 500-year-old fundamental concepts, analytical accounting is in full evolution. The variables entering into it have to be monitored and evaluated, some continuously and some discretely, for two reasons:

1. The evaluation of some of the variables often is based on the costs of consumed resources.
2. For other variables, evaluation depends on fair market price, which could be wholly disconnected to costs.

In the latter case, in an A&L management sense, we face a fact of future uncertainty that cannot be abolished by estimating the values of some of the variables. Business, customs, and the law recognize this uncertainty in part. Financial reporting is obliged to take into consideration all possible market twists and select out of them those making good business sense—while at the same time complying with rules and regulations.

For instance, balance sheet interest-rate risk must be monitored and managed primarily based on marking to market, but tests based on the hypothesis of rising and falling interest rates are also required. As we will see through a practical example with the Office of Thrift Supervision (OTS) in Chapter 12, test scenarios are valuable, and the same statement applies to requirements imposed by supervisory authorities in connection to daily reporting on interest-rate risk.

For asset and liability management purposes, many banks and other entities calculate value at risk (VAR)[1] based on the 99 percent confidence level and a 10-day holding period. Two years or more of underlying data are used to derive the market movements for this calculation. While such approaches are commendable, financial executives of banks, commercial entities, and industrial firms will be well advised to ensure real-time response. How to do so with virtual balance sheets is explained in Chapter 6.

AFTERMATH OF LIABILITIES: NISSAN MUTUAL LIFE AND GENERAL AMERICAN

Liabilities are the result of external financing, daily operating activities, and trade into which engages a company. The same forms of external financing are debt, equity, and hybrid instruments. *Debt* consists of claims of other parties that have to be repaid within a given time frame, in specific amounts, at an agreed interest rate. *Equity* constitutes a claim on the future profits of the firm for its shareholders. Unlike debt, equity does not have to be repaid, unless the company buys back its share to use as a cash hoard or support the price of its stock.

Major types of debt are loans, usually from banks, deposits by companies and the public, and debt securities issued to the capital market. The latter can be privately or publicly placed with investors. Debt securities in private placement cannot be traded easily on the financial markets. Trading opportunities with publicly issued debt securities are much greater.

The maturity of debt instruments is important. Publicly issued debt securities with an original maturity of less than one year are usually referred to as *commercial paper*. Debt securities issued with an original maturity over one year are known as *corporate bonds*. This is not the classical use of the term *commercial paper*. Originally it was supposed to have something to do with a commercial transaction, not a purely financial one.

Companies also finance their operations by resorting to trade credits and advances, which are claims arising from the direct extension of credit by suppliers as well as buyers of goods and services. The interest paid on debt securities reflects prevailing market rates (see Chapter 11) as well as differences in the creditworthiness of the respective issuers. In this sense, interest is a function of the issuers' prospective ability to meet the principal and interest payments of the debt issued.

As a general rule, debt securities are defined according to the creditworthiness attributed to them by rating agencies. A key distinction is between *investment-grade* and *subinvestment-grade* (high-yield, junk) debt securities. The ratings of debt securities also depends on guarantees attached to them. Debt secured by collateral, such as real estate in the case of a mortgage, normally has a better rating than unsecured debt, other things being equal.

Equity also can be issued privately or publicly. In a private offering, it can take the form of unquoted shares and venture capital. In public offerings, shares are listed on a stock exchange. These are known as quoted shares. Private equity consists of equity investments in the unquoted securities of private and public firms.

Venture capital, such as start-up money to finance new high-risk firms, is often provided by private investors and specialized venture capital companies in return for equity ownership. To recover their venture capital and make a profit, as well as to enhance their reputation and for financing reasons, start-ups decide at an appropriate moment to substitute unquoted for quoted shares by listing on a stock exchange. Doing this improves their access to the capital markets.

Listed companies have to meet public information requirements established by regulators as well as financial performance criteria and accounting standards. These requirements are intended to increase investor confidence in the firm. Once a company is listed, investors can follow its share price and consequently see a pattern of the company's investment potential and its financial health.

Shares and other equity are the main liability for nonfinancial corporations, followed by loans in Europe and by debt securities in the United States. Exhibit 5.1 shows the percentages of liabilities of nonfinancial corporations, using 1999 statistics. In Japan, loans are the most important liability. (Equity as a percentage of liabilities depends significantly on the evolution of share prices.)

Regarding other forms of debt financing, trade credits and advances play a relatively important role in the United States, Europe, and Japan. In 1999, debt financing in the form of securities other than shares had only a small share in the total liabilities of Euroland's nonfinancial corporations in terms of amounts outstanding. By contrast, this form of financing was more important in the United States and Japan.

Hybrid financial instruments, which cannot be classified strictly as equity or debt, have become more important in recent years. Some of them are regarded as financial innovations that aim to provide cheaper sources of corporate finance. Convertible bonds and warrants are examples:

- Convertible bonds give their owners the right to convert the bonds into shares, at a certain price.
- Warrants provide their holders with the right to buy shares in a company at a certain price.

Derivative financial instruments are another major class, playing an important role in corporate financing. As we saw in Chapter 3, they are used by companies to hedge against market risks, such as interest-rate and foreign exchange risks, or to adjust the features of their debt to specific needs.

Exhibit 5.1 Percentage of Total Liabilities of Nonfinancial Companies in Euroland, the United States, and Japan

	Euroland	United States	Japan
Loans	23.3	5.4	38.9
Trade credit and advance payments received	8.3	7.8	12.4
Securities other than shares	2.4	10.6	9.4
Shares and other equity	62.6	70.2	33.8
Other liabilities	3.4	6.0	5.5

Sources: European Central Bank, Board of Governors of the Federal Reserve System, and Bank of Japan.

But they also are used for speculating, creating liabilities that hit a company hard, usually at the most inopportune moment.

Financial companies authorized to take *deposits*, such as retail banks, commercial banks, and insurance companies, have a major liabilities exposure toward their depositors. As long as the companies are solvent and the market thinks they are well managed, depositors are happy to leave their money with the entity to which they have it entrusted. But when a financial institution is in trouble, depositors stampede to take their money out, to safeguard their capital.

Many examples dramatize the aftermath of poor management of one's liabilities. Nissan Mutual Life sold individual annuities paying guaranteed rates of 5 to 50 percent. It did so without hedging these liabilities. In the mid-1990s a plunge in Japanese government bond yields to record low levels created a large gap between the interest rates Nissan Mutual committed itself to pay and the return it was earning on its own investments. This gap led to the company's downfall.

On April 25, 1997, Japan's Finance Ministry ordered the company to suspend its business. Nissan Mutual was the first Japanese insurer to go bankrupt in five decades, with losses totaling $2.5 billion. Two years later, in 1999, a mismatch between assets and liabilities rocked General American Life, a 66-year-old St. Louis life insurer with $14 billion in assets. At the core of this crisis were $6.8 billion of debt instruments known as short-term funding agreements General American had issued.

At first, General American Life escaped liquidation, but on July 30, 1999, Moody's Investors Service reduced the company's debt and financial strength ratings by a notch, from A2 to A3. All on its own this reduction would not have been serious, but market sentiment was negative and the downgrade triggered a bank-type run. Within 10 days, the crisis of confidence brought the insurer to its knees.

The lesson to be learned from this overreaction is that insurers have disregarded ALM. The securities that General American Life issued paid a competitive yield and carried the promise that investors could cash them in on seven days' notice, probably on the premise that few of these investors, who were mainly fund managers, would invoke the redemption clause. But within hours of the downgrade, several fund managers requested payments of about $500 million.

This sort of run on General American Life can happen to any company at any time, even when it is in no way justified. In this case the insurer had $2.5 billion of liquid assets and met the $500 million in requests without difficulty. But the run did not end there. Over the next few days, overreacting investors sought to redeem another $4 billion of the obligations. Unable to sell assets quickly enough to meet these requests without severely impairing its capital, General American asked to be placed under state supervision.

This practically ended General American Life as an independent entity. On August 25, 1999, the company agreed to be sold to MetLife. The investors who brought General American Life near bankruptcy, transforming A2- and A3-rated receivables into junk, at the same interest rate, must have regretted their rush. In March 2001, General American Life was bought by Prudential Insurance of Britain in a $1 billion deal that created the world's sixth largest insurance group.

EARTHQUAKE AFTER LIABILITIES HIT THE BALANCE SHEET

The last section discussed external sources of corporate finance, which are usually shown under net incurrence of liabilities in the financial account. Financial accounts should be broken down by

instrument, with further detail referring to original maturity and other characteristics of instruments. Internal sources of corporate finance relate to the change in net worth due to savings and capital transfers that are part of the capital account.

While both the capital account and the financial account comprise transactions, other changes to the corporate sector balance sheet may relate to mergers and acquisitions, reclassifications, or holding gains and losses. For nonfinancial entities, changes in assets and liabilities are reflected in *flow accounts*. The example given in Exhibit 5.2 is based on reporting requirements for nonfinancial corporations defined in the European system (Council Regulation [EC] No. 223/96) of national and regional accounts in the European Community (ESA 95).

As an industrial sector, nonfinancial corporations cover all bodies recognized as independent legal entities that are market producers and whose principal activity is the production of goods and nonfinancial services. ESA 95 records flows and stocks in an ordered set of accounts describing the economic cycle, from the generation of income to its distribution, redistribution, and accumulation in the form of assets and liabilities. The flows of assets and liabilities are seen again in the changes in the balance sheet showing the total assets, liabilities, and net worth reflected in:

- The capital account
- The financial account
- Other changes

Because the effect of downgraded liabilities can be nothing short of a financial earthquake, many investors have been studying how to change nonnegotiable receivables, which for banks means credits and for insurers insurance contracts, into negotiable assets. For instance, a negotiable type of deposits for banks and different sorts of investments for insurance companies.

Exhibit 5.2 Flow Accounts for Nonfinancial Corporations: Changes in Assets and Liabilities

CHANGES IN ASSETS	CHANGES IN LIABILITIES	
CAPITAL ACCOUNT		
Acquisition of nonfinancial assets	Internal sources of corporate finance	* Net savings * Net capital transfers (Receivables minus payables)
FINANCIAL ACCOUNT		
Net acquisition of financial assets	External sources of corporate finance, by financial instrument	* Loans * Trade credit and advance payments received * Securities other than other liabilities (deposits, insurance, technical reserves, etc.)
OTHER CHANGES IN THE VOLUME OF ASSETS ACCOUNT AND THE REVALUATION ACCOUNT		

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This can be done at considerable cost and/or the assumption of substantially higher risk than that represented by liabilities. Even redemption at maturity, which transforms short-term into long-term receivables, assumes that the investor is willing to accept the resulting liquidity risk. Such transformations are not self-evident; whether it is doable at all greatly depends on:

- One's own assets
- Prevailing market psychology

Exhibit 5.3 presents in a nutshell four main classes of company assets, some of which might also turn into liabilities. This is the case of derivative financial instruments that for financial reporting purposes must be marked to market (except those management intends to hold for the long term; see Chapter 3). Most assets are subject to credit risk and market risk.

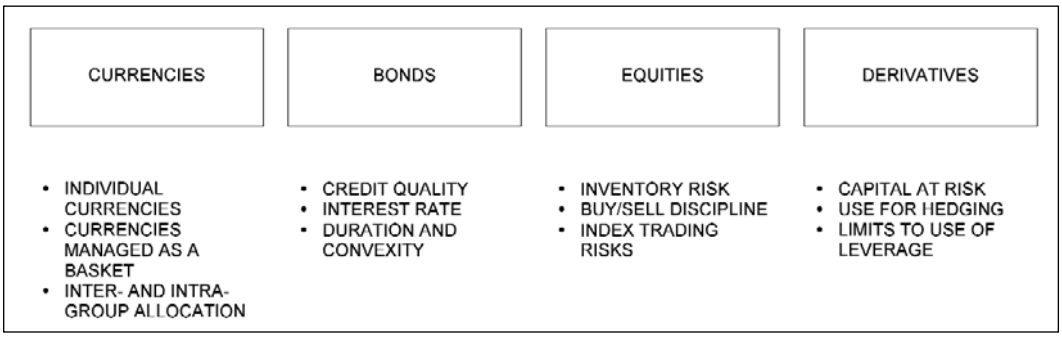
Volatility is behind the market risks associated with the instruments in the exhibit. Aside from mismatch risk, referred to earlier, volatility steadily changes the fair value of these assets. Although the assets might have been bought to hedge liabilities, as their fair market value changes, they may not perform that function as originally intended.

Therefore, it is absolutely necessary to assess investment risk prior to entering into a purchase of assets that constitute someone else's liabilities. This requires doing studies that help to forecast expected and unexpected events at a 99 percent level of confidence. Credit risk control can be done through selection of AAA or AA partners, collateralization, or other means. Market risk is faced through a balanced portfolio. The goal should be to actively manage risks as they may arise due to divergent requirements between assets and liabilities, and the counterparty's illiquidity, default, or outright bankruptcy.

Before looking into the mechanics, however, it is appropriate to underline that able management of assets and liabilities is, above all, a matter of corporate policy. Its able execution requires not only clear views and firm guidelines by the board on commitments regarding investments but also the definition of a strategy of steady and rigorous reevaluation of assets, liabilities, and associated exposure. (See Chapter 6 on virtual balance sheets and modeling approaches.)

Although some principles underpin all types of analysis, every financial instrument features specific tools, as Nissan Mutual and General American Life found out the hard way. In interest-rate risk, for example, one of the ways of prognosticating coming trouble from liabilities is to carefully

Exhibit 5.3 Company Assets and Market Risk Factors Affecting the Value of an Investment Portfolio



watch the spreads among Treasuries, corporates, lesser-quality high-yield bonds, and emerging market bonds:

- Is this spread continuing to widen?
- Is it less than, equal to, or greater than the last emerging market currency crisis?

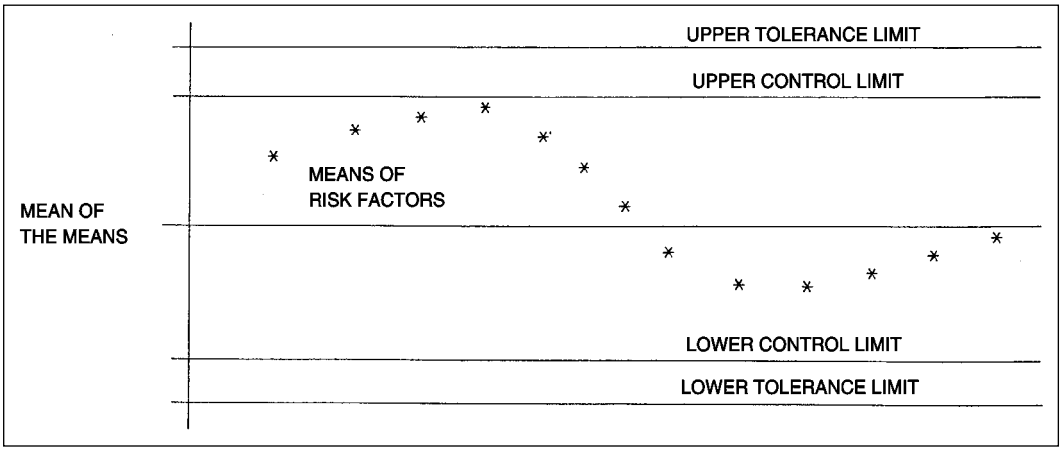
A spread in interest rates may have several reasons. The spread may be due partly to much-reduced Treasury issuance while corporate supply and other borrowings are running at record levels. But, chances are, the motor behind a growing spread is market nervousness. Bond dealers and market makers are unwilling to carry inventory of lesser-quality debt.

It is important to examine whatever spreads are unusually wide more for liquidity reasons than credit risk concerns. Is there a significant market trend? Can we identify these countervailing forces, or there are reasons to believe spreads will continue to widen because of additional pressure on spreads to widen? Statistical quality control (SQC) charts can be instrumental in following up the behavior of spreads over time, if we are careful enough to establish tolerance limits and control limits, as shown in Exhibit 5.4.[2]

Basically, wide spreads for every type of credit over Treasuries means the cost of capital has gone up, even for A-rated credits. If cost and availability of credit are continuing problems, that could have a negative effect on a company's profitability and inject another element of uncertainty for the markets. As in the case of the two insurance companies, it may weaken the assets in the portfolio and therefore give an unwanted boost to the liabilities in the balance sheet.

It should be self-evident that real-time evaluation of exposure due to the existing or developing gap between assets and liabilities cannot be done by hand. Analytical tools, simulation, and high-performance computing are all necessary. Off-the-shelf software can help. Eigenmodels may be better. Several ALM models now compete in the marketplace, but none has emerged as the industry standard. Many analysts believe that a critical mass of ALM practitioners rallying around a given approach or suite of applications would do much to:

Exhibit 5.4 Statistical Quality Control Charts by Variables Are Powerful Tools for Analytical Purposes, Such as the Follow-Up of Interest Rate Spreads



- Promote adoption of a standard
- Simplify communications
- Reduce overall costs of ALM
- Speed development of more efficient ALM solutions

Based on the results of my research, the greatest obstacle to the able, forward-looking management of assets and liabilities is the not-invented-here mentality that prevails in many companies. The next major obstacle is the absence of a unified risk management culture. Loans, investment, underwriting, trades, and internal control decisions are handled separately. Company politics and clashes regarding approaches to the control of risk also hinder the development of ALM.

Also working to the detriment of an analytical approach is the fact that too many members of boards of directors fail to appreciate that ALM is a process to be handled rigorously; it does not happen by accident; nor do imported models from other risk control practices, such as value at risk (introduced in major banks in the mid-1990s), provide a reliable platform for understanding and communicating the concept of exposure due to liabilities. A similar statement is valid regarding classic gap analysis, as we will see.

SENSITIVITY ANALYSIS, VALUE-ADDED SOLUTIONS, AND GAP ANALYSIS

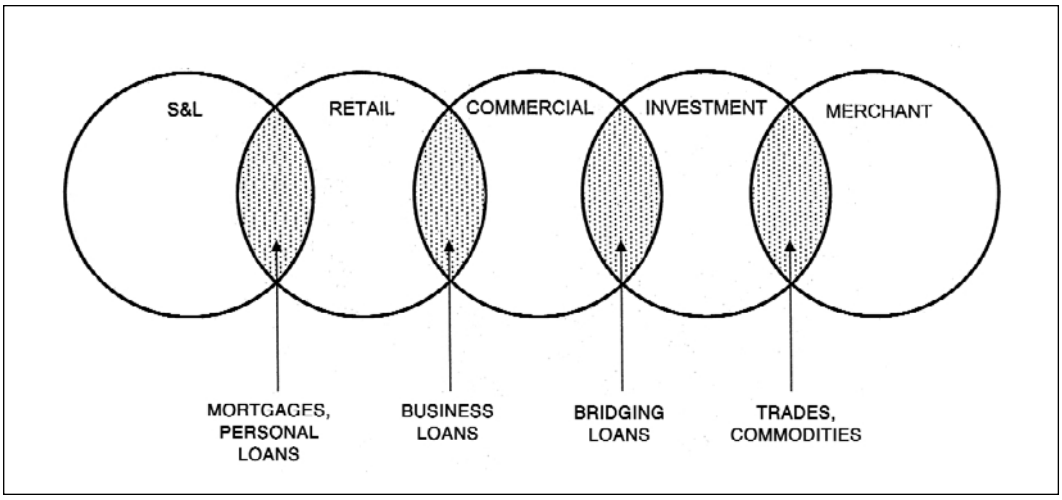
Large portions of the retail portfolio of commercial banks, insurance companies, and other entities consist of nonmaturing accounts, such as variable-rate mortgages and savings products. Because of this, it is wise to model sensitivities on the basis of an effective repricing behavior of all nonmaturing accounts, by marking to market or marking to model if there is no secondary market for the instrument whose risk is being studied.

Sensitivity refers to the ability to discover how likely it is that a given presentation of financial risk or reward will be recognized as being out of the ordinary. The ordinary may be defined as falling within the tolerances depicted in Exhibit 5.4. This section deals with sensitivity analysis. Associated with this same theme is the issue of *connectivity*, which identifies how quickly and accurately information about a case gets passed to the different levels of an organization that have to act on it either to take advantage of a situation or to redress a situation and avoid further risk. The analysis of the effect of fixed-rate loans on liabilities when interest rates go up and the cost of money increases is a matter of sensitivities. Sensitivity analysis is of interest to every institution because, when properly used, it acts as a magnifying glass on exposure. The types of loans different banks have on their books may not be the same but, as Exhibit 5.5 shows, end-to-end different types of loans form a continuum.

One of the most difficult forms of interest-rate risk to manage is *structural risk*. Savings and loans and retail and commercial banks have lots of it. Structural risk is inherent in all loans; it cannot be avoided. It arises because, most of the time, the pricing nature of one's assets and liabilities does not follow a one-to-one relationship in any market.

Many institutions fail to realize that, because of structural reasons, imbalances between assets and liabilities are an intraday business, with the risk that the liabilities side balloons. In most cases, senior management is informed of the balance sheet turning on its head only when something catastrophic happens. As a result, timely measures cannot be taken and the entity continues facing a growing liabilities risk.

Exhibit 5.5 The Main Business Areas Of Banking Are Partially Overlapping



Contrary to what the concept of a balance sheet suggests, an imbalance between assets and liabilities exists all the time. Leverage makes it worse because it inflates the liabilities side. Sensitivity to such lack of balance in A&L is important, but it is not enough. The timely and accurate presentation of sensitivity analysis results, as well as the exercise of corrective action, tells about the connectivity culture prevailing in an organization.

The fact that sensitivity and connectivity play an important role in assuring the financial health of an entity is the direct result of the fact that financial markets are *discounted mechanisms*. This fact, in itself, should cause us to consider a whole family of factors that might weigh on the side of liabilities, including not just current exposure but also worst-case scenarios tooled toward future events.

If, for example, by all available evidence, interest-rate volatility is the number-one reason for worry in terms of exposure, *then* contingent liabilities and irrevocable commitments also should be included into the model. Among contingent liabilities are credit guarantees in the form of avals, letters of indemnity, other indemnity-type liabilities, bid bonds, delivery and performance bonds, irrevocable commitments in respect of documentary credits, and other performance-related guarantees.

Part and parcel of the sensitivity analysis that is done should be the appreciation of the fact that, in the normal course of business, every company is subject to proceedings, lawsuits, and other claims, including proceedings under laws and government regulations related to environmental matters. Legal issues usually are subject to many uncertainties, and outcomes cannot be predicted with any assurance; they have to be projected within certain limits.

Consequently, the ultimate aggregate amount of monetary liability or financial impact with respect to these matters cannot be ascertained with precision a priori. The outcome, however, can significantly affect the operating results of any one period.

One of the potential liabilities is that a company and certain of its current or former officers may be defendants in class-action lawsuits for alleged violations of federal securities laws or for other reasons. Increasingly, industrial firms are sued by shareholders for allegedly misrepresenting financial conditions or failing to disclose material facts that would have an adverse impact on future earnings and prospects for growth. These actions usually seek compensatory and other damages as well as costs and expenses associated with the litigation.

Liabilities also might be associated with spin-offs, established in a contribution and distribution agreement that provides for indemnification by each company with respect to contingent liabilities. Such contributions relate primarily to their respective businesses or otherwise are assigned to each, subject to certain sharing provisions in the event of potential liabilities. The latter may concern the timeframe prior to their separation or some of its aftermath.

Like any other exposure, legal risk affects the value of assets. Unlike some other types of risk, however, the effects of legal risk are often unpredictable because they depend on a judgment. They also can be leveraged. "Don't tell me what the issue is," Roy Cohn used to say to his assistants. "Tell me who the judge is."

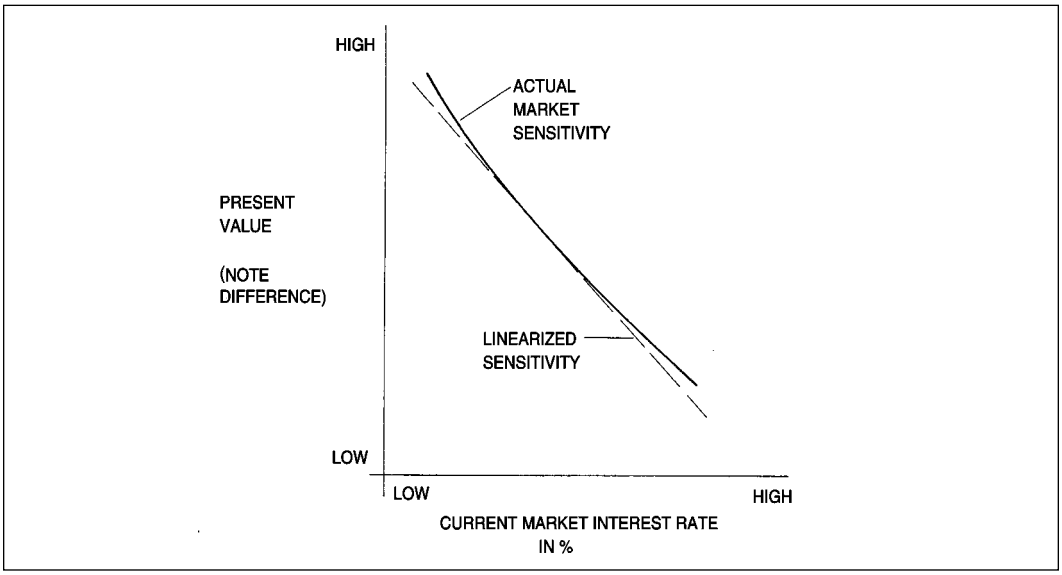
Because some of the issues at risk faced by a firm are judgmental, sensitivity analysis should be polyvalent, expressing the degree to which positions in a portfolio are dependent on risk factors and their most likely evolution. The study may be:

- *Qualitative*, with results given through "greater than," equal to," or "less than" a given value or threshold.
- *Quantitative*, with results expressed in percentages or in absolute units.

Whichever the exact nature of the study may be, whether its outcome is by variables or attributes, it is wise to keep in mind that there is a general tendency to linearize sensitivities. By contrast, in real life sensitivities are not linear. Exhibit 5.6 gives an example with interest rates.

Often, so many factors enter a sensitivity model that they cannot all be addressed at the same time. Time is one of the complex variables. The classic way of approaching this challenge is to organize assets and liabilities according to maturities, or time bands. This process often relates to interest rates, and it is known as *gap analysis*.

Exhibit 5.6 Actual Sensitivity and Linearized Sensitivity to Changes in Market Industry Rate



Gap analysis is a quantitative sensitivity tool whereby assets and liabilities of a defined interest-rate maturity are netted to produce the exposure inherent in a time bucket. Liabilities that are interest-rate sensitive are subtracted from assets:

- A positive result denotes a positive gap.
- A negative result identifies a negative gap.

With an overall positive (negative) gap, the institution or any other entity is exposed to falling (rising) interest rates. The difference between assets and liabilities in each time range or gap reflects net exposure and forms the basis for assessing risks. This procedure involves the carrying amounts of:

- Interest-rate–sensitive assets and liabilities
- Notional principal amounts of swaps and other derivatives.

Derivatives play a double role in this connection. At the positive end, in terms of ALM, derivatives of various maturities can be used to adjust the net exposure of each time interval, altering the overall interest-rate risk. At the same time, derivative financial instruments have introduced their own exposure.

With gap schedules, rate-sensitive assets and liabilities as well as derivatives are grouped by expected repricing or maturity date. The results are summed to show a cumulative interest sensitivity gap between the assets and liabilities sides of the balance sheet. Gap analysis has been practiced by several banks for many years, but by the mid- to late 1990s it lost its popularity as a management tool because:

- It fails to capture the effect of options and other instruments.
- It can be misleading unless all of the instruments in the analysis are denominated in a single currency.

In transnational financial institutions and industrial firms, currency exchange risk had led to failures in gap analysis. A number of reputable companies said that they had done their homework in interest-rate sensitivities, then found out their model did not hold. What they did not appreciate is that one's homework never really ends. For this reason, the best way to face the ALM challenge is to return to the fundamentals.

Controlling interest-rate risk in all its permutations is no simple task. If it were, practically no companies would have experienced financial distress or insolvency because of the mismanagement of their assets, their liabilities, and their maturities. Neither would companies need to build sophisticated financial models in order to be able to stay ahead of the curve.

Techniques like duration matching are very useful in managing interest-rate risk, but a company always must work to increase the sophistication of its models and to integrate other types of risk as well to analyze the ever-evolving compound effects. The study of compound effects calls for methods and techniques that help senior management understand the future impact of its decisions and actions from multiple perspectives.

Among the basic prerequisites of a valid solution are:

- Investing in the acquisition and analysis of information
- Screening all commitments and putting pressure on the selection processes
- Being able to absorb the impact of liquidity shocks
- Steadily reviewing asset and liability positions
- Evaluating well ahead the aftermath of likely market changes.

Management skill, superior organization, and first-class technology are prerequisites in serving these objectives. This is the theme we will explore in Chapter 6.

PROPER RECOGNITION OF ASSETS AND LIABILITIES, AND THE NOTION OF STRESS TESTING

It may seem superfluous to talk about the need for properly recognizing assets and liabilities in the balance sheet, yet it is important. Stress testing will mean little if all financial positions and transactions concerning items that meet the established definition of an asset or liability are not properly recognized in the balance sheet. This recognition is not self-evident because:

- Prerequisites to be observed in this process are not always present.
- Most often, the conditions we are examining are not the same as those we experienced in the past.

One of the basic prerequisites to proper recognition is that there is sufficient evidence of the existence of a given item, for instance, evidence that a future cash flow will occur where appropriate. This leads to the second prerequisite, that the transaction can be measured with sufficient dependability at monetary amount, including all variables affecting it.

When it comes to assets and liabilities in the balance sheet, no one—from members of the board and the CEO to other levels of supervision—has the ability to change the situation single-handed. It is past commitments and the market that decide the level of exposure. Therefore, the analyst's job is to be factual and to document these commitments and their most likely aftermath.

Events subject to this recognition in the balance sheet must be analyzed regarding their components and possible effects. Part of these events are exposures to risks inherent in the benefits resulting from every inventoried position and every transaction being done. This goes beyond the principle that each asset and each liability must continue to be recognized, and it requires:

- Addressing the basic definition of each item in assets and liabilities, and
- Setting the stage for experimentation and prognostication of the values of such items.

The definition of *asset* requires that access to future economic benefits is controlled by the company that is doing A&L analysis. Access to economic benefits normally rests on legal rights, even if legally enforceable rights are not essential to secure access. *Future* financial benefits inherent in an asset are never completely certain in amount or timing. There is always the possibility that actual benefits will be less than or greater than those expected. Such uncertainty regarding eventual benefits and their timing is the very essence of *risk*. Risk basically encompasses both an upside element of potential gain and a downside possibility, such as exposure to loss.

The definition of *liability* includes the obligation to transfer economic benefits to some other entity, outside of a company's control. In its fundamentals, the notion of obligation implies that the entity is not free to avoid an outflow of resources. There can be circumstances in which a company is unable to avoid an outflow of money, as for legal or commercial reasons. In such a case, it will have a liability.

Here there is a caveat. While most obligations are legally enforceable, a legal obligation is not a necessary condition for a liability. A company may be commercially obliged to adopt a certain course of action that is in its long-term best interests, even if no third party can legally enforce such a course.

Precisely because of uncertainties characterizing different obligations, one of the important rules in classic accounting and associated financial reporting is that assets and liabilities should not be offset. For instance, debit and credit balances can be aggregated into a single net item only where they do not constitute separate assets and liabilities.

Company policies should stipulate such rules to be observed by all levels of the organization, bottom up—whether the people receiving internal financial reports, and those preparing them, operate in a structured or an unstructured information environment. As shown in Exhibit 5.7, senior management decisions are made in a highly unstructured information environment where events are both fuzzy and very fluid. Their decisions are supported by discovery processes led by their immediate assistants (the next organizational level, top down). Most critical in an unstructured information environment is the process of *prognostication*.

- Prognostication is not necessarily the identification of future events,
- Rather, it is the study of aftermath of present decisions in the coming days, months, and years

This is essentially where senior management should focus in terms of evaluating liabilities, matching obligations by appropriate assets. In contrast, day-to-day execution takes place within a semistructured information environment, supported by general accounting and reliable financial reporting. A semistructured information environment has one leg in the present and the other in the future.

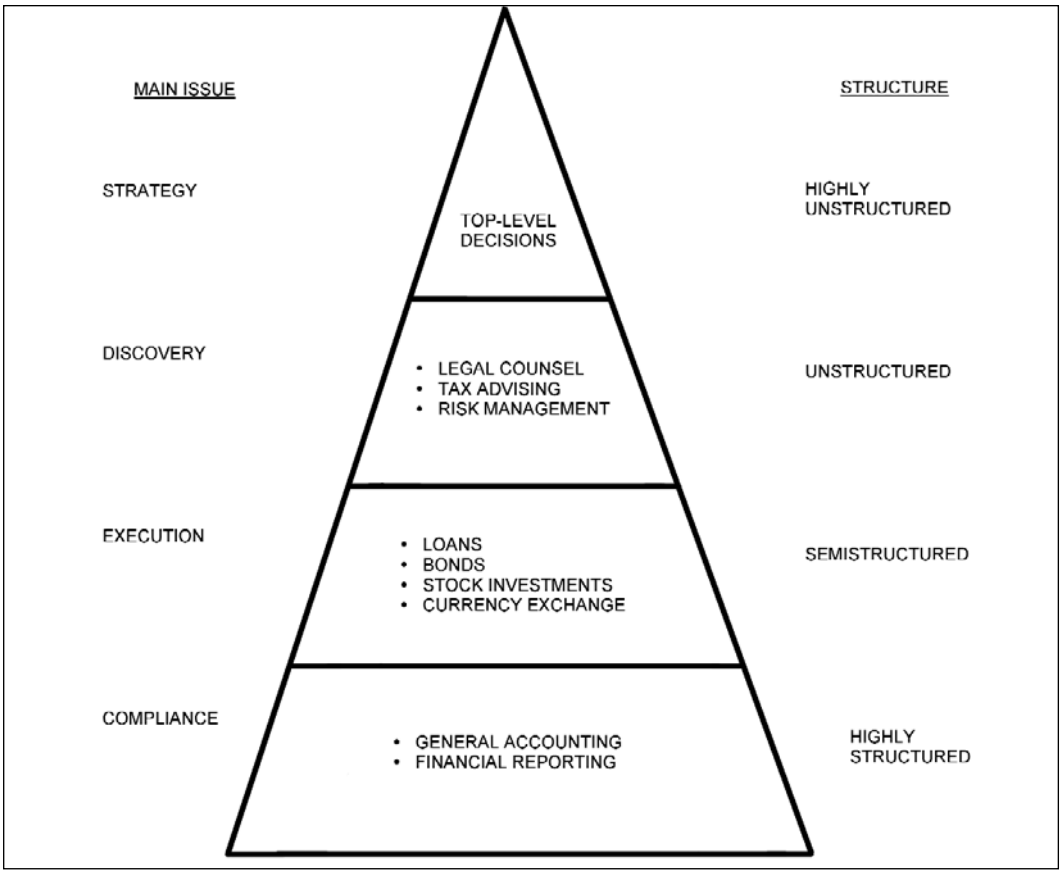
The real problem with the organization of accounting systems in many entities is that it is mostly backward-looking. Yet in a leveraged economy, we can control exposure resulting from liabilities only when we have dependable prognosticators at our disposal and a real-time system to report on deviations. (See Chapter 6.) Many companies fail to follow this prudential accounting policy of establishing and maintaining a forward look. By so doing, they hide bad news from themselves through the expedience of netting assets and liabilities.

Another practice that is not recommended is excluding the effects of some types of risk, which do not seem to affect a transaction immediately, from A&L testing. Examples may include credit risk, currency exchange risk, and equity risk. Leaving them out simplifies the calculation of exposure, but it also significantly reduces the dependability of financial reports, let alone of tests.

Stress testing should not be confused with sensitivity analysis; it is something very different, even if it is used, to a significant extent, as a rigorous way to study sensitivities. With stress tests, for example, extreme values may be applied to an investment's price volatility in order to study corresponding gains and losses.

Assuming events relating to gains and losses have a normal distribution around a mean (expected) value, $\bar{x}$, and since 99 percent of all values are within 2.6 *sd* (standard deviations) from the mean, we have a measure of risk under normal conditions. For stress testing, we study the effect of

Exhibit 5.7 A Highly Structured and a Highly Unstructured Information Environment Have Totally Different Requirements



outliers at $\bar{x}$ +5 *sd* (five standard deviations from the mean)[3] and beyond. The stock market meltdown of October 1987 was an event of 14 standard deviations.

- The goal in stress testing is the analysis of the effect(s) of spikes that are not reflected within the limited perspective of a normal distribution.
- Through stress tests we also may examine whether the hypothesis of a normal distribution holds. Is the distribution chi square? log normal? kyrtotic?

Extreme events that put a process or a system under test may take place even if they are ignored in a financial environment, because everyone feels "there is nothing to worry about." Or they may be compound effects of two or more factors. Covariance is a mathematical tool still under development, particularly the correct interpretation of its results.

In many cases the interaction of two or more factors is subject to the law of unexpected consequences. For instance, a model developed to track sensitivities to interest rates of European insurance companies that forgets about secondary effects of interest rates to equities exposure will give

senior management a half-baked picture of the interest-rate risk being assumed. Similarly, a lower dependability will be the result of failing to deal with some tricky balance sheet items.

Expressed in the simplest terms possible, when reading a company's balance sheet statement, analysts must be aware of one-time write-offs and should look twice at extraordinary items. Often they are used to conceal what a rigorous analysis would show to be imperfect business. Stress testing helps in fleshing out weak spots. In a recent case, loans exposure increased threefold under a stress test; but the same algorithm applied to derivatives exposure gave senior management a shock because likely losses at the 99 percent level of confidence grew by more than one order of magnitude.

REDIMENSIONING THE BALANCE SHEET THROUGH ASSET DISPOSAL

During the last 15 years, derivative financial instruments have been the most popular way for growing the balance sheet. In the 1980s, derivatives were reported increasingly off–balance sheet; however, regulators of the Group of Ten countries require their on–balance sheet reporting. In the United States, the Financial Accounting Standards Board (FASB) has regulated on–balance sheet reporting through rules outlined in successive Financial Accounting Statements, the latest of which is FAS 133. These rules obliged top management to rethink the wisdom of growing the balance sheet.

As mentioned earlier, an interesting aspect of reporting derivative financial instruments on the balance sheet is that the same item—for instance, a forward rate swap (FRS) transaction—can move swiftly from the assets to the liabilities side depending on the market's whims. Another problem presented with derivatives' on–balance sheet reporting is that it has swallowed the risk embedded in a company's portfolio.

For some big banks, derivatives exposure stands at trillions of dollars in notional principal amounts. Even demodulated to the credit risk equivalent amount, this exposure is a high multiple of the credit institution's equity; in some cases this exposure even exceeds all of the bank's assets.[4] It is therefore understandable that clear-eyed management is now examining ways to trim the liabilities side by means of disposing some of the assets.

Redimensioning the balance sheet is done through securitization and other types of asset disposal that help to reduce liabilities. Before taking as an example of balance sheet downsizing the relatively recent decisions by Bank of America, it is appropriate to define what constitutes the assets of a bank that can be sold. Major categories into which assets can be classified are loans, bonds, equities, derivatives, commodities, real estate, and money owed by or deposited to correspondent banks. All these assets are subject to credit risk, market risk, or both.

- Loans and bonds should be marked to market, even if many credit institutions still follow the amortized cost method.

With accruals, the difference between purchase price and redemption value is distributed over the remaining life of the instrument. Default risk is usually accounted for through the use of write-offs. But banks increasingly use reserve funds for unexpected credit risks.

- Listed shares are marked to market while unlisted shares are usually valued at cost.

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If the yield or intrinsic value is endangered, a valuation adjustment has to be made. With private placements and venture capital investments, such adjustments can go all the way to write-offs.

- Derivatives and other financial instruments held for trading are also marked to market.

Gains and losses are recognized in the income (profit and loss) statement, together with the offsetting loss or gain on hedged item. As Chapter 3 explained, derivatives hedging is a rather fuzzy notion, because the gates of risk and return are undistinguishable, and they are side by side.

- Depending on the law of the land, real estate is valued either through accruals or at market price.

Other solutions are possible as well. For instance, the value of a property is calculated at its capitalized rental income at the interest rate applied in the market where the real estate is. Undeveloped plots or land and buildings under construction are usually carried at cost.

To downsize the institution's balance sheet, the board may decide to dispose of any one of these assets. Usually this decision is based on two inputs:

1. The reason(s) why the bank wants to slim down
2. The opportunities offered by the market

Asset disposal is not something to be done lightly. Financial analysts watch carefully when formerly fast-growing banks are shedding assets, like the Bank of America did in July 2000. Its management said that it would deliberately and materially reduce its balance sheet through sales of loans and securities.

The second biggest U.S. bank by assets, Bank of America revealed the financial restructuring after announcing that second-quarter 2000 operating income had failed to grow significantly from the previous year, even if loan growth compensated for declining investment banking revenue. Due to the market psychology prevailing in late 2000, investors and analysts do not take kindly to bad earnings surprises.

Through securitization a bank may sell mortgages, consumer loans, and corporate loans. Doing this is now standard business practice. Selling its own securities portfolio is a different ballgame, because bonds and equities are held in the bank's vaults as investments and as a source of cash. (See Chapter 10.) When such redimensioning happens, it shows a shift:

- From a formerly fast-growing strategy that has failed to deliver the expected returns
- To a state of switching gears by shedding investments and businesses, to reduce liabilities and boost profit margins

In essence, Bank of America and many other institutions are participating in a trend in which commercial banks emulate investment banks. They focus their strategy on arranging financing in return for fees rather than holding loans on their balance sheets to produce for themselves interest income. They also disinvest from acquisitions that did not deliver as originally projected.

There is another reason why commercial banks are moving in this direction of assets disposal: They are having difficulty attracting deposits, a precondition to servicing loans without having to buy money. With deposits in decline, to offer more loans, these banks have to raise

funds in the capital market, which means higher costs that invariably find their way into profit margins.

Still another reason for redimensioning is that exemplified by assets disposal by Bank of America. It moved to reduce its credit exposure after its nonperforming assets grew in the second quarter of 2000 to $3.89 billion from $3.07 billion in 1999—an impressive 26.7 percent in one year. In fact, in mid-July 2000 the credit institution said it expected that credit conditions in the overall market would continue to deteriorate, but described the situation as manageable. The bank's biggest loan write-off in the second quarter of 2000 involved a case of fraud, not business failures. This being the case, one may ask why banks are eager to rent their balance sheet.

WEIGHT OF LIABILITIES ON A COMPANY'S BALANCE SHEET

It is important to appreciate the shades in meaning of balance sheet items, their true nature, and their proportions. Every managerial policy, and the absence of such policy, is reflected somewhere in the balance sheet, figures, profit and loss statements, and other financial reports. Too much poorly managed credit to customers will show up as extensive receivables and a heavy collection period.

If a balance sheet is out of line in its assets or liabilities, *then* the board and senior management should immediately examine the reasons for imbalance and experiment with the type of corrective action to be taken. They should do this analysis at a significant level of detail because the salient problem management is after often is hidden in an accounting riddle.

The need for detail and a method for classification have been discussed. Usually in a credit institution, liabilities include:

- Bills payable for financial paper sold
- Bills due to other banks
- Bills payable for labor and merchandise
- Open accounts
- Bonded debt (when due) and interest on bonded debt
- Irrevocable commitments
- Liability for calls on shares and other equity
- Liabilities for derivative instruments
- Confirmed credits
- Contingent liabilities
- Mortgages or liens on real estate
- Equity
- Surplus including undivided profits
- Deposits

Each of these items can be further divided into a finer level of detail; analysts then must examine the information to determine: its evolution over time; the limits the board has attached to it and the observance of these limits; and any changes that even if not extraordinary might contain a danger signal. Take contingent liabilities as an example. Its component parts usually are:

- Credit guarantees in the form of avals, guarantees, and indemnity liabilities; at *x*% of total contingent liabilities
- Bid bonds, delivery and performance bonds, letters of indemnity, other performance-related guarantees, at *y*%
- Irrevocable commitments in respect of documentary credits, at *z*%
- Other contingent liabilities—a class constituting the remainder

Senior management must ensure that, throughout the financial institution, decisions on these classes of liabilities are coordinated and that there is a clear understanding of the ongoing process of formulating, implementing, monitoring, and revising strategies related to the management of liabilities risk. The goal should be to achieve financial objectives:

- For a given level of risk tolerance
- Under constraints well specified in advance

In the case of gap analysis, this means a steady simulation up and down the interest-rate scale of the portfolio of assets and liabilities and of the covenants and other variables attached to them. The inventory must be stress-tested, to document the solution that will offset interest-rate risk exposure. As we saw earlier, stress testing assumes a variety of forms:

- We may consider the distribution of liability risks we have assumed over time and test at 5, 10, or 15 standard deviations.
- We may consider a number of outliers that have hit other industries and apply them to our portfolio, as a way of judging its balance and its ability to withstand shocks.
- We also may examine distributions other than the normal in an effort to uncover the pattern of liabilities

Establishing a distribution of liability risks, according to the first bullet, requires the examination of the entire financial position of our company over time. This must definitely consider both the interrelationships among the various parts which constitute the portfolio and the stochastic nature of the factors that enter the ALM equation.

An integral part of an analytical and experimental approach is the testing of a company's financial staying power. Doing this requires cash flow testing (see Chapter 9), which must be done regularly and reported to senior management through virtual balance sheets produced by tier-1 companies daily or, even better, intraday. (See Chapter 6.)

- The CEO and CFO must see to it that stress testing for ALM and cash flow testing are not manipulated to produce "desired" results.
- The hypotheses being made should not be taken lightly, nor should the results of scenarios be disregarded on grounds that they are highly unlikely.

Management and its professionals should use discretion in the hypotheses they make and avoid assumptions that reduce the rigor of tests. Modifying the outcome of these tests to meet stated management objectives and/or regulatory standards highly compromises the usefulness of the tests.

Modification also would make a company prone to encounter the unexpected consequences that often found face financial institutions, industrial companies, and national economies that sell their financial staying power short for nice-looking immediate results.

It is the job of analysts to provide the necessary evidence that will permit focused management decisions. Analysts must try to understand the effect of what they are going to do before doing it. Another basic principle is that analysts must immediately inform others—managers and professionals, who are the decision makers—of their findings. Still another principle is that analysts must not be influenced by management pressures to alter their findings—no matter what the reason for such pressure is.

Analysts worth their salt are always dubious about statements that things will take care of themselves or will turn around on their own accord. Typically, they look at faces. They sit up, look directly in the eye of the person they are interviewing, and use soft language but are absolutely clear about what they are after. They do not bend their opinion to please this or that "dear client," even if senior management asks them to do so.

NOTES

1. D. N. Chorafas, *The 1996 Market Risk Amendment : Understanding the Marking-to-Model and Value-at-Risk* (Burr Ridge, IL: McGraw-Hill, 1998).
2. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley, 2000).
3. Which will include 99.99994 percent of the area under the normal distribution curve.
4. D. N. Chorafas, *Managing Credit Risk,* Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).

CHAPTER 6

Virtual Balance Sheets and Real-Time Control

Part One discussed the many types of risk that exist with derivatives and other financial instruments because of the rapid development of new, custom-made products, the possibility of mispricing them, and the likelihood that some of their effects will not be known until it is probably too late. In bringing some of the risks associated with assets and liabilities to your attention, Chapter 5 made reference to the need for real-time support to manage exposure in an able manner.

Regulators are not usually known for looking too closely at the technology used by financial institutions or other entities. Yet the interest they brought to the Year 2000 problem (Y2K bug) marked the beginning of a change in attitude which has continued in connection with risk management. New financial instruments do much more than allow risk taking or risk hedging. They permit their designers and users to simulate virtually any financial activity by:

- Redrawing assets and liabilities, and their patterns
- Separating and recombining elements of exposure, and
- Bypassing what regulators may prohibit, through ingenious design.

Many of these instruments capitalize on liabilities. A little-appreciated fact about loading the liabilities side of the balance sheet is that trading debt rather than assets makes possible the blurring of distinctions between financial instruments regulated by different authorities responsible for *market discipline*, such as the reserve bank, the securities and future commissions, the ministry of finance, or other bodies.

Another little-noted but very significant effect of new financial instruments is that they virtually eliminate functional and other distinctions among commercial banks, investment banks, insurance companies, and nonbank institutions. This fact is important inasmuch as different entities actively use these instruments in executing financial transactions and/or making major investments.

One more underappreciated fact associated with increasingly greater dependence on debt-type financial products is the rapid action necessary to exploit the short time window of business opportunity and to provide a valid way for risk control. Real-time computation, and instantaneous response, is not just the better way to face this challenge; it is the only way.

Real-time reporting can be done within certain tolerances, leading to the concepts of a virtual balance sheet and a virtual income statement on profit and loss. Virtual balance sheets address recognized but not realized assets, liabilities, and earnings. The competitive advantage of this approach, which is based on simulation, is that it permits senior management to make learned, factual, and documented decisions, supporting in a more effective way a bank's interests than could be done otherwise.

Virtual balance sheets and virtual income statements show in order of magnitude assets, liabilities, and overall exposure. They also depict the relationship between equity capital set aside to cover risk and risk-related results. Establishing such a relationship, however, requires tier-1 information systems capable of exploiting financial results, whether these results are unexpected in a management planning sense or expected but uncontrollable through means available to the organization.

The risk management strategy by means of virtual balance sheets presupposes not only policies but also structural solutions that permit users to monitor, measure, and control exposure. It rests on rigorous internal controls,[1] high technology, and simulation as well as the appreciation of the need for implementing and using real-time systems.

VIRTUAL FINANCIAL STATEMENTS AND THEIR CONTRIBUTION TO MANAGEMENT

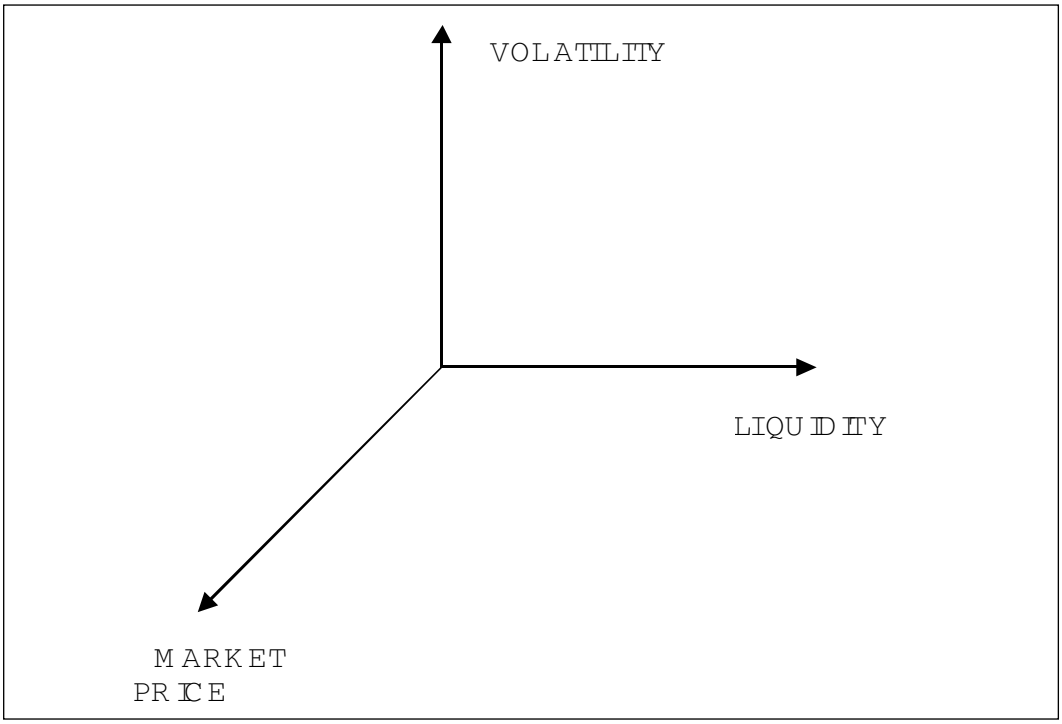
Classic financial reporting is usually done at preestablished time periods. Most systems used by financial institutions are not interactive, and they involve a delayed response. Traditional financial reports are available annually, semiannually, quarterly, or monthly—timeframes that today are not satisfactory. Slow-moving periodicity is a severe deficiency; it can be corrected through virtual financial statements produced intraday. Indeed, over the years successive steps have been undertaken to accelerate the production of balance sheets. Historically, since the 1970s, the development has been:

- Once per quarter, plus a one-month delay in compilation
- Once per quarter, but within a week
- Twice per quarter
- Once per month
- Once per week
- Once per day

Only those companies that know how to manage their accounts and their technology can produce daily balance sheets. During the late 1990s, tier-1 banks did better than daily reporting, compiling their balance sheets every hour, or every 30 minutes.

This is done in real time. One application of such updating is marking a loan's position to market in a coordinate system that also accounts for volatility and liquidity, as shown in Exhibit 6.1. We will see a practical implementation example with Cisco. The next goal in timely financial reporting is the production of virtual balance sheets every five minutes, and after that every minute. This rapid and flexible reporting on liabilities, assets, and risks at a certain level of approximation is becoming indispensable for good management.

Exhibit 6.1 Marking Loan Positions to Market Is a Complex Task Which Must Account for Volatility and Liquidity



A financial statement is *virtual* when it is very timely and accurate but does not necessarily square out in great precision, as is mandatory for regulatory financial reporting. A 4 percent approximation, for instance, does not fit regulatory guidelines and long-established financial reporting practices, but it serves a worthwhile purpose such as management accounting and internal risk control because:

- It is able to present in real-time the balance sheet.
- It permits users to answer ad hoc queries regarding the present value of trading book and banking book.

The 1996 Market Risk Amendment by the Basle Committee on Banking Supervision zeroed in on the trading book.[2] In 1999 the New Capital Adequacy Framework zeroed in on the banking book.[3] Since these two regulatory events, top-tier banks have been concerned with marking-to-model market risk and credit risk. Both can be part of the virtual financial statement.

Whether in banking or in any other industry, knowing in real time the true value embedded in the balance sheet, income statement, loans book, derivatives portfolio, or any other type of assets and liabilities register is a milestone in good management. It can also be a major competitive advantage in a market that is more demanding and more competitive than ever.

Virtual balance sheets are not as popular as they should be yet because today very few companies have the know-how to capitalize on what high technology currently offers. Most companies are still living in the past with legacy systems that grew like wild cacti—and the systems currently serve mostly trivial purposes at an enormous cost. This is far from being the right sort of preparedness. Yet, as Louis Pasteur said, "chance favors only the prepared."

One of the tragedies of modern business is that many company directors are computer-illiterate and computer-illiterate boards cannot lead in technology. They are taken for a ride by manipulative chief information officers, agreeing to cockeyed, medieval solutions to twenty-first-century problems. Even if computers and software cost a lot of money, companies often use them in a retrograde fashion. Many institutions fail to capitalize on the fact that financial statements can be called up with a mouse click, permitting:

- Full view of intraday values for assets and liabilities
- Comprehensive evaluation of current exposure
- Factual and documented capital allocation decisions
- Critical budget/actual evaluations regarding ongoing operations and deadlines

A critical "plan versus actual" evaluation that brings deviations into perspective is fundamental to good performance, and it can be obtained by analyzing the latest figures, comparing them to forecasts and plans. For instance, through interactive computational finance, Sears exploits online two years' worth of detailed budgets and plans.

Since the mid-1990s, at Sun Microsystems, Michael E. Lehman, the CFO, takes only 24 hours to close the books and deliver a virtual financial statement to the CEO. Yet as recently as 1993, the company required a whole month to close the books after the quarter ended. Of the reduced time needed, says Lehman: "We are spending more time managing forward instead of backward."[4]

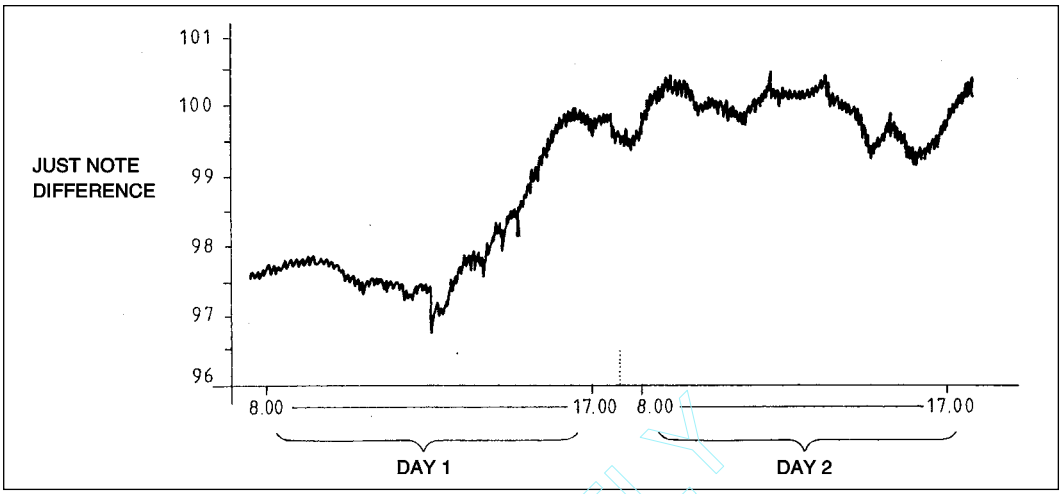
Among the better-managed companies, there is an accelerating pace of this sort of applications. In one of the better-known financial institutions, a former chief information officer (CIO) who became executive vice president developed a pattern analysis program that permits users to:

- Critically evaluate intraday activity.
- Compare intraday inputs on two successive days.
- Compare the pattern of one day to that of any other day.

An example of intraday patterning of market activity is given in Exhibit 6.2. Johnson & Johnson is one of the companies whose senior management has been revolutionized through modern financial information technology. Since the mid-1990s, Johnson & Johnson reinvented itself by thorough restructuring of its information infrastructure. This restructuring has enabled the CFO to concentrate on analyzing financial information to boost revenue and does away with the need to spend time on fire-brigade approaches to rush out financial reports.

To a significant extent, virtual financial statements are structured, quantitative forms of scenario analysis done with real-life data. As we saw in Chapter 5, in the financial industry stress scenarios are used to unearth the extreme characteristics of specific transactions portfolios, books, and trades. But there also are differences between virtual financial statements and scenario analysis, as we will see.

Exhibit 6.2 Intraday Activity—Difference in Market Patterns Over Two Consecutive Days



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MODELING OF ASSETS AND LIABILITIES MUST FOLLOW RIGOROUS RULES

Since its advent in 1494 through the seminal work of Luca Paciolo, a balance sheet is a model of financial activity. Computers and networks do not change this basic condition. What they do is to accelerate the collection, processing, and reporting of data entering into the evaluation of assets and liabilities. Rules to be followed in the process of developing and using the models vary from one entity to the other. However, chances are that they derive from two basic considerations:

1. Strategic
2. Financial

The strategic aspect of A&L modeling is a direct result of the fact that a company's balance sheets represent its successive financial states. The profit and loss calculations particularly emphasize those states that are important to all of a company's stakeholders: shareholders, members of the board, senior management, employees, regulators, and investors. High/low capital at risk with different instruments, as shown in Exhibit 6.3, is a strategic consideration.

Day-to-day financial data, on the other hand, are mainly of a tactical nature. In a real-time financial reporting exercise, other tactical aspects are concerned with the mechanics of modeling, the use of the artifact for predictive or evaluative purposes, and risks taken with models because of their imperfect fit with real-life information flows. After all, simulation in finance is a working analogy of a market construct.

The good news is that models written for simulation have the major advantage of making mental models explicit. Many people fail to appreciate that they use mental models whether they like it or not. They do so to understand a given situation, expose inconsistencies in their thoughts, make possible rethinking of variables and patterns, and contribute to determining future implications.

In this sense, models provide a rich source of information on problem structure or management policies, but they may be wrong in deducing behavior as a result of such structure or policies. It

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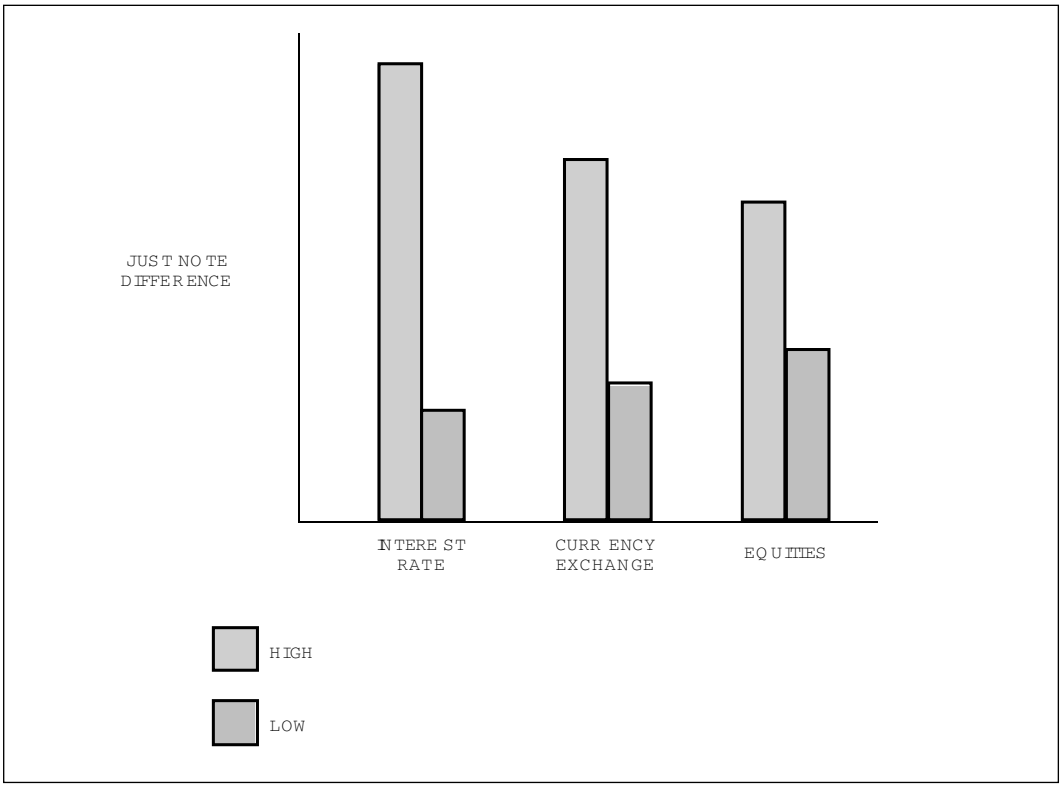
Exhibit 6.3 High and Low Capital at Risk with Different Instruments



must be remembered that simplification comes with abstraction. In a way, the simplified deductive process that is used is equivalent to quickly solving a higher-order, nonlinear differential equation by reducing everything to linearity.

Ideally, what we would like to do is to build the dynamic model of an accounting system that can look at the real world, receive steadily input, assist us in making *hypotheses*[5] about structure, test these hypotheses, and determine how the system (in this case, the market and its instruments) behaves. The underlying concept is that:

- *If* this simulated behavior represented by the model fits well enough the real world,
- Then we can develop confidence in regard to insights derived from the model.

Practical and ideal processes, however, rarely work in synergy or even find themselves in phase. Leaving aside model imperfection, in the corporate world there exist practices that make the most carefully constructed hypotheses void. For instance, many companies habitually leave big chunks of their exposure unattended by the risk estimates they do. And there is always the risk that linear, relatively static models can lead to misguided conclusions if they fail to account for business dynamics. Two points are worth noting:

1. Assuming all risks have been accounted for when they in fact have not been is a prescription for deceptions in regard to results expected from modeling.

2. Linearizing nonlinear systems, without accounting for approximations being introduced, limits that should be placed, and possible errors, leads to unreliable results.

Do not interpret this statement to mean that models, at large, are not worth that much. Practical experience suggests that a complex reality does not necessitate the use of complex models but of carefully crafted ones. An example is interest-rate modeling. The complexity of movements in the term structure of interest rates leads to the examination of impact of a variety of movements.

- Modeling must follow term structure movements that span the range of plausible courses of action, constituting different alternatives.
- The chosen method should permit a greater degree of interest-rate risk management and be able to identify problems that simple approaches overlook.

A sophisticated model would consider that asset and liability values are also influenced by risk factors other than interest rates. For instance, market factors forge links between assets and liabilities fundamental to the representation and control of overall exposure. To understand an organization's risk profile, numerous risk factors and their relation to one another must be analyzed.

- An integrated risk model describes a number of risks confronting *our* company, their evolution and their synergy.

It offers insight into how these risks interact and capitalizes on high-speed computation, data mining, interactive visualization, and advances in risk control methodology to provide risk estimates. The reality test is that when confronted with real-life data, these risk estimates can hold their own in a rigorous manner.

- A rigorous analytical approach pays attention to the fact that risks often combine in counterintuitive ways.

Because of this, it may be difficult for the human mind, even the trained one, to comprehend the interaction of processes characterized by fuzziness and uncertainty. Indeed, this is a major reason why many managers who work by rule of thumb fail to grasp the extent of risk exposure and why those who work by a cookbook are unable to look at different risks in an integrated manner.

A sound methodology must reflect *if* and *how* risks can be diversified. In principle, when different types of exposure are not correlated, which is not the general case, combining such diverse exposures might result in total risk that is less than the sum of the individual risks. However, do not take for granted that it is true in all cases.

Once they are identified, risks pertaining to liabilities and assets can be hedged. The overall exposure of a portfolio might be reduced through ingenious countermoves, but often hedging means the assumption of a different kind of risk—risk that might, some time down the line, escape control. Many companies enter into currency and interest-rate swaps to hedge their foreign exchange and interest-rate risks but misjudge market trends and/or the timing factor, and they pay dearly for this error.

In conclusion, the establishment of a sound policy in assets and liabilities modeling requires that management identify the issues of greater interest. Such issues might include: cash flow estimates

and their likelihood; earnings expectations; business elements that pose significant risk; currencies that might turn on their head; interest rates that might zoom or collapse. Then senior management must outline and evaluate the assumptions underlying these forecasts and projections.

The definition of critical variables and their range of change permits assets and liabilities simulations to be focused. While a single ALM analysis could address a fairly broad range of issues, it is unwise to try to answer at the same time and with the same model many diverse questions. The model should be kept relatively simple and tractable. And it should be focused.

STRESS SCENARIOS HELP TO REVEAL THE NATURE OF UNDERLYING CONDITIONS

The kind of experimentation today used in finance is a direct development of engineering and scientific studies. Stress scenarios help to identify low-probability events, such as abnormal market conditions. This is not the goal of virtual financial statements, which focus on the company's assets, liabilities, and overall performance; however, the two complement one another. For instance, a daily stress analysis may address:

- A spike in volatility characterized by large price movements
- A dramatic deterioration in market liquidity
- Other factors believed to be behind outliers in financial time series

Similarities between virtual financial statements and stress analysis also exist in the underlying mathematics. In a number of cases, the parameters for scenario analysis are based on 5-year or 10-year historical information, a one-day or a 10-day holding period, the 99th percentile, or the largest movements detected in a historical distribution of prices or other values.

Through scenario analysis, worst historical events are flagged out for each underlying risk factor, which helps analysts to guesstimate global effects. Examples of such events are NASDAQ's meltdown in March and October 2000; Russia's bankruptcy and LTCM's fall in August/September 1998; East Asia's deep crisis in the second half of 1997; Mexico's near bankruptcy in early 1995; the tightening of interest rates in the first quarter of 1994, shown in Exhibit 6.4; the September 1992 ERM crisis; the equity market's crash of October 1987; the oil crisis of the Gulf War in 1991, and the two oil spikes of the 1970s.

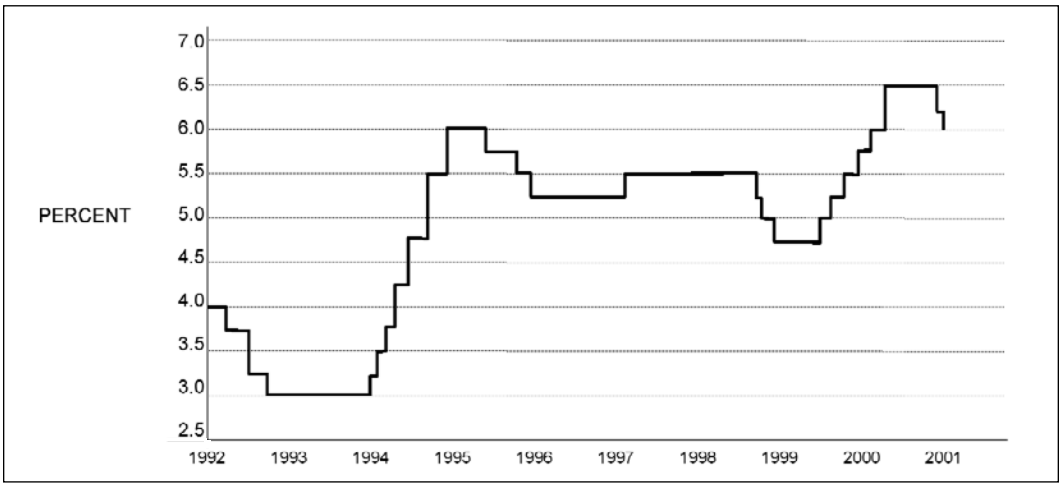
The critical evaluation of such events is not the goal of a virtual financial statement. However, a virtual financial statement will show, particularly on the liabilities side, the aftermath of any one of the just-mentioned spikes when they happen, as they happen. In a scenario analysis:

- Credit risk is reflected in the behavior of counterparties toward the obligations that they have assumed and their ability to confront such obligations.

Both information from the institution and the credit rating by independent agencies is critical to the development and sustenance of a credit risk pattern, counterparty by counterparty.

- Market risk is measured by dynamically revaluing each portfolio, according to significant market parameters and fair market value data.

Exhibit 6.4 Federal Funds Target Over a 10-Year Timeframe



A real-time response on the status of liabilities and assets, based on scenario analysis and other experimental tools—and reflected in the virtual balance sheet—allows a short-term dynamic utilization of capital at risk based on detailed and consolidated results. The intraday approach makes possible this distinct competitive advantage.. The overall concept is oriented toward flexible decision making and very rapid response.

Stress tests supplement the capital-at-risk approaches, permitting users to look at exposure in cases where market conditions change abruptly or are disrupted. They are particularly useful in calculating more accurately the impact of large market moves; value-at-risk (VAR) measures are usually more accurate for small movements than for big swings.

Information based on the results of these tests should be compared with information on the virtual balance sheet, which presents its users with reliable (if approximate) *current* positions. With these two elements available interactively in real time, senior management has a factual and documented basis for its decisions. It is as if the company's books are closed instantaneously under different scenarios that are expected to happen sometime in the future with a certain likelihood.

The risks to which we are exposed continue to evolve because of financial market volatility. This is true even if the company were to hold its portfolio of assets and liabilities fixed.

Regulators are watchful of the difference between the market value of assets and the present discounted value of all future cash flows. The resulting *economic value* is the true measure of longer-run financial staying power, even if it is not reported on classic financial statements. It is also key to liabilities management. However, the able implementation of a liabilities management methodology is not without challenges. To use virtual balance sheets effectively, senior management must address several important issues. It must:

- Establish metrics that permit users to measure whether objectives are being attained.
- Describe the nature and magnitude of exposures being taken and their reasons.
- Assemble reliable information on limits and tolerances associated to exposures.
- Be able to perform modeling, experimentation, and real-time reporting.

Whether in finance or in engineering, models are very specific. Readers should not use market risk models for credit risk evaluations, as many bond dealers and institutional investors are currently doing. Equity-linked computer models cannot estimate credit risk. The practice of manipulating algorithm models violates a cardinal principle that analytical solutions must be focused.

For instance, many market risk models derive asset value, leverage and likelihood of default from the market value and volatility of a company's share price. Therefore, if the price drops precipitously, dealers and investors also quickly mark down the value of the company's bonds, which in financial terms is misleading and also hurts liquidity since few people want to hold bonds whose prices are falling.

Developing and maintaining a rigorous methodology and the models that relate to it requires technical expertise that is in limited supply in many companies, either because the board does not appreciate the benefits due to a lack of understanding or because no internal training has taken place. It is therefore necessary to upgrade the company's human resources and, for technology transfer purposes, use outside experts to help perform the analysis and develop the eigenmodels.

Outsourcing this work is one of the options, but disadvantages to outsourcing go beyond its costs. These disadvantages consist primarily of the fact that the company may lose control of the process or lose interest in it because few people understand what it involves. In many cases, as well, the deliverables produced by outsourcers are not up to standard. Therefore, learning from tier-1 firms and technology transfer is the better policy.

FORWARD-LOOKING STATEMENTS AND VIRTUAL CLOSE AT CISCO

A sound practice of liabilities management requires the development and use of forward-looking financial statements that involve not only current A&L and their risks but also projected uncertainties. As with practically all real-time reporting, including financial virtual statements, actual results shown on balance sheets reported to the authorities can differ materially from those projected in forward-looking prognostications.

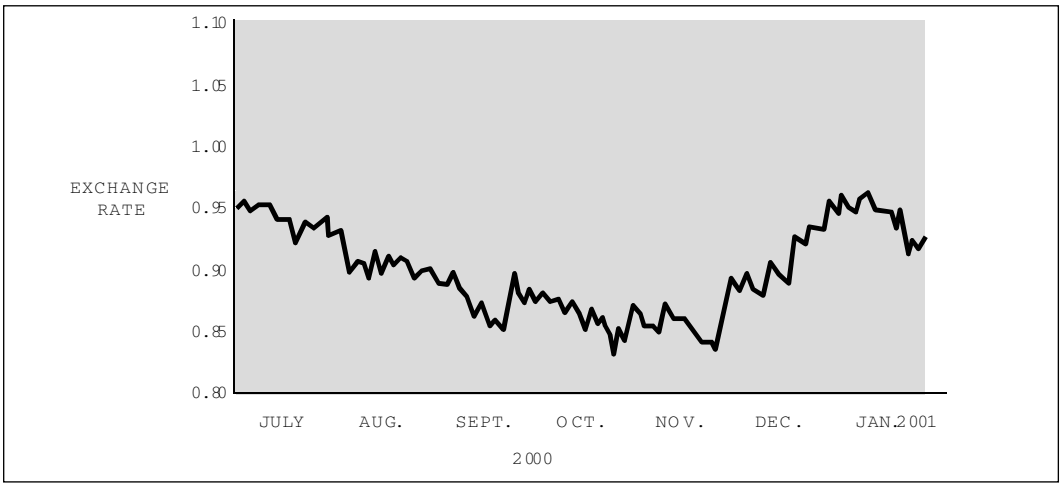
For instance, as a global concern, a multinational company faces exposure to adverse movements in foreign currency exchange rates. Its currency exposure changes intraday not only because business operations evolve and could have a material adverse impact on financial results but also for reasons of foreign exchange volatility, which is not under the company's control. Exhibits 6.5 and 6.6 give examples of $/euro and £/euro and £/$ volatility in the period from July 2000 to January 2001.

Virtual balance sheets of transnational companies, or entities depending to a significant extent on imports, should reflect currency risk and country risk as well. Management must be prepared to hedge against currency exposures associated with assets and liabilities, including anticipated foreign currency cash flows.

- The success of a currency exchange hedging activity depends on estimation of intercompany balances denominated in currencies in which an entity invests or trades.
- To the extent that these forecasts overestimate or underestimate currency risk during periods of significant volatility, the company can experience unanticipated currency losses.

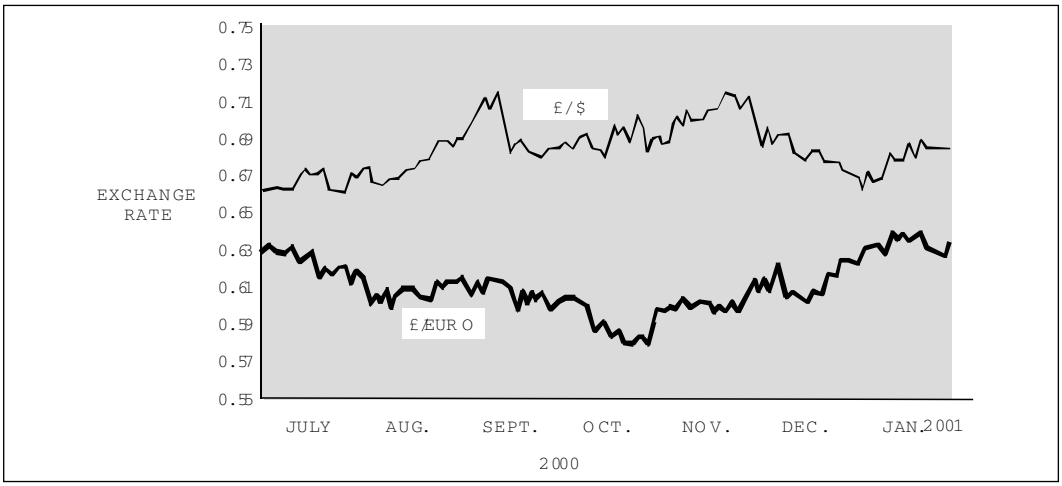
Prudent management enters into forward foreign exchange contracts to offset the impact of currency fluctuations on assets and liabilities but also keeps short maturities of one to three months.

Exhibit 6.5 Pattern of $/Euro Exchange Rate Over a Seven-Month Period (Daily Data)



Source: European Central Bank

Exhibit 6.6 Pattern of £/Euro and £/$ Exchange Rate Over a Seven-Month Period (Daily Data)



Source: European Central Bank

Well-run companies see to it that no forward currency contract has a maturity of greater than one year and no derivatives contract targets gains to be realized beyond strictly defensive liabilities, assets, and cash flow reasons.

This can effectively be done when the professionals responsible for the balancing act have the needed information at their fingertips—intraday. This is doable. In the mid-1990s, it took Cisco 14 days to close its books each quarter. Now, with what in company jargon is called the *virtual close*, Cisco executives have real-time, daily access to financial information affecting their company.

As Cisco's and other virtual balance sheet implementation examples demonstrate, it is very important to empower managers and professionals to react instantly to market shifts and changing business requirements. A major competitive advantage is the ability to experiment on likely outcomes using prognosticator models. Virtual financial statements allow Cisco management to know a month ahead what the company's earnings will be on a specific date. Such an analysis is possible not only because of real-time solutions but also to fulfill prerequisites addressing:

- Expenses
- Profitability
- Gross margins
- Other component parts of financial statements

Cisco capitalizes on the Internet to achieve virtual balance sheet reporting, which includes its business partners. It structures its information elements in standard supply-chain format, and this empowers every one of its employees to make decisions that earlier might have had to come all the way from the CEO.

After the virtual quarterly close, an individual product-line manager can see exactly what the gross margins are on products he or she is responsible for and whether they are above or below expectations. This information is crucial in determining on the fly if below-expectation conditions were caused by delays, cost escalation, or other factors that have escaped internal control or if they were due to discounting by competitors.

Cisco's CFO, Larry Carter, and CEO, John T. Chambers, are credited with developing this virtual financial reporting system. Cisco is one of the first companies to generate hourly updates on revenues, product margins, discounts, and bookings. It takes most other companies at least five days to do so, and some entities need a whole month to produce the same financial information. Carter credits real-time financials with allowing the company to enter the Japanese market in late 1999, just in time to profit off a robust first quarter. (An example of the implementation of real-time reporting with the State Street Bank of Boston will also be provided.)

Once a real-time financial reporting system is in place, it can be used for a whole family of experimental approaches to the management of liabilities. Currency exchange risk has been mentioned as an example. A company also is exposed to interest-rate risk associated with investments, loans, or payments. The interest rate of many contracts is tied to the London Interbank Offered Rate (LIBOR), and prudent treasurers employ on-line experimentation to evaluate the hypothetical change in obligations due to changes in the LIBOR rate.

A valid modeling technique used for analysis of interest-rate volatility measures hypothetical changes, by class of obligations, arising from selected possible changes in the LIBOR rate. A computation of exposure based on likely market changes may, for instance, reflect immediate hypothetical parallel shifts in the LIBOR curve of plus or minus 20, 50, 100, 150, and 200 basis points (bp) over a 12-month period. (See also Chapter 12.)

Because, in general, a company also maintains investment portfolio holdings of various issues, types, and maturities, these securities must be recorded on the balance sheet at fair value with unrealized gains or losses reported as a separate component of shareholders' equity, net of tax.

The modeling technique that has been adopted measures the likely hypothetical change in fair values arising from selected changes in each stock's price. Stock price fluctuations of plus or minus

15 percent, 35 percent, and 50 percent were selected for benchmarking, based on the probability of their occurrence.

Ultimately, real-time experimentation on liabilities and assets and the virtual close procedure for management accounting will become commonplace, but by then the leaders will have shrunk the time to less than one hour. There will come a day when one-day close will be a throwback to the Dark Ages because tier-1 financial institutions and industrial companies will produce for their management balance sheets and other financial statements with virtual close of five minutes or less.

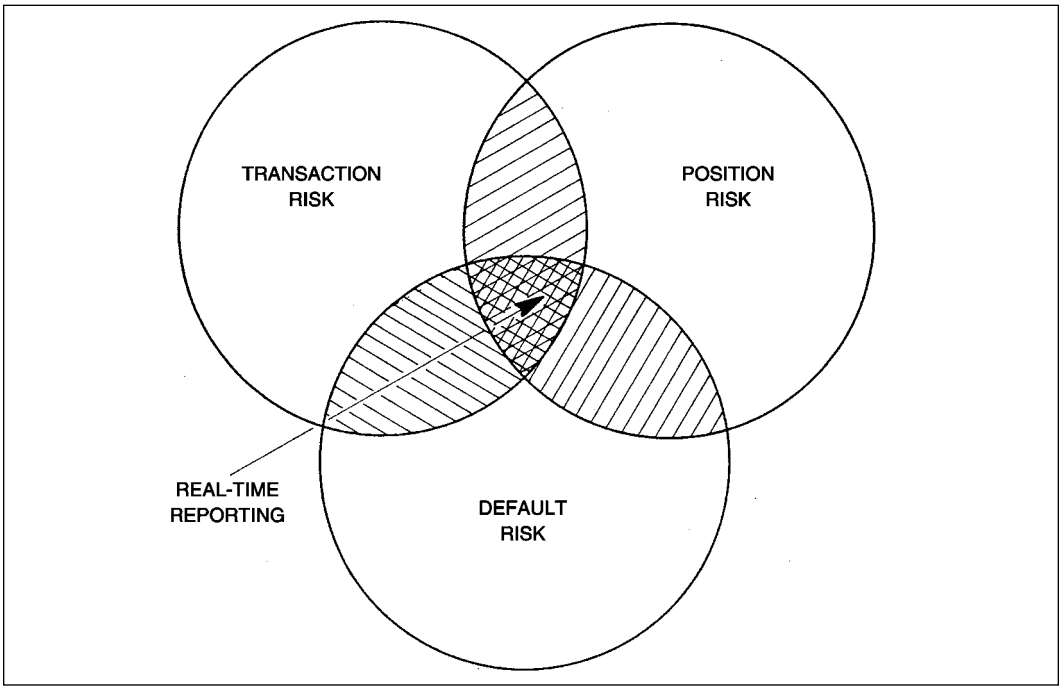
PREPARING A REAL-TIME REPORT ON HEDGING AND EXPOSURE

Some boards, chief executives, and their immediate assistants simply do not want to hear bad news. Hiding one's head in the sand is a wrong-headed policy that leads to many pains and eventually all the way to bankruptcy.

Computer illiteracy by board members and CEOs is another problem. Boards that do not understand much about technology fail to see that real-time reporting at top management level and transparency of the bank's financial position are not only the best solution, they are also the only one that effectively serves the financial staying power of the institution.

As Exhibit 6.7 suggests, real-time reporting should address transaction risk, position risk, and default risk as well as their correlation, the observance of established limits, and all issues relating to compliance.

Exhibit 6.7 Real-Time Reporting Is at the Heart of Able Solutions to Financial Risk



Few financial institutions can capitalize on real-time reports on exposure and virtual balance sheets. First-class information technology can produce virtual financial statements in a matter of minutes, providing their recipient with an order-of-magnitude appreciation of the current status of assets and liabilities.

Banks are not the only entities interested in virtual financial statements. From semiconductors to computers and instruments manufacturers, tier-1 exporting companies monitor foreign exchange contracts in each country in which they operate. Everything that affects their bottom line is looked at through a real-time magnifying glass.

Back in 1994, with help from a consulting firm, Perkin Elmer initiated a project to centralize foreign exchange hedging. This started with six countries, which represented half of Perkin Elmer's foreign currency exposure. By offsetting positions in different currencies against each other, senior management at Perkin-Elmer enabled itself to optimize its treasury regarding currency exchange risks.

Merck offers another example. The company has operations in 140 countries but pays dividends in dollars and incurs about 70 percent of its research and development expense in the United States. Optimization provides plenty of scope to protect foreign-currency earnings against fluctuations in the value of the dollar.

Inordinate currency risk will put at peril the company's ability to continue funding dividends as well as research costs. Hence, Merck experiments in bending the curve of its currency exposure. But hedging for risks evidently means taking on other risks that also must be watched. In a risk control system:

- It is difficult to define the boundaries of hedging, because the issue is often elusive.
- Every new transaction, even one done for control of exposure, carries with it more unknowns, hence risks.

Reporting in real-time on gains and losses and on assumed exposure is a solution with merits, even if it is done at an order of magnitude. One takes risks in whatever one does, suggested Dennis Weatherstone, former chairman and CEO of J. P. Morgan, but if one understands, measures, and accounts for them, that should keep one out of trouble.

Since the mid-1990s at the Morgan Bank, every day its risk management unit compiles a one-page *4:15 report*: This is so known because it gets handed to Morgan's top six executives by that time of day, providing them with a snapshot of assumed risks.

The Morgan Bank's idea of a 4:15 report is very good, but it would have been even better to have the information in this report available interactively on the senior executives' workstations, graphically presenting in a snapshot of the bank's entire range of assumed liabilities due to foreign exchange, interest rates, commodity trades, equity positions, and all other exposures—with detail accessible to any interested party upon request. Even better would be reports enriched with alarms actuated through agents.[6]

Using heuristics and algorithms to exploit database contents in connection to trade book and banking book, senior executives should be able to experiment on prevailing liquidity and volatility. Knowledge artifacts written by specialists in interactive computational finance should be on hand to calculate in real time:

- Capital at risk
- Earnings at risk

This type of high-powered interactive management information system is necessary to bring attention to overall types of exposure. Exhibit 6.8 presents a frame of reference in just one domain: liquidity. Similar visualization models can be built for other domains, and they can be personalized to meet specific requirements of the executive receiving them, of the desk, the department, and the bank.

A more sophisticated version of a real-time reporting model would handle limits and set alarms when one of these limits is broken: In terms of earnings at risk, for example, as a maximum amount, Morgan has a 5 percent likelihood of losing per day, which identifies the pain the bank is willing to accept.

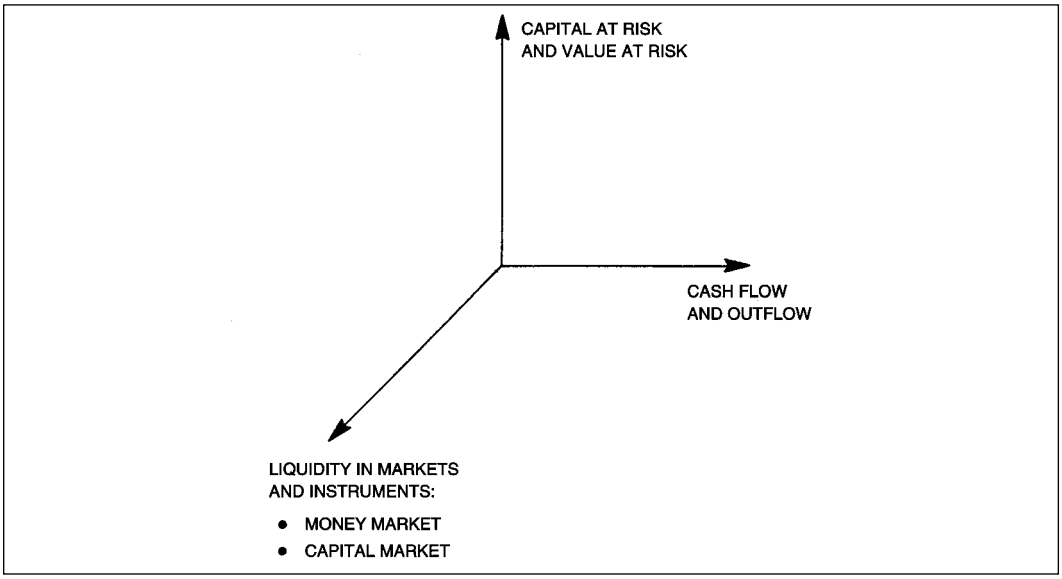
An outgrowth of the algorithms underpinning the value-at-risk presentation has been Morgan's *RiskMetrics*. It offers daily risk information on different instruments and currencies through calculated exposures over one day or one month. RiskMetrics is the background algorithm of value at risk, which has been generalized in the aftermath of the 1996 Market Risk Amendment by the Basle Committee.[7]

But while the model seems to have worked well for Morgan, five years of generalized experience have demonstrated that VAR has severe limitations; nor does it cover all of the exposure taken by institutions through derivative financial instruments.[8] What provides proof that a model is valid or invalid? Quite simply, the ensuing events.

Events may prove or disprove the value of a model, but the fact remains that "companies don't own anything of real value other than knowledge, skills and intellectual property." Lester Thurow, former dean of the Sloan School of Management at MIT, is credited with that statement. Financial assets are volatile, and with leveraged instruments such as derivatives, they can turn into liabilities faster than ever before.

As if to prove the validity of this dictum, the more technologically advanced institutions have or are currently developing a daily risk report that tallies the exposure in every business and market.

Exhibit 6.8 Three-Dimensional Representation of Crucial Factors Affecting Liquidity



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In most cases, such reports are very confidential, circulated at the end of each day among half a dozen senior executives, including the president.

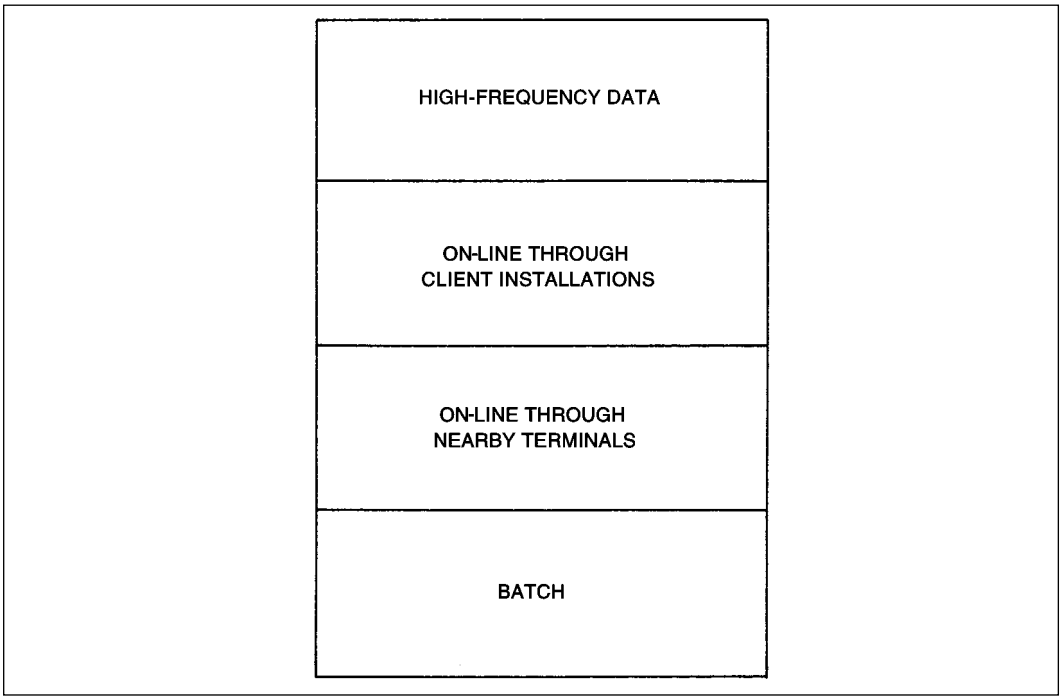
- Theoretically, this approach is right—at least in a slow-moving financial market.
- Practically, however, it has a major flaw: Once per day is too slow a pace in a highly dynamic environment.

Risk management reporting should be actuated online by senior executives themselves, rather than being given to them in a dull format on a sheet of paper, but they also should be able to make online what-if experimentation and take a fully interactive market shock approach through stress testing. One of the reporting goals should be high-frequency financial data available interactively intraday at an acceptable level of accuracy. As shown in Exhibit 6.9, this is a far cry from batch reporting given to top decision makers late in the afternoon.

Every senior executive should be able to access seamlessly the database and experiment through his or her workstation on how the bank would fare in the event of a worst-case event, such as an intermittent spike or a sharp and protracted rise in interest rates accompanied by a significant movement in foreign exchange rates. Another scenario should examine a severe drop in stock market index and a sustained movement in key commodities.

Executives also need to watch other risk indicators, such as a buildup of loan concentrations in certain industries and in geographic regions. While practically every bank targets diversification in loans, the facts of life often point the other way. For instance, credit institutions specialize in

Exhibit 6.9 Changing Characteristics of Management Reporting



commercial real estate, the oil industry, selected major client accounts, certain countries or regions, and other windows on risk. Keep in mind these principles:

- Every deal and every company must be risk-rated.
- Individual countries and industries must have their own limits or tripwires.
- Limits also should exist by geography and by type of product.[9]

Not just the corporate top but all line managers also must be accountable for controlling their positions through interactive computational finance. Networks, databases, and knowledge artifacts (agents) must be used to monitor risks in derivatives and all other products worldwide, overseeing risk limits for each trade and product line and tracking both local and overall corporate risk limit.

These are the characteristics of a risk-sensitive culture that must permeate the entire organization. (Note that this culture did not exist at LTCM.) Both direct responsibility of each member of staff and line and advanced technology solutions are necessary to keep financial institutions out of trouble, particularly in times of turbulence. A lot of pain and suffering can be avoided, but that will not occur without hard work and new departures.

FROM VIRTUAL BALANCE SHEETS TO FINANCES OF VIRTUAL CORPORATIONS

The previous examples demonstrate that virtual financial statements based on intraday information are fundamental to sound management. Several companies recognize this fact but also feel that interday information cannot be compiled in real time because of the diversity of forms, incompatible office supports, heterogeneous computer hardware and software—and inertia.

Another reason why many financial institutions and industrial companies are moving so slowly to gain competitive advantage through technology is backward culture. Typically, old policies, ossified practices, and embedded legacy systems require a 100-step consolidation process through the company's information technology maze. Only tier-1 organizations now see to it that the consolidation job is done interactively:

- At any time
- In any place
- For any purpose

These organizations are ingeniously using their intranets to deliver financial information. They are also dynamically linking intranets with extranets through their corporate landscape and that of their business partners to form the flexible backbone of a virtual entity. The use of publicly available Internet software helps to:

- Accelerate the implementation cycle
- Tremendously reduce paper transactions
- Significantly improve business partnerships
- Make cash flow run faster through the system

The concept of a *virtual company* or a *virtual office* and other virtual structures should be used with prudence. The reader is well advised to avoid clichés like "the virtual office means never having to commute" or "the virtual marketplace means never having to waste time waiting in line at the mall." Down to its fundamentals, business and technology need a base to be applied to—and this base is the real world.

The virtual company is based on real companies, and it becomes possible because, in more than one way, the new wave in sophisticated use of technology benefits from breakthroughs in modeling. Not only has real-time simulation reached a mature level, but top-tier companies are reaping operational advantages from an interdisciplinary cross-fertilization of skills and know-how.

Cross-fertilization can be seen in the case of the benefits banks have enjoyed through the employment of rocket scientists[10]: physicists, engineers, and mathematicians with experience in nuclear science, weapons systems, and aerospace. Senior bankers should, however, appreciate that rocket science and high technology have no respect for in-grown authority and hierarchical structures. This, too, is a lesson learned from Silicon Valley and the drive of companies to reinvent themselves every two and a half years in order to survive.

Stiff hierarchical solutions are counterproductive not only because rocket scientists are generally independent-minded but because significant achievements cannot be reached without:

- Independence of spirit and of opinion, and
- The freedom to question the obvious

Let us make no mistake on this subject. The new technology has been a minefield of costs and deceptions for unsophisticated companies that think they can have their cake and eat it too. Dropping legacy systems is not easy—not because the transition to highly competitive solutions presents major obstacles but because so many careers are associated with the old structures. Yet change is necessary for survival. Virtual companies and virtual offices should be viewed in this light: as necessary.

Cultural change is inescapable. A major evolution must take place in the way we look at our business—even if a long list of unknowns is associated with that change. For instance, virtual financial statements can provide up-to-the minute information, but they also pose a potential problem. When financial analysts in the city and in Wall Street get wind that virtual financial reporting is in place, updated in real time, they will do whatever they can to:

- Get hold of its information and
- Scrutinize it for clues on the company's future performance.

Financial analysts do understand that even a virtual statement provides a perfect mirror of, say, the bank's mismatch exposure. Forward-looking scrutiny is a very likely scenario in the coming years, and its pivot point will be the virtual balance sheet. What is certain is that new financial reporting practices, new regulations, marking to model, internal swaps on interest rates, and virtual balance sheets will radically change the way we *value equity*.

These same elements will also greatly impact on the manner we look at cash flow and profits. Cisco, Intel, Microsoft, Motorola, Sun Microsystems, and other high-tech companies have been able to produce a daily financial statement updated every 24 hours. They have moved to intraday reporting because they appreciate that:

- The number-one criterion for good management is timeliness and accuracy.
- Precision is more important to general accounting and regulatory reporting.

Even if such a report involves, for example, a potential 3 percent error, management loves to have a balance sheet available on request, ad hoc, in real time and a virtual close that can be updated intraday. We are at the threshold of institutionalizing virtual financial statements that are supported by models, are available interactively, and help in increasing a company's competitiveness in a market that is tougher than ever.

MANAGING THE LIABILITIES ACCOUNTS OF VIRTUAL COMPANIES

The management of liabilities of virtual companies defies what is written in accounting and finance books, because such entities are ephemeral and their alliance(s) may last no more than the current project on which they are working together. At the same time, since in the course of their work together they complement one another in terms of engineering know-how, production facilities, and/or distribution outlets, the one company's liabilities are the other company's assets.

The way to manage risk within this perspective of temporary integrated liabilities due to ephemeral alliances is not the same as what has been known so far about a simple company's consolidated balance sheet. We must break down each post to its basic A&L elements and pay due attention to risk tolerances, not only at each entity's level but within the virtual company as well and within the project that is under way.

A good deal can be learned from the financial industry. At investment banks, for example, risk tolerance at trader level is allocated by the desk head. To each desk senior management assigns a risk tolerance limit, after having decided about the level of corporate risk tolerance. Hence risk control becomes part of a coordinated system but also maintains a significant level of detail that makes it possible to focus on risk and return.

Theoretically, a virtual company works in a similar way to a real company. Practically, there is the added complexity that it is not a fixed but a temporary consortium of independent entities coming together to quickly exploit fast-changing local, national, or international business opportunities. Virtual enterprises share costs, skills, and core competencies that collectively enable them to:

- Access the market in a cost/effective manner
- Provide world-class solutions their members could not deliver individually

It is particularly important that virtual companies working on common projects and solutions follow in a multidimensional manner their current liabilities—that is, obligations whose liquidation is expected to require current assets. Usually this concerns projects on which they work together, but it also might have to do with the creation of new liabilities for each one of the cooperating entities. These liabilities might consist of:

- Obligations for items that have entered into the operating cycle, such as payables incurred in the acquisition of labor, materials, and other supplies.
- Collections received in advance of the delivery of goods and services, and taxes accrued but not yet paid.

- Debts that arise from operations directly related to projects they are doing together and services they provide to one another regarding the completion of such projects.

Notes payable to banks and trade acceptances are a good example. It is sound accounting practice to show the various note obligations separate in the balance sheet. In the virtual company environment, however, this must be done at a greater level of detail, specifically by business partner and project, including collaterals (if any), but without netting incurred liabilities with those assets that enter into bilateral transactions of the partnership.

A distinction that is not uniformly accepted in accounting circles but that can be helpful in transactions of virtual companies is that of *loans payable*. The term identifies loans from officers, relatives, or friends, accepted as a friendly gesture to the creditor and used in place of bank borrowing; such a practice is often used in small companies.

Many virtual companies are composed of small entities, and might use this type of financing. What complicates matters is that receivables may not be collected by the borrower but by a business partner who assembles—and who will be in debt to the borrower, not to the party that has advanced the funds. This adds a layer of credit risk.

Another example of a virtual company's more complex accounting is *subordinate debentures*. These issues are subordinated in principal and interest to senior, or prior, debt. Under typical provisions, subordinate debentures are more like preferred stock aspects than they are like debt. Each of the business partners in a virtual company alliance might issue such debentures; some of the companies might be partnerships; and all of the companies might follow accounting systems different from one another.

The aspect that is of interest to virtual companies is that subordinate debenture holders will not commence or join any other creditor in commencing a bankruptcy, receivership, dissolution, or similar proceedings. Relationships developing in a virtual company, however, may involve both senior debt regarding money guaranteed in a joint project, and junior debt from current or previous transactions into which each of the real companies had engaged.

A virtual organization must handle plenty of basic accounting concepts in a way that leaves no ambiguity regarding its financial obligations (as a whole) and the obligations of each of the organization's ephemeral partners. Furthermore, each of its activities that must be entered into the alliance's accounts has to be costed, evaluated in terms of exposure, and subjected to financial planning and control. This approach requires that:

- Management makes goals explicit.
- Financial obligations taken by different entities are unambiguous.
- There is in place an accounting system that tracks everything that moves and everything that does not move.

Virtual companies are practicable if the infrastructure, including networks and computer-based models, facilitates the use of complementary resources that exist in cooperating firms. Such resources are left in place but are integrated in an accounting sense to support a particular product effort for as long as doing so is viable. In principle, resources are selectively allocated to the virtual company if:

- They can be utilized more profitably than in the home company.
- They can be supported by virtual office systems based on agents to help expand the boundaries of each individual organization.

The books must be precise for general accounting reasons; in addition, they must be timely and accurate for management accounting. Financial reporting internal to the virtual company should be done by means of virtual balance sheets and virtual profit and loss statements. These statements must be executed in a way that facilitates interactions between business partners in a depth and breadth greater than is possible under traditional approaches.

Because in a dynamic market intra- and intercompany resource availability can change minute to minute, advantages are accruing to parties able to arbitrage available resources rapidly. Virtual organizations must use information technology in a sophisticated way to supplement their cognitive capabilities; doing so will provide them with an advantage, given tight time constraints and the need to reallocate finite resources.

NOTES

1. D. N. Chorafas, *Implementing and Auditing the Internal Control System* (London: Macmillan, 2001).
2. D. N. Chorafas, *The 1996 Market Risk Amendment: Understanding the Marking-to-Model and Value-at-Risk* (Burr Ridge, IL: McGraw-Hill, 1998).
3. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley & Sons, 2000).
4. *Business Week*, October 28, 1996.
5. A hypothesis is a tentative statement made to solve a problem or to lead to the investigation of other problems.
6. See D. N. Chorafas, *Agent Technology Handbook* (New York: McGraw-Hill, 1998).
7. Chorafas, *The 1996 Market Risk Amendment.*
8. D. N. Chorafas, *Managing Credit Risk*, Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Bank, 2000).
9. D. N. Chorafas, *Setting Limits for Market Risk* (London: Euromoney Books, 1999).
10. See D. N. Chorafas, *Rocket Scientists in Banking* (London: Lafferty Publications, 1995).

CHAPTER 7

Liquidity Management and the Risk of Default

Liquidity is the quality or state of being liquid. In finance, this term is used in respect to securities and other assets that can be converted into cash at fair market price without loss associated to fire sale or other stress conditions. A good liquidity depends on the ability to instantly and easily trade assets. In general, and with only a few exceptions, it is wise to stay liquid, although it is not necessary to hold the assets in cash (see Chapters 9 and 10).

Liquidity is ammunition, permitting quick mobilization of monetary resources, whether for defensive reasons or to take advantage of business opportunities. Every market, every company, and every financial instrument has liquidity characteristics of its own. While futures markets are usually liquid, very large orders might have to be broken down into smaller units to prevent an adverse price change, which often happens when transactions overwhelm the available store of value.

In their seminal book *Money and Banking*,[1] Dr. W. H. Steiner and Dr. Eli Shapiro say that the character, amount, and distribution of its assets conditions a bank's capacity to meet its liabilities and extend credit—thereby answering the community's financing needs. "A critical problem for bank managements as well as the monetary control authorities is the need for resolving the conflict between liquidity, solvency, and yield," say Steiner and Shapiro. "A bank is *liquid* when it is able to exchange its assets for cash rapidly enough to meet the demands made upon it for cash payments."

"We have a flat, flexible, decentralized organization, with unity of direction," says Manuel Martin of Banco Popular. "The focus is on profitability, enforcing strict *liquidity* and *solvency* criteria, and concentrating on areas of business that we know about—sticking to the knitting."[2] Solvency and profitability are two concepts that often conflict with one another.

A bank is *solvent* when the realizable value of its assets is at least sufficient to cover all of its liabilities. The solvency of the bank depends on the size of the capital accounts, the size of its reserves, and the stability of value of its assets. Adequacy of reserves is a central issue in terms of current and coming capital requirements.

- *If* banks held only currency, which over short time periods is a fixed-price asset,
- *Then* there would be little or no need for capital accounts to serve as a guarantee fund.

The currency itself would be used for liquidity purposes, an asset sold at the fixed price at which it was acquired. But this is not rewarding in profitability terms. Also, over the medium to longer term, no currency or other financial assets have a fixed price. "They fluctuate," as J. P. Morgan wisely advised a young man who asked about prices and investments in the stock market.

Given this fluctuation, if the need arises to *liquidate*, there must be a settlement by agreement or legal process of an amount corresponding to that of indebtedness or other obligation. Maintaining a good liquidity enables one to avoid the necessity of a fire sale. Good liquidity makes it easier to clear up the liabilities side of the business, settling the accounts by matching assets and debts. An orderly procedure is not possible, however, when a bank faces liquidity problems.

Another crucial issue connected to the same concept is market liquidity and its associated opportunities and risks. (See Chapter 8.) Financial institutions tend to define market liquidity with reference to the extent to which prices move as a result of the institutions' own transactions. Normally, market liquidity is affected by many factors: money supply, velocity of circulation of money, market psychology, and others. Due to increased transaction size and more aggressive short-term trading, market makers sometimes are swamped by one-way market moves.

LIQUID ASSETS AND THE CONCEPT OF LIQUIDITY ANALYSIS

Liquidity analysis is the process of measuring a company's ability to meet its maturing obligations. Companies usually position themselves against such obligations by holding liquid assets and assets that can be liquefied easily without loss of value. Liquid assets include cash on hand, cash generated from operations (accounts receivable), balances due from banks, and short-term lines of credit. Assets easy to liquefy are typically short-term investments, usually in high-grade securities. In general,

- liquid assets mature within the next three months, and
- they should be presented in the balance sheet at fair value.

The more liquid assets a company has, the more liquid it is; the less liquid assets it has, the more the amount of overdrafts in its banking account. Overdrafts can get out of hand. It is therefore wise that top management follows very closely current liquidity and ensures that carefully established limits are always observed. Exhibit 7.1 shows that this can be done effectively on an intraday basis through statistical quality control charts.[3]

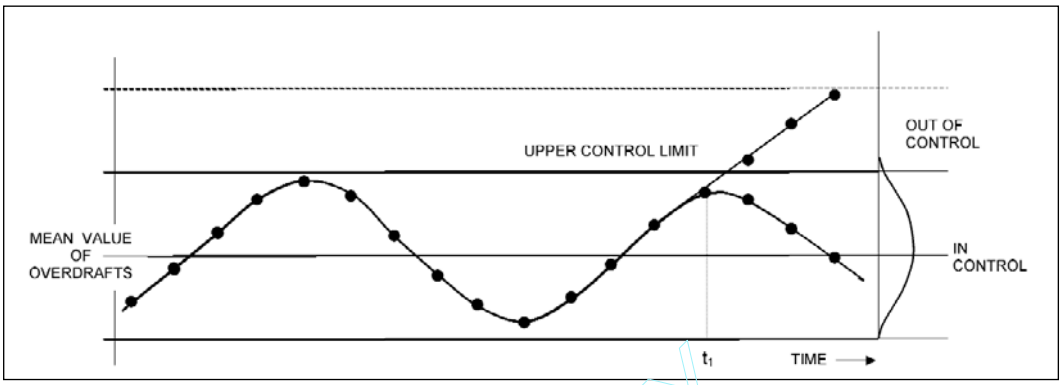
Because primary sources of liquidity are cash generated from operations and borrowings, it is appropriate to watch these chapters in detail and have their values available ad hoc, interactively in real time. A consolidated statement of cash flows addresses cash inflows, cash outflows, and changes in cash balances. (See Chapter 9 for information on the concept underpinning cash flows.) The following text outlines the most pertinent issues:

1. *Cash Flows from Operational Activities*

1.1 Income from continuing operations

1.2 Adjustments required to reconcile income to cash flows from operations:
   - Change in inventories
   - Change in accounts receivable
   - Change in accounts payable and accrued compensation

Exhibit 7.1 Using Statistical Quality Control to Intraday Overdrafts or Any Other Variable Whose Limits Must Be Controlled



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- Depreciation and amortization
- Provision for doubtful accounts
- Provision for postretirement medical benefits, net of payments
- Undistributed equity in income of affiliated companies
- Net change in current and deferred income taxes
- Other, net charges

2. *Cash Flows from Investment Activities*

2.1 Cost of additions to:

- Land
- Buildings
- Equipment
- Subsidiaries

2.2 Proceeds from sales of:

- Land
- Buildings
- Equipment
- Subsidiaries

2.3 Net change for discontinued operations

2.4 Purchase of interest in other firms

2.5 Other, net charges

3. *Cash Flows from Financing Activities*

3.1 Net change in loans from the banking industry

3.2 Net change in commercial paper and bonds

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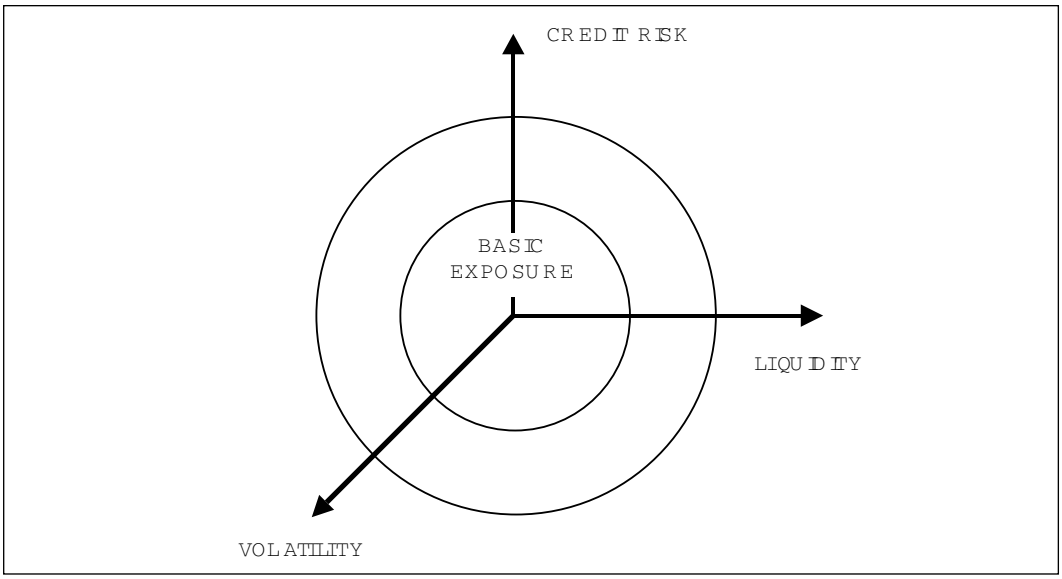
3.3 Net change in other debt
3.4 Dividends on common and preferred stock
3.5 Proceeds from sale of common and preferred stock
3.6 Repurchase of common and preferred stock
3.7 Proceeds from issuance of different redeemable securities

4. *Effect of Exchange Rate Changes on Cash*
4.1 Net change from exchange rate volatility in countries/currencies with stable establishments
4.2 Net change from exchange rate volatility in major export markets
4.3 Net change from exchange rate volatility in major import markets
4.4 Net change from exchange rate volatility in secondary export/import markets

Every well-managed company sees to it that *any term* funding related to its nonfinancing businesses is based on the prevailing interest-rate environment and overall capital market conditions. A sound underlying strategy is to continue to extend funding duration while balancing the typical yield curve of floating rates and reduced volatility obtained from fixed-rate financing. Basic exposure always must be counted in a coordinate system of volatility, liquidity, and assumed credit risk, as shown in Exhibit 7.2.

The reference to *any term* must be qualified. The discussion so far mainly concerned the one- to three-month period. The liquidity of assets maturing in the next short-term timeframes, four to six months and seven to 12 months, is often assured through diversification. Several financial institutions studied commented that it is very difficult to define the correlation between liquidity and diversification in a sufficiently crisp manner—that is, in a way that can be used for establishing a common base of reference. But they do try to do so.

Exhibit 7.2 A Coordinate System for Measuring Basic Exposure in Connection to a Bank's Solvency



Diversification can be established by the portfolio methodology adopted, based on some simpler or more complex rule; the simpler rules usually reflect stratification by threshold. A model is necessary to estimate concentration or spread of holdings. Criteria for liquidity associated with securities typically include:

- Business turnover, and
- Number of market makers.

Market characteristics are crucial in fine-tuning the distribution that comes with diversification. This fact makes the rule more complex. The same is true of policies the board is adopting. For instance, what really makes a company kick in terms of liquidity? How can we establish dynamic thresholds? Dynamically adjusted limits? What are the signals leading to the revision of thresholds?

Other critical queries relate to the market(s) a company addresses itself to and the part of the pie it wishes to have in each market by instrument class. What is our primary target: fixed income securities? equities? derivatives? other vehicles? What is the expected cash flow in each class? What is the prevailing liquidity? Which factors directly and indirectly affect this liquidity? No financial institution and no industrial company can afford to ignore these subjects. Two sets of answers are necessary.

- One is specific to a company's own trading book and banking book.
- The other concerns the global liquidity pie chart and that of the main markets to which the company addresses itself.

The company's business characteristics impact on its trading book and banking book. Generally, banks have a different approach from securities firms and industrial outfits in regard to cash liquidity and funding risk, but differences in opinion and in approach also exist between similar institutions of different credit standing and different management policies. Cash liquidity risk appears to be more of a concern in situations where:

- A firm's involvement in derivatives is more pronounced.
- Its reliance on short-term funding is higher.
- Its credit rating in the financial market is lower.
- Its access to central bank discount or borrowing facilities is more restricted.

Provided access to central bank repo or borrowing facilities is not handicapped for any reason, in spite of the shrinkage of the deposits market and the increase in their derivatives business, many banks seem less concerned about liquidity risk than do banks without such a direct link to the central bank. Among the latter, uncertainty with respect to day-to-day cash flow causes continual concern.

By contrast, securities firms find less challenging the management of cash requirements arising from a large derivatives portfolio. This fact has much to do with the traditionally short-term character of their funding. Cash liquidity requirements can arise suddenly and in large amounts when changes in market conditions or in perceptions of credit rating necessitate:

- Significant margin payments, or
- Adjustment of hedges and positions.

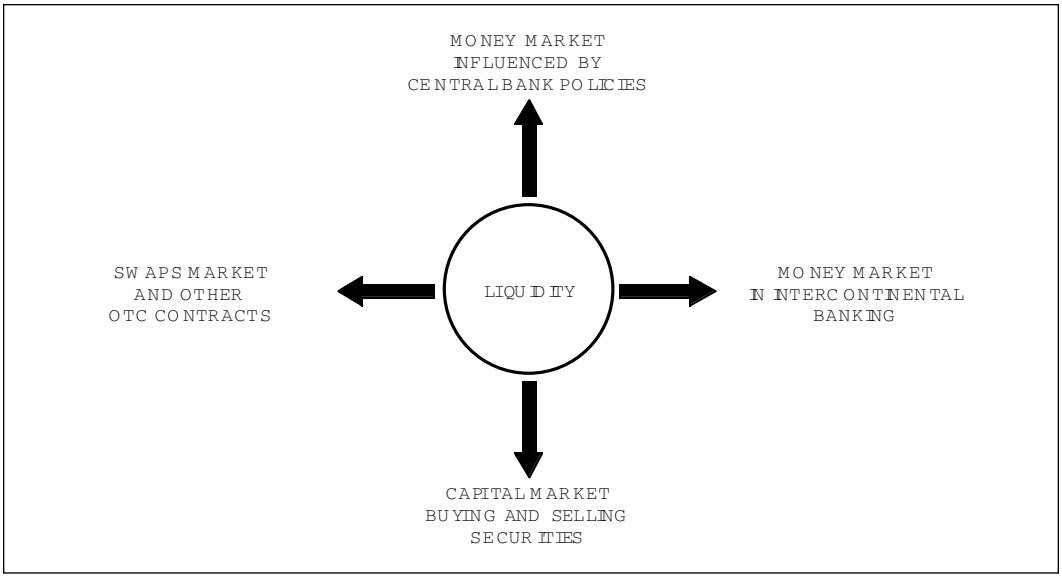
The issues connected to bank liquidity, particularly for universal banks, are, as the Bundesbank suggested during interviews, far more complex than it may seem at first sight. "Everybody uses the word 'liquidity' but very few people really know what it means," said Eckhard Oechler. He identified four different measures of liquidity that need to be taken into account simultaneously, as shown in Exhibit 7.3.

1. *General money market liquidity* is practically equal to liquidity in central bank money.
2. *Special money market liquidity*, in an intercommercial bank sense, is based on the credit institution's own money.
3. *Capital market liquidity* has to do with the ability to buy and sell securities in established exchanges.
4. *Swaps market liquidity* is necessary to buy or sell off–balance sheet contracts, usually over the counter.

The crucial question in swaps market liquidity is whether the bank in need really can find a new partner to pull it out of a hole. This is very difficult to assess a priori or as a matter of general principle. Every situation has its own characteristics. Therefore, a prudent management would be very sensitive to swaps liquidity and its aftermath.

Swaps market liquidity is relatively novel. As the German Bundesbank explained, not only is the notion of swaps liquidity not found in textbooks, but it is also alien to many bankers. Yet these are the people who every day have to deal with swaps liquidity in different trades they are executing.

Exhibit 7.3 Four Dimensions of Liquidity That Should Be Taken Into Account in Financial Planning



These are also the players in markets that are growing exponentially and therefore require increasing amounts of swaps and other derivatives products in bilateral deals that may be illiquid.

LIQUIDITY AND CAPITAL RESOURCES: THE VIEW FROM LUCENT TECHNOLOGIES

As detailed in the Lucent Technologies 2000 annual report, the company expected that, from time to time, outstanding commercial paper balances would be replaced with short- or long-term borrowings, as market conditions permit. On September 30, 2000, Lucent maintained approximately $4.7 billion in credit facilities, of which a small portion was used to support its commercial paper program, while $4.5 billion was unused.

Like any other entity, Lucent expects that future financing will be arranged to meet liquidity requirements. Management policy sees to it that the timing, amount, and form of the liquidity issue depends on prevailing market perspectives and general economic conditions. The company anticipated that the solution of liquidity problems will be straightforward because of:

- Borrowings under its banks' credit facilities
- Issuance of additional commercial paper
- Cash generated from operations
- Short- and long-term debt financing
- Securitization of receivables
- Expected proceeds from sale of business assets
- Planned initial public offering (IPO) of Agere Systems

These proceeds were projected to be adequate to satisfy future cash requirements. Management, however, noted in its annual report to shareholders that there can be no assurance that this would always be the case. This reservation is typical with all industrial companies and financial institutions.

An integral part of a manufacturing company's liquidity is that its customers worldwide require their suppliers to arrange or provide long-term financing for them, as a condition of obtaining contracts or bidding on infrastructural projects. Often such projects call for financing in amounts ranging up to $1 billion, although some projects may call only for modest funds.

To face this challenge, Lucent has increasingly provided or arranged long-term financing for its customers. This financing provision obliges Lucent management to continually monitor and review the creditworthiness of such customers.

The 2000 annual report notes that as market conditions permit, Lucent's intention is to sell or transfer long-term financing arrangements, which may include both commitments and drawn-down borrowing, to financial institutions and other investors. Doing this will enable the company to reduce the amount of its commitments and free up financing capacity for new transactions.

As part of the revenue recognition process, Lucent had to determine whether notes receivable under these contracts are reasonably assured of collection based on various factors, among which is the ability of Lucent to sell these notes.

- As of September 30, 2000, Lucent had made commitments, or entered into agreements, to extend credit to certain customers for an aggregate of approximately $6.7 billion.

Excluding amounts that are not available because the customer has not yet satisfied the conditions for borrowing, at that date approximately $3.3 billion in loan commitments was undrawn and available for borrowing; approximately $1.3 billion had been advanced and was outstanding. In addition, as of September 30, 2000, Lucent had made commitments to guarantee customer debt of about $1.4 billion.

Excluding amounts not available for guarantee because preconditions had not been satisfied, approximately $600 million of guarantees was undrawn and available and about $770 million was outstanding at the aforementioned date.

These examples are revealing because they show that the ability of a manufacturing company to arrange or provide financing for its customers is crucial to its day-to-day and longer-term marketing operations. Such facility depends on a number of factors, including the manufacturing company's:

- Capital structure
- Credit rating
- Level of available credit
- Continued ability to sell or transfer commitments and drawn-down borrowing on acceptable terms

In its annual report, Lucent emphasized that it believed it would be able to access the capital markets on terms and in amounts that are satisfactory to its business activity and that it could obtain bid and performance bonds; arrange or provide customer financing as necessary; and engage in hedging transactions on commercially acceptable terms.

Of course, there can be no assurance that what a company believes to be true will actually be the case, but senior management must exercise diligence in its forecasts and pay due attention to risk control. Credit risk, however, is not the only exposure. The company is also exposed to market risk from changes in foreign currency exchange rates and interest rates that could impact results from operations and financial condition. Lucent manages its exposure to these market risks through:

- Its regular operating and financing activities
- The use of derivative financial instruments

Lucent stated in its 2000 annual report that it uses derivatives as risk control tools and not for trading reasons. It also enters into bilateral agreements with a diversified group of financial institutions to manage exposure to nonperformance on derivatives products. (See Chapter 4 on reputational risk.)

Regarding equity risk, the annual report states that Lucent generally does not hedge its equity price risk, but on occasion it may use equity derivative instruments to complement its investment strategies. In contrast, like all other manufacturing firms with multinational operations, Lucent uses foreign exchange forward and options contracts to reduce its exposure to the risk of net cash inflows and outflows resulting from the sale of products to non-U.S. customers and adverse affects by changes in exhange rates on purchases from non-U.S. suppliers.

Foreign exchange forward contracts, entered into in connection with recorded, firmly committed, or anticipated purchases and sales, permit the company to reduce its overall exposure to exchange rate movements. As of September 30, 2000, Lucent's primary net foreign currency market exposures included mainly the euro and its legacy currencies: Canadian dollars and Brazilian reals. The annual

report estimated that as of September 30, 2000, a 10 percent depreciation (appreciation) in these currencies from the prevailing market rates would result in an incremental net unrealized gain (loss) of approximately $59 million.

An important reference also has been how Lucent manages its ratio of fixed to floating rate debt with the objective of achieving an appropriate mix. The company enters into interest-rate swap agreements through which it exchanges various patterns of fixed and variable interest rates, in recognition of the fact that the fair value of its fixed rate long-term debt is sensitive to changes in interest rates.

Interest-rate changes would result in gains or losses in the market value of outstanding debt due to differences between the market interest rates and rates at the inception of the obligation. Based on a hypothetical immediate 150-basis-point increase in interest rates at September 30, 2000, the market value of Lucent's fixed-rate long-term debt would be reduced by approximately $317 million. Conversely, a 150-basis-point decrease in interest rates would result in a net increase in the market value of the company's fixed-rate long-term debt outstanding, at that same date, of about $397 million. (See also in Chapter 12 the case study on savings and loans.)

WHO IS RESPONSIBLE FOR LIQUIDITY MANAGEMENT?

Well-managed companies and regulators pay a great deal of attention to the management of liquidity and the need to mobilize money quickly. But because cash usually earns less than other investments, it is necessary to strike a balance between return and the risk of being illiquid at a given point of time. We have seen how this can be done.

In nervous markets, liquidity helps to guard against financial ruptures. This is as true at company level as it is at the national and international levels of money management. Robert E. Rubin, the former U.S. Treasury secretary, found that out when confronting economic flash fires in spots ranging from Mexico, to East Asia and South America. Putting out several spontaneous fires and avoiding a possible devastating aftermath has become an increasingly important part of the Treasury Department's job.

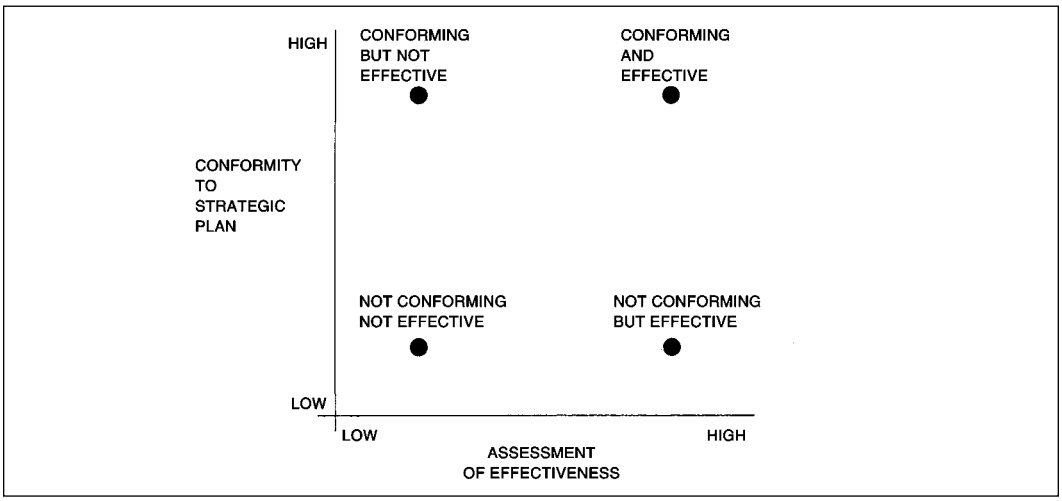
Liquidity and fair value of instruments correlate. When a financial instrument is traded in active and liquid markets, its quoted market price provides the best evidence of fair value. In adjusting factors for the determination of fair value, any limitation on market liquidity should be considered as negative. To establish reliable fair value estimates, it is therefore appropriate to distinguish between:

- Instruments with a quoted market price
- Unquoted instruments, including those of bilateral agreements

Who should be responsible for liquidity management at the corporate level? Bernt Gyllenswärd, of Scandinaviska Enskilda Banken, said that the treasury function is responsible for liquidity management and that liquidity positions always must be subject to risk control. The liquidity threshold of the bank should be dynamically adjusted for market conditions of high volatility and/or low liquidity.

In my practice I advise a hedging strategy, which is explained in graphic form in Exhibit 7.4. It is based on two axes of reference: compliance to strategic plan (and prevailing regulations) and steady assessment of effectiveness. The results of a focused analysis typically tend to cluster around one of four key points identified in this reference system.

Exhibit 7.4 Liquidity Hedges and Practices Must Be Subject to Steady Evaluation and Control



"Liquidity management is the responsibility of the global asset and liability committee, and is carried out in general terms through the head of global risk control," said David Woods of ABN-Amro. He added: "At present, there is no definition in the organization as to how this function impacts on internal control. The threshold for internal controls is adjusted for high volatility and low liquidity somewhat on an ad hoc basis."

Another commercial bank commented that liquidity risk is controlled through limits, paying particular attention to the likelihood of being unable to contract in a market with insufficient liquidity, particularly in OTC deals. The management of liquidity risk is best followed through:

- The establishment of policies and procedures
- Rigorous internal controls
- An infrastructure able to respond in real time

At Barclays and many other commercial banks, liquidity management is done by the treasury, in close collaboration with collateral management. Bank Leu said that liquidity control does not directly affect trading limits, because senior management depends on the professionalism of line management to tighten them.

In another financial institution, liquidity management is handled by the group's asset and liability management operations, which are part of the treasury department. The ALM activities are overseen by the bank's Asset Liability Committee, which meets regularly on a weekly basis, as well as by the Strategy and Controlling department.

After observing that liquidity and volatility correlate and that, therefore, liquidity management cannot be effectively done without accounting for prevailing volatility, representatives of one bank suggested that "When we see a volatile environment, we make adjustments." Although the process tends to be informal in a number of banks, some credit institutions have established formal procedures.

In another major brokerage house, liquidity management is done by the treasury. Treasury operations are responsible for assets and liabilities management as well as for funding. As documented through my research, this policy is characteristic of an increasing number of institutions that tend to formalize their liquidity management procedures.

To help in liquidity management, some banks have developed models that can track liquidity requirements in conjunction with the prevailing credit environment. Senior management has come to realize that modeling is a "must," particularly when credit fundamentals deteriorate and negative financial news affects individual client companies' credit. Such events tend to increase in a slowing economic climate.

Attention to liquidity must be so much greater when leverage rises, and with it financial risk. For instance, in January 2001 the credit environment was poor, as leverage had risen considerably and Wall Street experts spoke about cash flows being unlikely to keep pace with the debt buildup in a more subdued economic climate. Ultimately, this was expected to drive credit quality downward.

In the telecom sector, a number of operators were expected to fail to meet self-imposed deleveraging procedures. Indeed, this is what has happened, and it led rating agencies to downgrade their credit. Financial analysts believed that, as of March 2001, the telecom industry would stabilize at the BBB credit rating level, down from its AA to single-A level of 2000, with rating agencies downgrading 3.4 investment-grade companies, on average, for every one they upgraded.

Executives responsible for liquidity management should appreciate that when the credit market deteriorates, supervisors pay particular attention to the liquidity of the entities for which they are responsible. By law in many countries, credit institutions must ensure they are able to meet their payment obligations at any time. For instance, Austrian regulations demand that commercial banks shall:

- Adopt company-specific finance and liquidity planning, based on their business experience
- Adequately provide for the settlement of future discrepancies between cash income and cash expenditures by permanently holding liquid funds
- Establish and maintain systems able to effectively monitor and control the interest-rate risk on all of their transactions
- Organize their interest adjustment and termination options in a way that enables them to take account of possible changes in market conditions and maturity structure of their claims and liabilities

Austrian law also specifies that banks must establish and maintain documentation that clearly shows their financial position and permits readers to calculate with reasonable accuracy, at any time, discrepancies in needed liquidity levels. These documents must be submitted, with appropriate comments, to the Federal Ministry of Finance, which supervises credit institutions.

How are reserve institutions confronting the management of liquidity? "Liquidity management in a central bank is a decision of the board," said Hans-Dietrich Peters and Hans Werner Voth of the German Bundesbank. Other central bankers concurred. For the European Central Bank, because of the introduction of the euro, liquidity management responds to the rules established by the treaties and takes into account the relatively slow transition until 2002 and the rapid transition afterward.

UNREALISTIC ASSUMPTIONS CHARACTERIZING A FAMOUS MODEL

Liquidity analysis requires the use of budgets, particularly the cash budget, which forecasts cash flows in future periods. (See Chapter 9.) A rule of thumb, but good enough as a method, is provided by *liquidity ratios* relating to current obligations, the amount of cash on hand (or in the bank), and assets likely to be converted to cash in the near future without a fire sale.

One of the liquidity ratios I like to use is the *leverage ratio*, which measures the contributions of owners as compared to financing provided by creditors. The leverage ratio has a number of implications as far as financial analysis is concerned. Creditors look to equity to provide a margin of safety.

- *If* owners have contributed only a small proportion of total financing,
- *Then* business risks are mainly born by the creditors, and this increases by so much credit exposure.

The owner's viewpoint is quite different. By raising funds through debt, they maintain control of the company with a limited investment. If the firm earns more on borrowed funds than it pays in interest, the return to the owners is augmented while lenders continue carrying the larger part of business risks.

This statement contradicts what was stated in the now-famous paper by Franco Modigliani and Merton Miller that won them a Nobel Prize; but their hypotheses on cost of capital, corporate valuation, and capital structure are flawed. Modigliani and Miller, either explicitly or implicitly, made assumptions that are unrealistic, although the authors show that relaxing some of these assumptions does not really change the major conclusions of their model of firm behavior. In a nutshell, their assumptions state that:

- *Capital markets are frictionless*. Everyone knows that the opposite is true in real life.
- *Individuals can borrow and lend at the risk-free rate.* Only the U.S. Treasury can do that because the market perceives the Treasury as having zero credit risk.
- *There are no costs to bankruptcy.* To the contrary, the costs of bankruptcy can be quite major.
- *Firms issue only two types of claims: risk-free debt and (risky) equity*. For companies other than some state-owned ones, risk-free debt has not yet been invented.
- *All firms are assumed to be in the same risk class*. In reality, credit ratings range from AAA to D, and each of the main classes has graduations.[5]

Modigliani and Miller further assumed that corporate taxes are the only form of governmental levy. This is evidently false. Governments levy wealth taxes on corporations and personal taxes on the dividends of their shareholders.

Another unrealistic assumption is that all cash flow streams are perpetuities. It is not so. Cash flow both grows and wanes. Neither is it true that corporate insiders and outsiders have the same information. If this were true, the Securities and Exchange Commission would not be tough on insider trading.

Another fallacy in the Modigliani-Miller model is that the board and senior managers of public firms always maximize shareholders' wealth. In real life, by contrast, not only are there agency costs but also a significant amount of mismanagement makes wealth maximization impossible.

Yet, in spite of resting on the aforementioned list of unrealistic assumptions, the Modigliani-Miller model has taken academia by storm. It also has followers at Wall Street and in the city. By contrast, the liquidity, assets/liabilities, and other financial ratios used by analysts in their evaluation of an entity's health have both a longer history and a more solid record than such hypotheses —which are based on guesswork, at best.

LIQUIDITY RATIOS AND ACTIVITY RATIOS IN THE SERVICE OF MANAGEMENT

One has to be selective in one's choice of ratios, because accounting textbooks present over 100 financial ratios as "standard." Some of these 100 overlap, while others complement one another. I present the financial ratios I consider to be the more important below and select those worth including in a prognosticator. Notice that their critical values tend to change over time as leverage becomes an accepted practice. There are 12 ratios:

1. Leverage
2. Profitability
3. Current ratio, or acid test
4. Quick ratio
5. Cash velocity
6. Sales to total assets
7. Sales growth
8. Average collection period
9. Fixed assets turnover
10. Interest earned
11. Inventory turnover
12. Inventory to net working capital

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Leverage

There is no unique way to compute the leverage of a company. Superficially it looks as if everyone uses the algorithm:

$$\frac{\text{Liabilities}}{\text{Assets}}$$

Also, nearly everyone agrees that the higher this ratio is, the greater the likelihood of default. The big question is what should the liabilities and the assets consist of. My answer is that:

- The numerator should contain *all liabilities* in the balance sheet minus equity.
- The denominator should contain only *tangible assets* in the balance sheet.

Team-Fly®

In this ratio, liabilities are equal to all types of debt, including equity, but not derivatives. A sound strategy is that intangible assets should not be taken into account, because they are usually subjective and inflated—and therefore unreliable. Serious financial analysts do not appreciate the often exaggerated value of intangible assets.

Three financial ratios—total debt (including derivatives) to total assets, current liabilities to net worth, and fixed assets to net worth—complement the leverage ratio. The same is true of other ratios, such as retained earnings to assets, liquidity, and the *acid test*—which is a proxy to both liquidity and leverage.

Profitability

A different algorithm should be used in connection to profitability in the short term and in the long term. Webster's dictionary defines something as being profitable when it is gainful, lucrative, remunerative, or advantageous. Profitability, however, is a financial metric interpreted in different ways by different firms. In a business enterprise, the state or quality of being profitable is expressed as one of two ratios:

$$\frac{\text{Net Income}}{\text{Assets}} = \frac{\text{NI}}{\text{A}}$$

A higher profitability lowers the default likelihood, but NI/A is not linear nor is it the sole criterion of a company's survival. Some analysts use:

$$\frac{\text{Earnings Before Interest and Taxes}}{\text{Interest}} = \frac{\text{EBIT}}{\text{Interest}}$$

This ratio is number 10: Interest Earned. In the longer term, profitability involves not only financial measures but also those measures not immediately expressed in financial terms that, however, eventually have a financial effect. Examples are management ability, product quality, innovation, order lead time, production flexibility, skills, customer satisfaction, and the management of change. "To succeed in this world," said entrepreneur Sam Walton, "you have to change all the time."[4]

Current Ratio, or Acid Test

The current ratio is computed by dividing current assets by current liabilities. For the short term, it is roughly the inverse of the leverage ratio. When I was a graduate student at UCLA, the current ratio had to be 2.5 or greater. Then it became 2.0 and kept on slimming down. With leverage, it can be even much less than 1. Look at LTCM.[5] Leverage aside, however, the current ratio is a good measure of short-term solvency, as it indicates the extent to which the claims of short-term creditors are covered by assets that are expected to be converted to cash in a period roughly corresponding to the maturity of these claims. Can we *really* forget about leverage? Evidently, we cannot. This issue is treated in the next section when we talk about ratios germane to derivative financial instruments. For the time being, let us define the acid test in classical terms:

$$\text{Acid test} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{CA}{CL}$$

As already mentioned, it is generally accepted that a liquid enterprise has a CA/CL ≥ 2. If CA/CL = 1, the company is in trouble. And if CA/CL < 1, it is illiquid and it should deposit its balance sheet. However, this prudential rule has been turned on its head because of leverage.

Quick Ratio

The quick ratio is not as popular as the acid test. It is calculated by deducting inventories from current assets, then dividing the remainder by current liabilities. This is a measure of the "quick" assets available relative to liabilities due soon.

The rationale for such computation is that usually inventories are the least liquid of a company's current assets. Inventories are also the asset on which losses are most likely to occur in the event of bankruptcy or liquidation. Added to this is the fact that different companies use different ways to account for their inventories, and for some companies inventory pricing is more subjective than objective.

Cash Velocity

Cash velocity is one of the activity ratios that measures how effectively a given company is employing its resources. Cash velocity is computed as sales divided by cash and cash equivalents (i.e., short-term negotiable securities). It indicates the number of times cash has been turned over during the year. In principle, high cash velocity suggests that cash is being used effectively. But *if* the liquidity ratios are weak, *then* a high cash velocity may be an indication of liquidity problems faced by the company.

The family of cash flow ratios discussed in Chapter 9 both compete with and complement cash velocity as a criterion of cash management. I chose to include cash velocity in this list because, as we will see in Part Three, cash flow has more than one interpretation.

Sales to Total Assets

The sales-to-total-assets ratio has been developed by du Pont, and it is still a central metric in the du Pont system of financial control. Like cash velocity, it serves to analyze the use of the different total assets components and their correlation to sales. What we are really after is a method that helps to measure the efficiency of a company's operations.

Sales Growth

Sales growth is a twin ratio to sales to total assets. Business statistics show that the relation between sales growth and the likelihood of default is nonlinear; it is U shaped: As Moody's Investors Service suggests, both low and high sales growth are associated with higher default probabilities.[6]

Average Collection Period

Average collection period is a sister ratio to accounts receivable turnover. To compute the average collection period, annual sales are divided by 360 to get the average daily sales. The daily sales are then divided into classes with special attention to accounts receivable. Doing this helps to find the

number of days' sales that are tied up in receivables. The average collection period represents the mean length of time that, after making a sale, a company must wait before receiving cash.

For instance, *if* a firm sells on a net 30-day basis, *then* a 24-day average collection period is good. But if it sells on a net 20-day basis, then the 24-day collection performance is not satisfactory, because there is spilling over into payments. If cash sales are a significant percentage of the total, it is preferable to use *credit sales* when computing the average collection period.

Fixed Assets Turnover

The ratio of sales to fixed assets measures the turnover of capital assets. The typical industry average is five times. A turnover of three indicates that a company is not using its fixed assets to as high a level of capacity as are the other firms in the industry.

Interest Earned

To obtain the interest-earned ratio, we divide earnings before interest and taxes (EBIT) by interest charges. The ratio measures the extent to which our earnings could decline without major financial problems because of inability to meet annual interest costs. (See the discussion on ratio. 2, Profitability.)

Inventory Turnover

Inventory turnover is computed as sales divided by inventory. The industry average used to be nine times. In the 1990s it accelerated, and 11 or 12 times are not unknown. One of the problems arising in analyzing the inventory turnover ratio is that sales are at market prices; for comparability purposes, inventories also should be marked to market. If inventories are carried at cost, as is frequently the case, then it would be more appropriate to use cost of goods sold in place of sales in the numerator.

Another problem with the inventory turnover algorithm lies in the fact that sales occur over the entire year, while the inventory figure is essentially taken at one point in time. For this reason, it is better to use an average figure—for instance, computed as the average of the beginning and ending inventories or the sum of quarterly or monthly inventory values.

Inventory to Net Working Capital

Economists as well as businesspeople identify working capital with current assets. The definition of net working capital most commonly encountered in finance is current assets minus current liabilities. The ratio of inventory to net working capital shows the proportion of net current assets tied up in inventory. This ratio helps in indicating the potential loss to the company that would result from a decline in inventory values because of rapid technological advances, in case of bankruptcies, and when its inventory becomes damaged goods.

COMPUTATION OF LEVERAGE AND DEFAULT INCLUDING DERIVATIVES EXPOSURE

Since performance is judged, at least in major part, in terms of balance sheet and income statement, management's business plans and their execution will be evaluated on the basis of both actual and anticipated effects of current decisions on balance sheets and profit and loss statements. This being the case, more factors than those just discussed should be included in estimated financial statements

that run into the future—including also the immediate future mapped into virtual financial statements (see Chapter 6).

To consolidate what has been presented, prior to looking into these "other factors" we should take an integrative approach on what has already been explained, bringing together ratios that can serve as predictors of an entity's default likelihood. This is done in Exhibit 7.5, which presents in a nutshell the trend curves of six critical ratios. Estimated default frequency depends on the value of these selected financial metrics.

The ratios chosen for this model are shown in Exhibit 7.6. Each pigeonhole in the exhibit shows a trend curve permitting the reader to note the difference in prognosticated default likelihood. The emphasis is on accuracy rather than precision.

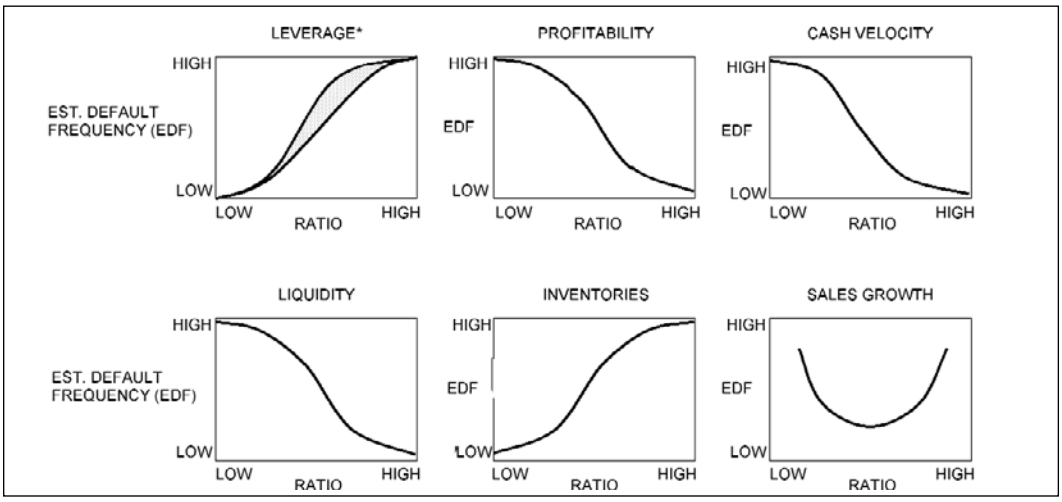
Beyond what is shown in Exhibit 7.5, the ratios discussed in this section pay particular attention to the amount of assumed leverage and the effect of exposure associated with derivative financial instruments. The modern way to approach exposure due to gearing is to look at the balance sheet and its ratios to determine not only the extent to which borrowed funds have been used for financing—which was done with the leverage ratio—but also to estimate the exposure from off–balance sheet trades and portfolio positions. This should be in compliance with the FASB's Statement of Financial Accounting Standards 133.

Demodulated Notional Principal Amount

Trades in derivative financial instruments are expressed in notional principal amounts. With few exceptions, such as all-or-nothing derivatives, the notional principal is not 100 percent at risk if the market turns against the trader's guesstimate. The credit equivalent risk must be computed by demodulating the principal amount.[7] Different divisors exist depending on the type of derivative instrument as well as volatility, liquidity, and market psychology.

This demodulated amount should be added to other debt to help in computing critical ratios. We can further measure the risks of debt by focusing on the new generation of income statement ratios,

Exhibit 7.5 Trend Curves of Important Ratios That Can Serve as Prognosticators of Default



* Short-term Proxy of Leverage is the acid test.

Exhibit 7.6 Critical Ratios Entering into a Prognosticator of Default

1.	Leverage
2.	Profitability
3.	Cash Velocity
4.	Liquidity
5.	Inventories

Ratios 1, 2, 4, and 5 enter in RiskCalc for Private Companies by Moody's Investors Service. Moody's uses RiskCalc as a rating methodology. See Moody's Investor Service: "RiskCalc for Private Companies II," New York, December 2000.

that is, those ratios whose profits and losses are recognized even if they are not realized. Such financial statements indicate how well different types of exposure are covered by operating profits, preferably without netting, because netting leads to wishful thinking and plenty of subjective judgment.

Total Debt to Total Assets, Including Derivatives

Total debt to total assets, including derivatives, expresses a company's obligations to creditors and trading partners, in relation to all the funds that have been provided and/or are involved in outstanding commitments. Under this sum total of debt are included current liabilities, loans, mortgages, notes, debentures, and bonds as well as losses from derivatives positions that are recognized but not yet realized.

Lenders and trading partners are interested in this ratio of total debt to total assets because the lower it is, the greater the cushion against their losses as creditors and trading counterparties in the event of liquidation.

Prior to exposure resulting from trades in derivatives, and before the big wave of leverage that hit business and industry and found a place in lending, creditors generally required owners to have as large an investment as the creditors themselves. Past rules of thumb no longer hold because the true derivatives risk is unearthed only through stress testing.

Total Debt to Net Worth, Including Derivatives

It is useful to compare the sum of debt from loans, bonds, and derivative financial instruments to net worth, not only for a company but also for peer entities. Such comparison provides an interesting insight in financial staying power and can lead to scenarios that reveal the likely evolution of financial relationships.

Current Liabilities to Net Worth, Including Derivatives of Short-term Maturity

This ratio measures the amount of equity by owners against the amount of current debt, with the added flavor of short-term derivatives obligations—and it should be seen in conjunction with the acid test, discussed earlier. It is advisable to distinguish four brackets for the short term: less than one month, two to three months, four to six months, and seven months to one year, incorporating all derivative products and their recognized but not realized profits and losses.

Loans and trading have at least this common element in a dependability sense. If owners do not put enough funds into the firm to cover its obligations, suppliers of longer-term funds and trading partners will not be willing to expose themselves to risks, and the company will be forced to resort to short-term, stopgap financing, which has its own perils.

Because owners' equity is usually tied up in fixed assets, while the aftermath of recognized but not yet realized gains and losses enters the net worth, I have deliberately chosen to include in this section the following two ratios: fixed assets to net worth and fixed charge coverage.

Fixed Assets to Net Worth

Fixed assets to net worth shows the extent to which ownership funds are invested in assets with relatively low turnover. For industrial firms, without counting the effect of derivatives, a rule of thumb for this measure is 65 percent. If a company's fixed assets are 100 percent of net worth, then it has too large a commitment in fixed assets relative to ownership funds, and its financial situation is unsatisfactory. The aforementioned ratios change when derivatives exposure is incorporated.

Fixed-Charge Coverage

Fixed coverage shows the number of times fixed charges are covered. The ratio is determined by dividing profit before fixed charges by the total fixed charges (interest, lease payments, sinking fund requirements, and the tax related to sinking fund payments). An industry average, without counting derivatives exposure, is four times.

The fixed coverage ratio helps in fleshing out financial problems that may arise from the nonpayment of lease obligations or sinking fund charges and from failure to meet interest payments. Sinking fund charges are required annual payments necessary to amortize a bond issue. They are not deductible for income tax purposes, so they must be paid with after-tax profits. Hence, the company must earn sufficient profits before taxes to pay its tax bill and still have money to meet sinking fund requirements.

Another reason for including fixed assets to net worth and fixed metrics addressing charge coverage, is their importance to the New Economy. Internet companies have different investment and leverage characteristics from Old Economy firms, and both ratios stand a good chance of playing a key role in differentiating between Old and New Economy companies.

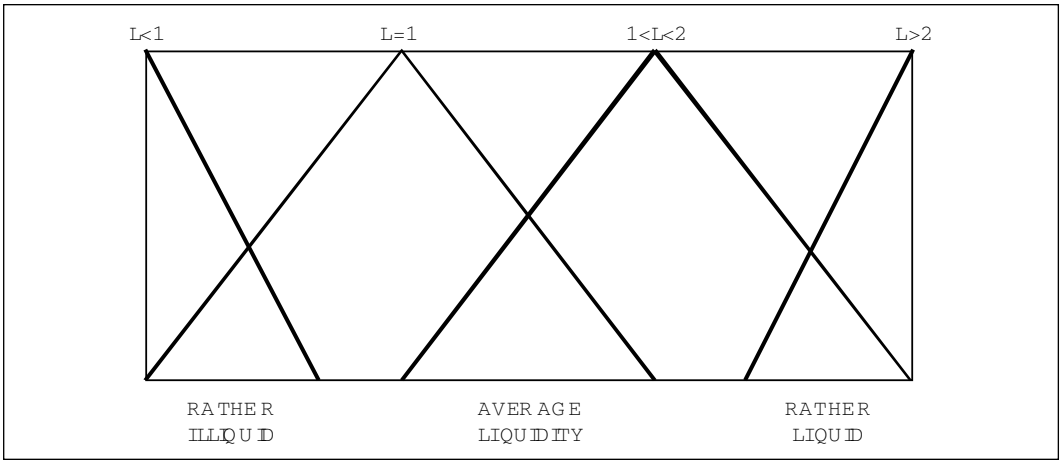
Extraordinary-Charge Coverage

A common problem of financial institutions and of many industrial corporations is that large derivatives portfolios can at times give rise to unexpected, sizable, and costly cash liquidity needs. It is therefore advisable to estimate a priori the magnitude of unexpected risks and charges to cover such risks. Reference has been made to this need in connection with loans. (See also the chi square curve, Exhibit 13.4, in Chapter 13.) Some institutions forecast this type of cash requirement by adding together:

- Cash needs whose origin can be found in historical information by studying their periodicity while holding prices and volatilities constant
- Cash requirements arising from potential price and volatility changes by event or time bracket, also computed in large part by using historical data

An example of the combined effect of these two items in connection to derivatives exposure is presented in Exhibit 7.7. The input of this histogram is from a VAR model. It presents daily profit and loss resulting from derivative financial instruments in the trading book of a major financial institution.

Exhibit 7.7 A Fuzzy Engineering Diagram to Position an Institution Against the Derivatives Acid Test



Estimated cash needs always should be compared to funding availability and used to draw up new funding plans. It is also recommended to run regular *liquidation analyses* to determine whether the firm can survive a run on its resources resulting, for example, from a sudden downgrading of its debt, severe derivatives losses, or a market panic.

Derivatives Acid Test

Companies may experience severe liquidity problems associated with leveraging that turns sour. An example is the Orange County, California, debacle. With over-the-counter options and other derivatives deals, it is often difficult to find a counterparty to close out or sell a company's positions. The following algorithm can help a bank or an investor to evaluate the liquidity of a derivatives portfolio.

$$L = \frac{\text{Exchange Traded Instruments}}{\text{OTC and other Bilateral Agreements}}$$

$$= \text{Derivatives Acid Test}$$

L indicates the ratio of those instruments that tend to be more liquid to those that can be manifestly illiquid. Both the numerator and the divisor have credit risk and market risk. However, market risk dominates in the numerator, while credit risk is more pronounced in the denominator, where the sum of exposures should not be netted.

There are no established tables for L ratios to help quantify and judge the numerical result given by this algorithm, but a case can be made in using known facts from the *acid test*. Bilateral agreements depend a great deal on the counterparty honoring its obligations. Some do not. After the crash of the so-called Asian Tigers, J. P. Morgan had to go to court to recover its $489 million in derivatives losses in South Korea because SK Securities refused to perform[8] (see Chapter 4).

Notice that what has been outlined in the foregoing paragraphs can be nicely expressed in a fuzzy engineering diagram, as shown in Exhibit 7.8. The use of fuzzy logic is advisable because statements characterizing the derivatives acid test are not crisp, but the resulting pattern can be most helpful in positioning a bank against market forces. This should be done in association with contingency planning.

CONTINGENCY PLANNING FOR LIQUIDITY MANAGEMENT

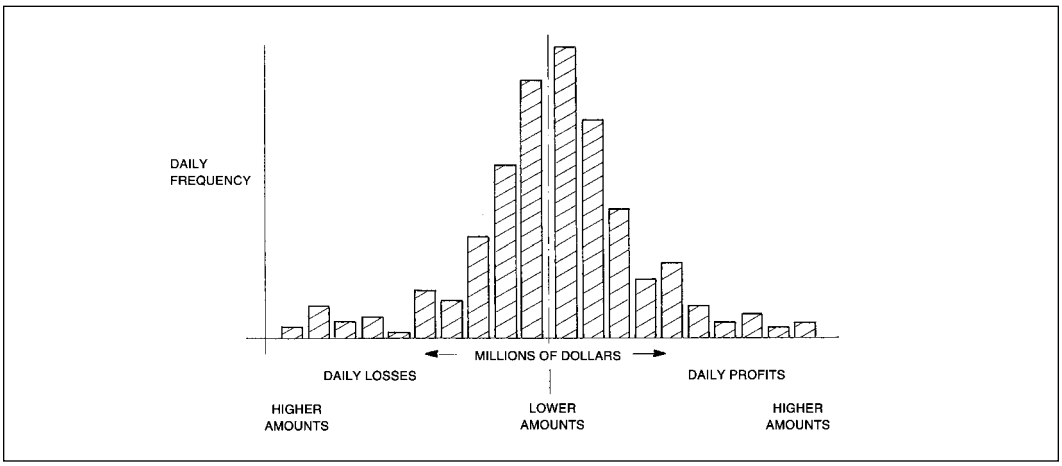
The liquidity of a financial institution must be measured and managed to ensure that it is able to meet liabilities as they come due. Fundamentally, liquidity management aims to reduce the probability of an irreversible adverse situation and its aftermath. Even in cases where a crisis develops because of a problem elsewhere in the bank, a severe deterioration in the quality of current assets may cause a crisis to be generalized.

In times of stress, the resources available to address the problem of loss of confidence in an institution's financial standing will be determined, to a substantial extent, by its liquidity. Therefore, the steady tracking and analysis of the liquidity position along the ratios discussed is critical. A steady watch requires bank management to:

- Examine how its funding requirements are likely to evolve over time, both in normal conditions and under crisis scenarios, and
- To study, on an ongoing basis, not only its own liquidity position but also that of correspondent banks.

Well-managed credit institutions and industrial organizations establish both quantitative and qualitative measures to assess liquidity, and have a rigorous method for analyzing balance sheet and off–balance sheet activities on a consistent, company-wide basis. Money-center banks have a

Exhibit 7.8 Daily Profit and Loss In Trading Book Computed Through Modeling Over One Year, Sorted in 20 Buckets



liquidity strategy in each currency and part of the globe where they operate. They also have a contingency plan in case normal approaches to funding are disrupted.

In the insurance business, liquidity risk comes from the possibility that the insurer will have insufficient liquid assets to service requirements under its guarantees. In this case, liquidity risk includes the risk of losses incurred on securities liquidated at an inopportune time because of pressing funding needs, but it also may involve a run by clients trying to save their money, as in the cases of Nissan Mutual Life and General America. As a strategy, insurers limit their liquidity risk by:

- Investing primarily in high-quality, publicly traded fixed income securities that have a liquid market
- Maintaining alternative liquidity arrangements on which they can draw funds when the need arises

The Basle Committee on Banking Supervision advises credit institutions that an effective contingency policy should address two major questions:

1. Does management have a contingency plan for handling a crisis?
2. Are there procedures in place for accessing cash in an emergency?

Each of these basic queries can be analyzed in further detail. A well-thought-out contingency plan must identify procedures able to ensure that:

- Information flows are reliable and remain timely and uninterrupted.
- These information flows provide senior management with the precision needed to make quick decisions.

The execution of this strategy requires first-class information technology able to deliver results in real time. Also, organization-wise, an unambiguous division of responsibility must be established so that all personnel understand what is expected of each individual person before, during, and after a liquidity crisis.

According to the Basle Committee, a bank that requires liability managers to maintain strong ongoing links with lenders and large liability-holders during periods of relative calm will be better positioned to secure sources of funds during emergencies. In a similar manner, astute public relations management can help the institution avoid the spread of public rumors that might result in runoffs by depositors, institutional investors, and correspondent banks.

A valid strategy is classifying borrowers and trading customers according to their importance to the bank well before adversity hits. By so doing, management can determine which relationships it may need to forgo in the aftermath of different types of crises, if and when they develop.

Internal controls should ensure the quality and accuracy of contingency plans, informing senior management whether these include procedures for making up cash flow shortfalls in an emergency.[9] Credit institutions and industrial companies have available to them several sources of such funds, such as previously unused credit facilities and the domestic central bank. However, every credit institution also must be able to develop and test different scenarios so that when adversity hits, there is no panic that would make salvaging operations ineffectual.

Models based on the critical ratios should run in real time, with the results examined by agents (knowledge artifacts) that alert management to impending deviations from limits and other thresholds. (For liquidity limits, see Chapter 8.) The use of agents is fundamental in obtaining quick decisions by senior management, which will most likely involve action to alter the assets and liabilities mix:

- Tracking by models requires certain assumptions as to how an asset or liability will behave under given conditions.
- Experimentation under different hypotheses is indispensable, and the company must have the tools permitting it to change the current A&L pattern.

Just as important is the ability to experiment with a number of alternatives prior to deciding how to rebalance assets and liabilities. When in August 1990 the Iraqis invaded Kuwait, many banks were caught in terms of exposure in the wrong side of their balance sheet. The invasion took place late in the night New York time, but Bankers Trust was able to measure its exposure worldwide in about two hours. Then, in the early hours of the morning, its board experimented with different alternatives on-line, with the result that Bankers Trust repositioned itself using its British subsidiary. At 8:00 A.M. New York time, the bank was at the right side of the balance sheet.

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NOTES

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3. For a practical example on applications of SQC charts in finance, see D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley & Sons, 2000).
4. Sam Walton, *Made in America. My Story* (New York: Bantam, 1992).
5. D.N. Chorafas, *Managing Risk in the New Economy* (New York: New York Institute of Finance, 2001).
6. Moody's Investors Service, "RiskCalc for Private Companies: Rating Methodology," New York, December 2000.
7. Chorafas, *Managing Credit Risk*, Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
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9. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley & Sons, 2000).
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CHAPTER 8

Market Liquidity and the Control of Risk

A capital market is said to be liquid if securities can be bought and sold in that market at any time, in both small and large amounts, without any noticeable premiums or discounts on fair market prices. Economists use certain indicators to show that liquidity in the capital market has increased, decreased, or remained the same.

Liquidity underpins the market's ability to buy or sell commodities and securities in established exchanges and derivative products (options, futures, swaps, and so on) at a competitive price at any time with any chosen counterparty. It should, however, be remembered that every market and every financial instrument has liquidity characteristics of its own. While the futures market may be liquid, very large orders might have to be broken down into smaller ones to prevent an adverse price change.

Other criteria also help in the measurement of market liquidity and its sustenance. For this reason, measures of market liquidity must consider the spread, depth, and price impact of trades in addition to liquidity's implications for trading and the management of risk. It is also important to examine the role of:

- Transaction time
- Number of transactions made
- Transaction volume
- Volatility in liquidity and liquidity predictions

Liquidity can become the key element in the risk profile of any entity and of every one of its positions. The problem is that the method by which financial institutions and industrial companies address the issue of liquidity produces many unreliable responses because of their tendency to mix different distinct factors addressing liquidity, such as market liquidity and transaction liquidity.

In principle, it is wise to differentiate between liquidity in a general market sense and an entity's own liquidity, or illiquidity in terms of not meeting liabilities as they fall due, which is default. In connection with market liquidity, management has to adjust its business activities, but to do so it needs information about what a normal and an abnormal market-size trade is plus a wealth of specific spread data relating to what is considered to be acceptable market size. In the case of listed

securities, for example, one of the indicators of increased liquidity is a noticeably higher volume of individual issues.

The use of ratios, modeling, and experimentation, in the sense discussed in Chapter 7, is important because adequate liquidity is a prerequisite for ensuring that financial resources are transferred without friction and without surprises. This transfer depends not only on well-balanced suitable institutional arrangements but also on stable supply and demand conditions.

During economic phases in which there is a dearth of willing counterparties, owing to one-sided transactions by banks and institutional investors, general market illiquidity sees to it that large price movements occur even in market segments that are otherwise considered liquid. As a rule, technical measures to improve market liquidity are no substitute for a longer-term perspective taken by capital market players. It is important to remember that:

- In the longer term, the market tends to be liquid.
- Illiquidity spikes do not last long, but when they come they can be devastating.

Senior management should be prepared to face the aftermath of illiquidity at any time for any reason it may arise. It also should understand that in the last analysis, the market is the arbiter of liquidity or illiquidity. The market system performs best when credit institutions execute their intermediation action in full appreciation of the fact that they are an integral part of the liquidity equation and of the recycling of money that underpins it.

DIFFERENT TYPES OF MARKET LIQUIDITY AND MONEY SUPPLY

Liquidity and leverage correlate in a negative way. The same is true about credit quality and leverage. According to Henry Kaufman, in the 1980s the corporate leveraging explosion was accompanied by a severe drop in corporate credit quality. Kaufman adds: "Among other things I believe that highly leveraged firms ran a good chance of reporting higher-than-normal losses during the cyclical downturn in the economy."[1]

Highly leveraged firms may go bust in a market liquidity crisis or at least find it difficult to execute new transactions necessary to balance liabilities versus assets. They cannot function properly to take advantage of business opportunities or for hedging reasons. Yet money is the raw material of banks, and as market theory teaches, there are many ways that we might split up the demand for money. One breakdown, which over the years has been found to be convenient, was originally proposed by Dr. Paul Samuelson. It divides demand for money into two major classes:[2]

- *Liquidity for transactions,* where money is needed to facilitate ordinary purchases of goods and services, or for trading reasons.

Note that depending on the type of transaction, this class takes a certain amount of money out of circulation or, alternatively, injects money into the market. Intermediation by banks works in both ways, with credit institutions contributing to:

- *Market liquidity proper.* This demand for money aims to hold part of the wealth in a form whose cash value is safe and readily available when needed.

In general, liquid money is *active money* with a fairly high velocity of circulation. The velocity of circulation creates the liquidity in a market that permits financial institutions, other companies, and investors to make transactions as well as to face unforeseen contingencies. Like any central bank, the Federal Reserve can inject liquidity into the market by:

- Lowering the interest rate, which makes money cheaper
- Promoting easy money through *open market* operations

For instance, the Fed buys bonds from investors and commercial banks, paying for them by money it prints and by its checks. As a result, interest rates fall and bond prices rise. Investors who have sold bonds will be holding more cash. They will look at common stocks and consider them a better buy than bonds with reduced yield. This happened at the New York Stock Exchange after the 1995 $52 billion rescue plan for Mexico, as the money got recycled into the United States.

Tempting investors to buy shares boosts the price of equities and lowers their yield, making it easier for businesspeople to raise capital. For their part, commercial banks end up with higher excess cash reserves than before. Therefore:

- They will be more lenient in lending.
- Competition will drive down interest rates on mortgages and business loans.

There are other aftermaths of market liquidity: Capital formation will rise and the stock of capital will grow. The national product also will grow, but so will wages, with this eventually translating into inflation. While interest rates and property yields will fall, total property earnings will rise or fall depending on elasticity or inelasticity in market demand. Classical economics considers market liquidity to fit well with the concept of *market efficiency* because it assumes that, by definition, an efficient market is one that:

- Is very large
- Has many players
- Has someone to look after it (the reserve bank)

But due to the globalization of markets, this theory is no longer valid. Even the United States, which is a large market with many participants, does not fit the classic description as American investors turn their thrust toward Mexico, Turkey, Indonesia, and other emerging markets—markets that, incidentally, are outside the Fed's jurisdiction.

One of the crucial issues that still is in need of factual and documented answers is the connection between *market heterogeneity* and *market inefficiency*. The two are not the same, but neither are they independent from one another. A great deal more research is necessary, particularly in connection to ephemeral inefficiencies.

Let us now turn to a concept introduced earlier: the velocity of circulation of money, *v*. It impacts most significantly on the money, and it is never constant. If MS stands for *money supply* and MB for *monetary base* (the sum total of all paper money and coins issued by the reserve bank, also known as M_0)[3], then:

$$MS = MB \bullet v$$

There are different metrics for money supply, from M_1 to M_9. M_1 is the more limited definition of money supply, representing the money that can be spent right away; it represents the gross sum of all currency and demand deposits held by every consumer and business in a country. Checking account deposits are about three-quarters of M_1; hence M_1 is much larger than M_0.

The Fed targeted M_1 for many years. Then it switched to M_2, which is equal to M_1 plus time deposits in the banking system. Like M_1, M_2 varies over time in relation to reserve bank policies, investment policies, propensity to consume, and other factors. As Exhibit 8.1 shows, from January to March 2001 the money supply exploded, rising at a 12 percent annual rate. The last time M_2 surged at a similar pace was in late 1998, in the aftermath of the Russian bond default and the collapse of Long Term Capital Management.

Other central banks use different metrics. For instance, the German Bundesbank tracks M_3, which includes: currency in circulation, demand deposits with banks, demand deposits with postal giro system, time deposits, and savings deposits.

No matter which metrics the monetary authorities follow, rapid growth in supply of money can lead to inflation. Money supply is increased by increasing either the monetary base or the velocity of circulation of money, or both. Not only the reserve bank but also the banking sector as a whole impacts on the money supply. The quantity theory of money links money supply to gross national product (GNP):

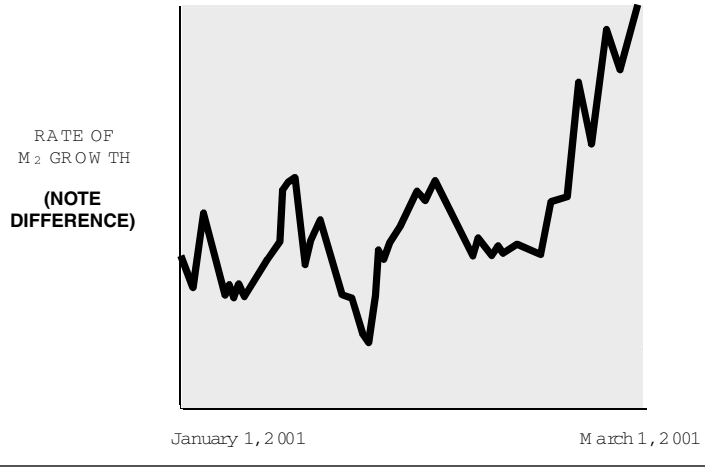
$$GNP = P \bullet Q$$

where:

P = price level

Q = output of the economy

Exhibit 8.1 The Rapid Growth of M_2 in a Matter of Three Months (January to March 2001)



Money supply impacts on the output of the economy as well as on the price level. The algorithm to remember is that *credit*, and therefore *debit*, and money supply grow together. When added to the monetary base, the banking system's *liabilities* make up the basic components of the money supply at the different M_i (M_1, M_2, M_3, etc.) levels. A rapid growth pattern of M_i leads to fears it might be followed by inflation.

There is practically no limit to the amount the banking system can expand the money supply, said Marriner Eccles, chairman of the Fed in the Franklin Roosevelt years. Eccles was against leverage. His father had taught him that "A business, like an individual, could remain free only if it kept out of debt."[4]

All this is relevant to our discussion because money supply underpins Paul Samuelson's two classes: transaction liquidity and general market liquidity. The notions presented in the preceding paragraphs also serve to bring attention to the fact that Dr. Samuelson's classification of the demand for money—transactions and liquidity proper—gives altogether a very simplified picture. Shifts in demand for money can be most rapid and unpredictable, therefore altering the overall pattern— and globalization further promotes pattern changes.

The simplification and idealization of a real-world situation is meaningful only when we know what we are after and appreciate the approximations we make. Financial analysts should map economic and financial relations into models *only after* they really understand the critical factors influencing the market and its behavior. Subsequently, what mathematics can describe computers can bring to life through experimentation.

LIQUIDITY RISK, VOLATILITY, AND FINANCIAL STATISTICS

Many knowledgeable financial analysts have suggested that even if the books do not say so, liquidity risk is the biggest exposure a financial institution can take because it impacts on the institution's reserves and on its liabilities in the short, medium, and longer term. Drexel failed because it could not roll its commercial paper. Therefore, a Treasury functions properly when it understands the liabilities structure of the firm and associates it to projected liquidity. This structure can be modeled, and it should be kept under perspective with every new commitment and with every examination of current obligations

Liquidity must be measured both in qualitative and quantitative terms—not in a quantitative way alone. Dr. Henry Kaufman says that liquidity has to do with *the feel of the market*. Reference has been already made to the fact that liquidity is no real problem when the market goes up. It becomes a challenge when:

- The banking system gets destabilized, as in Japan from 1990 until today.
- Market psychology turns negative with the prices of stocks and the other commodities going south.

The regulation of liquidity is so much an art because ways and means we have available are essentially imperfect. This has been demonstrated by the brief discussion on money supply metrics. Contrary to what *might* seem to be the case, overleveraging is an enemy of liquidity—and it could make the survival of some big banks problematic, as in the case of huge loans to telecommunications companies discussed in Chapter 1.

Timely and effective liquidity management, therefore, should be a steady preoccupation of credit institutions. After all, they have huge liabilities made up of financial assets of households, businesses, and governments—and, usually, their own capital is only a small percentage of their total footings, as Kaufman aptly suggests.

Sometimes interest on liquidity management takes a back seat because of an ill-conceived *wealth effect*. Its importance depends on absolute value and composition of wealth, on the impact of monetary policy, and on changes in consumption and investment decisions. Changes in financial structure toward greater recourse to securities markets are likely to reinforce the importance of wealth effect, as households and nonfinancial corporations probably will hold a larger share of their wealth in the form of financial market instruments such as corporate bonds and/or equity. However, this mechanism can be weakened by the fact that:

- Credit institutions also hold in their portfolio debt securities, shares, and other equity issued by nonfinancial entities.
- The control of exposure of the private sector to price fluctuations in such instruments is not keeping pace with developments in these markets.

This is another reason that making an institution's financial staying power is so important. Tier-1 banks establish liquidity limits based on two levels of reference: (1) *liquidity risk*, by risk type, risk factor, currency, and market; and (2) *liquidity volume*, by open position and individual security in their portfolio or in which they are interested for future investments. What do regulators look for when they examine a financial institution's ability to survive? Four questions are topmost:

1. Does it have risk limits of a type appropriate to our business?
2. Do its policies constrain the trading to the risk/reward ratio desired by top management?
3. Does it have real-time monitoring of all transactions? of tick-by-tick exposure?
4. Is top management sensitive to deviations and the breaking of limits?

The component elements underpinning these queries form, so to speak, the infrastructure on which a control model operates. Beyond this, a valid internal control model needs an input from every operating department. It also requires building a *modular* capital code to permit flexible risk control, splitting financial exposure according to counterparty, instruments being handled, and their volatility. As far as the control structure is concerned:

- *Liquidity* and *volatility* are those prevailing in the market.
- *Cash flow* has to be carefully calculated by channel of activity.
- *Interest-rate risk* must be tractable intraday. (See Chapters 11 and 13.)

The input from regulators must include a great deal of clear definitions and guidelines. For instance, how many degrees of freedom do we have in handling commercial mortgages? Valid approaches will invariably involve taking a look at securitized products and working by analogy: Can we manage the loan book *as if* it were a bond book?

We can develop securitization models that reflect policies and practices with house mortgages but embed a stronger credit risk factor for corporates. A similar type of prudence should prevail in

connection with cash flow estimates (see Chapter 9) as well as with cash holdings. It is wrong to place the *cash book* into the *banking book*, a practice followed because of cash management reasons. The cash book is part of the *trading book*.

In the absence of clear regulatory directives, it may be wise to look at what some of the best-managed financial institutions are doing: How do they massage and mine market data, and what do they get out of their models? In short, how do they increase their business acuity in performing in different environments? Said Brandon Davies, of Barclays Bank: "As we get more sophisticated we find we consume time and thought trying to develop solutions other banks do already."

The *economic turnover ratio* is a model that can extend what has been discussed about ratios in Chapter 7. It addresses market liquidity by measuring the total value of all trades divided by a country's market capitalization. A thorough analysis also looks at stock market volatility and the openness of a country's capital market.

Current account information is also important. Based on U.S. Department of Commerce statistics, Exhibit 8.2 shows the pattern of physical goods imports over three decades: 1970 to 2000. The exponential growth shown in this figure finds its counterpart in trade deficit connected to physical goods and the U.S. current account deficit. Both are shown in Exhibit 8.3. The careful reader will appreciate the similitude of these two patterns.

It is also wise to examine how closely different indicators are correlated with economic growth. In principle, countries with the most liquid stock markets tend to grow fastest. Stock market liquidity is a convenience, but price changes can distract attention from the need to assess corporate value regularly and to evaluate the way corporate governance behaves.

Exhibit 8.2 Statistics on Three Decades of Imports of Physical Goods in the United States

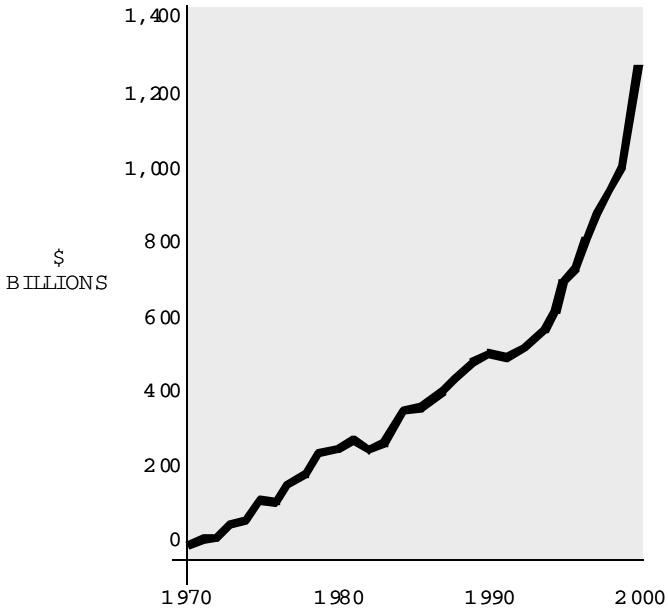
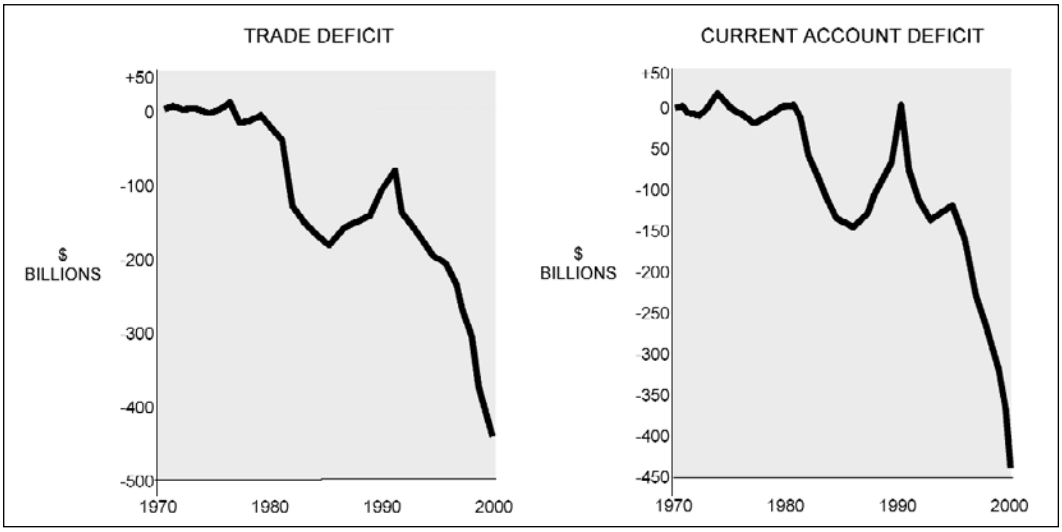


Exhibit 8.3 Deficit from Trade of Physical Goods and Current Account Deficit of the U.S. Economy



Mathematical models and simulation provide a great deal of assistance in studying current account deficits and the analysis of factors characteristic of corporate governance. Investing in equities demands the ability to analyze an entity's intrinsic value (see Chapter 9) and ignore emotion when stocks become volatile. The best strategy is to follow a company, its products, and its instruments closely and make a long-term commitment. Only when fundamentals change is it wise to sell; but it is worth monitoring prices all of the time.

Even stop-loss systems considered to be a rather conservative approach are geared toward portfolios, not the typical investor. Sell limits can be useful for locking in gains but also may prompt premature selling of equities that have considerable volatility, such as technology stocks.

With all these constraints in mind, one may ask the question: Why does market liquidity matter that much? For one thing, investors avoid illiquid markets and illiquid instruments. Also, liquid equity markets allow investors to sell shares easily while permitting firms access to long-term capital through equity issues. Many profitable investments require a long-term commitment of capital.

MARKING TO MARKET AND MARKING TO MODEL

Liquidity risk and price risk due to volatility are part of market risk. Both are fundamental elements in the business of every financial intermediary. The liquidity risk faced by a credit institution may be its own or that of its major client(s) in some country and in some currency. Clients who are unable to meet their financial commitments are credit risks, but they also create liquidity problems.

Price risk affects earnings. It may arise from changes in interest rates, currency rates, equity and commodity prices, and in their implied volatilities. These exposures develop in the normal course of a financial intermediary's business. Therefore, an efficient risk control process must include the establishment of appropriate market controls, policies, and procedures permitting a rigorous risk oversight by senior management.

Liquidity must be subject to a control process that has upper and lower limits. If low liquidity is a danger signal, for different reasons, so is *excess liquidity* (see Chapter 5) or liquidity surplus to an institution's needs. Excess liquidity can be invested in financial markets for better profits than those provided by cash. We can invest excess liquidity without taking inordinate risks only when we are able to monitor our liquidity requirements steadily and prognosticate those that are coming.

The able use of advanced technology permits investors to track some of the risks described in the above paragraphs. We can do so through real-time systems and the quantification of changes in value of assets and liabilities. This analysis should be accomplished in absolute terms and as a function of market volatility. There are two ways to do so:

1. Through marking-to market instruments
2. Through marking-to-model instruments

Marking-to-market is double for those instruments in our portfolio for which there is an active market. For instance, bid/ask is a dynamic market-driven parameter which makes it possible to gauge the market price for a given product.

There are a couple of problems with marking to market. One of them is that quite often the prices are really estimates that prove to be too optimistic or plainly biased. This is the case with the *volatility smile*, where traders think that volatility will be benign and therefore underprice the instruments they deal with.

The second problem is that the majority of over-the-counter trades are esoteric, developed for the counterparty, or too complex to price in an objective manner. Even more involved is their steady repricing. Derivative financial instruments, particularly those which have been personalized, fall into this class. Their valuation can be achieved by *marking to model*, duly appreciating that models are approximations to reality and frequently contain assumptions that may not always hold. Marking to model also has its limitations. One of them is the lack of skill to do the modeling. Another is that the assumptions we make are not always sound; still another is oversimplification of algorithmic approaches.

Few institutions appreciate that it is not enough to model the instrument. We also must study the volatility and liquidity of financial markets through historical analysis. We should take and analyze statistics of market events including both:

- Normal market behavior
- Squeezes, panics, and crashes

The model should work on the premise that liquidity tends to follow different patterns, falling from peak to trough and then increasing again, over a fairly regular time span. The theory underpinning this approach dates back to the writings of economists Irving Fisher and Friedrich Hayek. The algorithm works on the basis that too much money chasing too few financial assets causes their prices to rise, while tighter liquidity produces the opposite effect.

Globalization has seen to it that this concept of volatility in market liquidity became more complex, particularly for financial institutions and industrial companies working transborder. Liquidity issues are not only domestic; they are also global. Economists argue which matters more, global liquidity or domestic liquidity.

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Because financial markets of the Group of Ten nations are networked, psychology aside, stock market prices are increasingly being driven by global liquidity. Cross-border investments have left an increasing proportion of shares in foreign hands. But that does not mean that domestic factors play only a minor role. Among other reasons why domestic liquidity remains a key player is that economies around the world are at different stages of the business cycle. It is also good to notice that:

- The real economy lags nine months or so behind the liquidity cycle.
- An institution's liquidity may be, up to a point, uncoupled from that of the economy as a whole.

Many reasons are behind the bifurcation in these statements. A few examples are excessive leverage, imprudent management, and poorly followed-up commitments. A more thorough examination of the behavior of the bank in the market requires understanding of its trading mandate and risks being taken at all levels of transacting business. There are a great deal of other critical questions as well, such as clear levels of authority, not only in normal times but also in times of crisis like escalation events:

- Level of sophistication of internal auditing
- Existence of funding/liquidity limits
- Experience of management and trading staff

Models are not supposed to solve these problems. In times of crisis, much will depend on the maturity of the whole system of management and its ability to perform steady review and monitoring using rapid-response feedback loops. Discovery action by senior management greatly depends on critical analysis of what is working and what is not working as it should.

Some of the cases I have seen involved potential loss not constrained in a rigorous manner or measured at an acceptable level of accuracy; lax management supervision of liquidity issues; and the "feeling" that if matters are left to their own devices, they will take care of themselves. For a money center bank, a liquidity crisis could happen anywhere in the world because large financial institutions typically have:

- A global book
- Complex portfolios
- Overseas traders who are not well controlled
- A universal asset base that is not always thoroughly analyzed

In general, when the analytical part is wanting, the results of marking to model will be abysmal. I have seen cases where the modeling constructs were so sloppy and untested that the results obtained ranged from chaos to uncertainty. Also the data being used were neither accurate nor obtained in real time.[5]

Those institutions whose operations are characterized by overnight trading, long communication lines, incompatible information technology systems, and a great deal of internal politics have to be the most careful with their models—and with their management. These are usually big banks. Small banks also have constraints, such as the limited number and skills of personnel, lack of specialists in

some of the areas they operate, small budgets for information technology, and the fact that because the senior people actually do much of the business, controlling the resulting exposure is more difficult.

LIQUIDITY PREMIUM AND THE CONTROL OF EXCESS LIQUIDITY

Whether debt or equities, financial instruments are liquid if they can be easily sold at a fair market price. Traders would consider a liquid security, bought or sold, as one characterized by little or no liquidity premium. A problem, however, arises when we try to describe liquidity risk in terms of thresholds in liquidity premium, which often are used to explain different price effects.

Liquidity premium exists because a given change in interest rates will have a greater effect on the price of long-term bonds than on short-term debt. With long-term bonds, there is more of an opportunity for gains if interest rates fall and greater risk for losses if interest rates rise. At the same time, even if a certain premium were solely a function of market liquidity, it could at best measure the perceived value of liquidity but not other factors, such as transaction size.

Transactions in small amounts and in large blocks trigger the inclusion of an extra liquidity premium in the price, which does not necessarily occur with the classic notion of a liquidity premium. This extra premium suggests that the risk of a transaction should not be measured independently from its size, because doing so would be equivalent to assuming constant market liquidity regardless of fundamentals.

In academic circles and among some investment bankers, the liquidity premium theory often is used as an explanation of the term structure of interest rates. By supplementing investors' expectations with a liquidity premium, the theory aims to explain the prevalence of upward- and downward-sloping yield curves. Investor uncertainty is behind such movement, as shown in Exhibit 8.4, with two 30-year Treasury yield curves in consecutive months at the end of 1997. Analysts try to explain:

- Why the yield curve is generally downward-sloping when interest rates are high
- Why the opposite is generally true when interest rates are low
- Which fundamentals underpin a flat yield curve

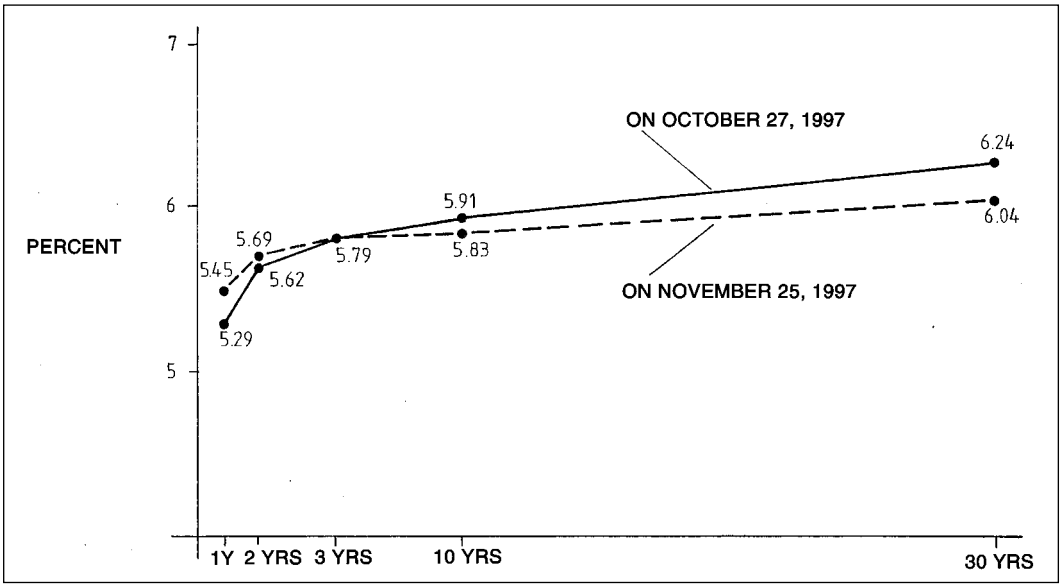
A good deal of challenge lies in the fact the liquidity preference theory makes no significant contribution to the influence of forward rates on the existing term structure. To do so requires the ability to estimate relevant liquidity premiums accurately, which is not easy, especially in a dynamic market.

To make matters more complex, the magnitude of the risk premium is itself variable, and it can depend on existing and projected economic conditions and investor psychology. For this reason, its study requires much more than a textbook sort of algorithm, which, for instance, states that the interest rate on a long-term bond will be equal to:

- The average of the short-term interest rates that are expected to prevail over the life of the bond
- Plus a liquidity premium that investors must be paid to convince them to hold the bond in the longer term

These two points express a simplification that is used quite often. Based on this algorithm, the liquidity premium theory argues that investors are not indifferent to investments of different

Exhibit 8.4 Within a Month, Investor Uncertainty Changes the Yield Curve of U.S. Treasury Bonds



maturities; they have a preference for short-term instruments because of their superior liquidity. (See also Chapter 7 on the advantages of liquid instruments.)

Other things being equal, short-term instruments have less interest-rate risk because their prices change more slowly for a given change in interest-rate levels. Therefore, investors may be willing to accept a lower return on short-term securities. Again, everything else being equal, investors would like to be paid something extra for holding long-term securities, but this liquidity premium must be estimated carefully, accounting for the fact that "other things" may not be equal.

Even if future spot rates are expected to be equal to current spot rates, there may be an upward-sloping yield curve because of a liquidity premium. At the same time, liquidity has a cost associated with it, which means that price liquidity is not a one-way street. Therefore, we need methods, procedures, and models that permit:

- Experimentation
- Optimization
- Control of results

For every financial institution and industrial company, optimization decisions must be based on policies established by the board and on internal tools that can be used for analysis and evaluation of alternatives. Typically, such an approach requires the study of the company's liquidity requirements along a maturity ladder and national economic data that are steadily updated to reflect liquidity conditions, as well as a view of the global market.

To help themselves in optimization studies, financial institutions use indices of national data on money supply growth and the evolution of interest rates in all the countries where they operate, as

well as on indices weighting heavily on the global market. The metrics employed attempt to measure volatility in liquidity as well as excess liquidity, where it exists. In this case, excess liquidity is defined as:

- Money that is not spent directly on goods and services.
- Therefore, it can be plowed into financial assets, propelling market activity.

For instance, in 1995 and the years immediately thereafter, the sharp rise in this index signaled a significant increase in the amount of excess money available. This increased availability was most likely due to the fact that central banks in the United States and Europe were cutting their interest rates, while the Bank of Japan was pumping money into the Japanese economy in a bid to revive it.

One way of looking at the liquidity cycle is that it follows a pattern whereby, at different points, different types of assets tend to outperform others. When there has been a surge in liquidity in the United States and other developed countries, their stock markets have been the first to benefit.

In general, less developed countries and their financial assets also benefited. From 1995 to 1997, emerging markets tended to lag behind the G-10 ones in the investment cycle, even when they absorbed inordinate amounts of money, which led to the crash of East Asian countries of August to December 1997—as the latter were overloaded with foreign funds in search of quick profits. Quick bucks are not what companies and investors should look for, because invariably such a policy leads to disaster.

MATURITY LADDER FOR LIQUIDITY MANAGEMENT

Today there exists no global supervisory authority that can look into international monetary flow. This breach in the supervisory armory, as far as global markets are concerned, risks bringing them to the breaking point. The International Monetary Fund (IMF) usually acts after the fact, usually in a fire department's role. While there has been a great deal of discussion regarding giving the IMF new powers, with a preventive authority associated with it (the so-called New Bretton Woods agreements), this has not happened yet.[6]

The fact that there is no global gatekeeper for international money flows and liquidity increases the scope of focused liquidity management systems and procedures within every financial institution. Better management usually happens through the institution of maturity ladders, which permit the study of net funding requirements, including excess or deficit of liquidity at selected maturity brackets.

A study of maturity ladder can address a coarse or a much finer grid. I personally advise the latter. In each bucket, the study is typically based on assumptions of future behavior of cash inflows and outflows—the latter due to liabilities, including off–balance sheet items. By dividing future commitments into a finite maturity ladder, we are able to look more clearly into future positive and negative cash flows. (See Chapter 9.)

- Positive cash flows arise from maturing assets, nonmaturing assets that can be sold at fair value, and established credit lines available to be used.
- Negative cash flows include liabilities falling due, contingent liabilities that can be drawn down, maturing derivative instruments, and so on.

A maturity ladder is dynamic and needs to be updated intraday as new trades are executed. In developing it, we must allocate each cash inflow or outflow to specific calendar date(s), preferably starting the first day in the bracket, but also accounting for clearing and settlement conventions we are using that help to determine the initial point. The best policy is to use conservative estimates for both cash inflows and outflows—for instance, accounts receivables, other money due, liabilities falling due, repayment options, possible contingencies, and so on. In each period, this calculation leads to an excess or deficit of future liquidity.

The computation of positive and negative excess liquidity is by no means the end point. The resulting funding requirements require senior management to decide how they can be met effectively. It is always wise to account for a margin of error. Such analysis might reveal substantial funding gaps in distant periods, and solutions must be found to fill these gaps. This can be accomplished by:

- Generating additional cash flows
- Influencing the maturity of transactions to offset the gap(s)

It is always wise to act in time to close the gap(s) before it (they) get too close or too wide. Doing so requires a more rigorous analysis of liabilities and assets, because having sufficient liquidity depends in large measure on the behavior of positive and negative cash flows under different conditions. Hence the need to do *what-if* scenarios and to employ real-time financial reporting. (See Chapter 6.)

Going from the more general to the more specific, one of the scenarios being used is based on *general market crisis*, where liquidity is affected at all credit institutions, in one or more markets. The basic hypothesis is that perceived credit quality would be king, so that differences in funding access among classes of financial institutions would widen, as will the interest rate of their debt against benchmark Treasuries.

A more limited version of this scenario, in terms of a spreading liquidity crisis, is one that considers that liquidity problems remain confined to one bank or a specific group of banks. This scenario also provides a worst-case benchmark, but one of more confined aftermath. Depending on the extent of such an event, it could be that some of a bank's liabilities are not rolled over or replaced and have to be repaid at maturity. This obliges the bank to wind down its books to some extent; or it might bring up specific problems not related to liquidity proper.

A more favorable scenario is one that establishes a benchmark for what is assumed as basically normal behavior of balance cash flows in the ordinary course of business, with only some minor exceptions that oblige a closer look at debt markets. In this case, the goal is to manage net funding requirements in the most economical way while avoiding being faced with large needs for extra cash on a given day. A sound strategy is that of countermeasures designed to smooth the impact of temporary constraints on the ability to roll over liabilities.

Theoretically, all banks should be doing maturity ladder computations and scenario analyses. In fact, however, very few—only the best-managed ones—are doing so. The others either lack skills for such exercise or even fail to appreciate the need to control their liabilities exposure. If the concept of closing their liabilities gaps was not alien to them, they would not fail at the rate they do because of the combined effect of assumed risks with loans and derivatives losses—as was the case with the Bank of New England (BNE) among others. At the end of 1989, when the Massachusetts real estate bubble burst, BNE had $32 billion in assets and $36 billion in derivatives exposure (in notional principal).

To keep systemic risk under lock and key, the Federal Reserve Bank of Boston took hold of the Bank of New England, replaced the chairman, and pumped in billions in public money. Contrarians said this was like throwing good money after bad money, but most financial analysts saw this salvage as necessary because the risk was too great that a BNE collapse might lead to a panic. On $36 billion in notional principal amount, BNE had $6 billion in derivatives losses, a ratio of 1:6.

The Bank of New England was clogged by regulators in January 1991—at a cost of $2.3 billion. At that time its derivatives portfolio was down to $6.7 billion in notional amount—or roughly $1 billion in toxic waste, which represented pure counterparty risk for those institutions and other companies that traded in derivatives with BNE.

This is a good case study because it demonstrates how imprudent management may be in assuming risks. Because a credit institution's future liquidity position is affected by factors that cannot always be forecast with precision, assumptions need to be made about overcoming adverse conditions in financial markets. Typically, such hypotheses must address assets, liabilities, derivatives, and some other issues specific to the particular bank and its operations, including:

- Cash inflows
- Cash outflows
- Discounted cash flows by maturity ladder

Concepts underpinning these items and the tools necessary are discussed in more detail in Chapter 9 in conjunction with cash management. Here, I wish to stress the importance of establishing in a factual and documented manner the evolution of a bank's liquidity profile under different scenarios, including the balance of expected cash inflows and cash outflows in every maturity bracket and at selected sensitive time points.

Both short-term and long-term perspectives must be considered. Most credit institutions do not manage in an active way their funding requirement over a period longer than a month or so, especially in banks active in markets for longer-term assets and liabilities. These banks absolutely need to use a longer time frame. The methodology we choose and apply always must correspond to the business we make.

ROLE OF VALUATION RULES ON AN INSTITUTION'S LIQUIDITY POSITIONS

At the beginning of the twenty-first century, banking and financial services have become a key global battleground, with the most important financial battles fought off-exchange. This globalized environment develops by involving banks, nonbanks, and corporate treasuries in bilateral agreements that, for the most part, lack a secondary market. Increasingly more powerful tools are used for:

- Rapid development of new instruments
- Optimization of trades
- Online execution of complex transactions and their confirmation

What (regrettably) is often lacking is the a priori risk analysis and, in many cases, the a posteriori reevaluation of exposure. Yet, to be able to survive in an increasingly competitive market, let

alone to make a profit, we must not only follow a risk and return approach but also develop and test different scenarios. Old-style approaches that do not provide for experimentation can:

- Give false signals about the soundness of transactions.
- Create perverse incentives for banks to take on disproportionate and/or concentrated risks.

Much of the inertia in living with one's time comes from lack of experience in the processes discussed here and in Chapter 7. Back in 1996, critics of the BIS Market Risk Amendment[7] contended that the costs to banks of implementing its clauses, including the value-at-risk (VAR) model, would be out of proportion to any benefit they, or the system, might receive. The Amendment, they said, "would engender inefficiency in financial institutions" and would "encourage disintermediation." In the years since, all these negative arguments proved to be false.

Contrary to what its critics were saying, the 1996 Market Risk Amendment by BIS allowed banks to use superior methods of risk measurement in many circumstances. In 1999 the new Capital Adequacy Framework by BIS set novel, more sophisticated capital adequacy standards. Based on this framework, banks should not only establish minimum prudential levels of liquidity but also experiment on a band of fluctuation within which each institution can:

- Adapt itself and its operations
- Receive warning signals and act on them

Both the amount of capital a bank needs and its liquidity position should be related to the value it has at risk. Algorithmic and heuristic solutions[8] must incorporate the uncertainty about future assets and liability values and cash added (or subtracted) on each side of the balance sheet because of projected events.

Such a value-added approach to risk management can be served by disaggregating risks by type across all positions and activities and by evaluating the likelihood of spikes in exposure and reaggregating risk factors by taking into account reasonable estimates of correlations among events. In contrast to a static approach, the suggested methodology requires:

- Appropriate definition of dynamic parameters
- The ability to validate the output of models being used

Critical to a successful control of exposure is the adoption of accounting, financial accounting, and disclosure practices that reflect the economic reality of a bank's business and provide sufficient information to manage assumed responsibilities in an able manner. Due attention should be paid to the fact that:

- Risk management feeds into capital allocation by way of management decisions about balancing risk and return,
- Capital adequacy is calculated in a way able to provide a buffer against losses that may be unexpected, and
- Adequate liquidity is available within each time bracket of the maturity ladder for all expected events, with a reserve for unexpected events.

This process can be helped if control limits applied to the *trading book* and *banking book* are tracked in real time, covering current positions and new transactions as they happen, and addressing all items—both on-balance sheet and off-balance sheet. The technology solution we adopt must reflect the fact that the trading book is typically characterized by the objective of obtaining short-term profits from price fluctuations.

For both internal and regulatory financial reporting purposes, instruments in the trading portfolio must be stated at fair value. According to the definition given by the Financial Accounting Standards Board (FASB) and International Accounting Standard (IAS) 32, fair value is the amount at which a financial instrument could be exchanged in a transaction entered into under normal market conditions between independent, informed, and willing parties, other than in a forced or liquidation sale.

NOTES

1. Henry Kaufman, *On Money and Markets* (New York: McGraw-Hill, 2000).
2. Paul A. Samuelson, *Economics. An Introductory Analysis* (New York: McGraw-Hill, 1951).
3. For a detailed discussion on monetary base and money supply, see D. N. Chorafas, *The Money Magnet. Regulating International Finance and Analyzing Money Flows* (London: Euromoney Books, 1997).
4. William Greider, *Secrets of the Temple* (New York: Touchstone/Simon and Schuster, 1989).
5. For real-life modeling failures, see D. N. Chorafas, *Managing Risk in the New Economy* (New York: New York Institute of Finance, 2001).
6. D. N. Chorafas, *New Regulation of the Financial Industry* (London: Macmillan, 2000).
7. D. N. Chorafas, *The 1996 Market Risk Amendment. Understanding the Marking-to-Model and Value-at-Risk* (Burr Ridge, IL: McGraw-Hill, 1998).
8. D. N. Chorafas, *Chaos Theory in the Financial Markets* (Chicago: Probus, 1994).

PART THREE

Cash Management

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CHAPTER 9

Cash, Cash Flow, and the Cash Budget

Cash is any free credit balance in an account(s) or owed by a counterparty payable upon demand, to be used in the conduct of business. Cash management is not a subject that can be attacked without a road map. The road map is the financial plan that clearly states objectives, need(s) for cash, and timing. Only then is it possible to decide if cash resources permit the execution of the plan as is or if revamping it is preferable.

As stated in connection with liabilities and liquidity, the financial plan itself must be factual and documented as well as complete and detailed. Most important, it must be capable of being executed. Computers and mathematical models are used to evaluate alternative financial plans, experiment on likely cash flows, test hypotheses, and evaluate likely return on investment from projected allocations of capital and human resources. These models permit a documented approach to financial planning.

All cash flows should be considered, along with their influence on a financial plan, and they should be discounted at the opportunity cost of funds. As we will see, cash management is indivisible from financial planning. In fact, cash management is a part of the definition of the financial plan regarding liquidity management (see Chapter 7).

Cash at the bank is kept in a *cash account*. Generally, this account constitutes an internal sight account made available by the credit institution for the funding of trading lines. The account bears interest. For risk management purposes, risk premium income and write-offs in connection with default risks, among other items, are often booked via the cash account.

- Premiums due are credited to the cash account, and
- Default payments are debited to the cash account.

Cash flow from assets and operations defines a company's liquidity as well as its ability to service its debt. Properly done, cash flow analysis succeeds in exposing a firm's mechanism in sustaining its liquidity position, therefore in facing its financial obligations. As such, cash flow and discounted cash flow studies constitute some of the best tools available in modern finance.

Every financial manager should be interested in the influence of the cash cycle and price level changes on financing requirements. He or she should be aware that financing needs follow sales and trades with a lag. As sales rise and decline, so do cash inflows; as commitments change, these changes are reflected in cash outflows.

Therefore, the cash budget is a basic tool in financial analysis. It assists users in distinguishing between temporary and permanent financing requirements as well as in determining liquid means for meeting obligations. A key influence on financing requirements is exercised by the minimum cash balance a company maintains. Cash should be enough to:

- Take care of transactions through liquidity management.
- Maintain a good credit rating, accounting for obligations.
- Take advantage of business opportunities.
- Meet emergencies as they develop, when they develop.

Cash flow means financial staying power. Cash flow forecasts should definitely cover at least a one-year period, including accounts receivables to be paid "this" time period, plus "other" income (i.e., patents and other open accords on know-how, interest from deposits, sales of property, etc., or alternatively, deposits, bought money, credit lines from correspondent banks, and trading contracts).

In the long term, cash flow is a function of products and services and their marketing. In the very short to short term (90 to 180 days), cash flow makes the difference between liquidation and survival. But at the same time, cash is costly because return on investment is lower than with other assets; it might also cause the loss of credit contacts. Therefore, one of the critical tasks of the financial manager is to determine the optimum cash level.

BASIC NOTIONS IN CASH MANAGEMENT AND THE CASH CRUNCH

Let us start with the concept of *working capital* since cash is part of it and, at the same time, working capital is a basic concept in industry while its definition is by no means clear. In my book, working capital represents the extent to which current assets are financed from longer-term assets—even if they frequently are viewed as representing some percent of sales.

- A portion of current assets is owned by the company permanently, and it is financed from longer-term sources.
- Another portion of current assets is turned over within relatively short periods; this is the portion coming from sales.

No matter the origin of funds, working capital represents a margin of safety for short-term creditors. Typically, with the possible exception of inventories, current assets yield a higher share of their book value on liquidation than fixed assets, as the latter are likely to be more specialized in use and suffer larger declines from book values in forced liquidation.

For this reason, short-term creditors look to cash and other current assets as a source of repayment of their claims. The excess of current assets over the total of short-term claims indicates the amount by which the value of current assets could drop from book values and still cover such claims without loss to creditors. Taken together, these definitions lead to the notion that a company's gross working capital is nearly synonymous with total current asset, evidently including cash. Another important issue to keep in mind is that:

- Current assets must be financed, just as fixed assets must be.

- How this financing is done can be determined by examining the flow of cash in the operations of a company.

This is an integral part of cash management based on the notion of the cash cycle and its effects on balance sheet. The budget implies that ways and means chosen for financing follow changes in the level of activity of the firm. Transactions have balance sheet consequences.

To better appreciate this statement, keep in mind that the preparation of a budget is based on the notion that the transactions that will be executed within its context, both individually and as a pattern, represent the company's way of doing business. Financial transactions and business performance are interrelated.

- *If* some part of the financial plan can be taken as a starting point,
- *And* we know the pattern of *our* transactions and cash flows,
- *Then* the financial plan may be established with a fair degree of certainty.

This "if, then" rule allows a better documentation for cash management decisions as well as on issues involved in the allocation of funds. It also makes feasible a factual level of experimentation in regard to a number of queries that invariably arise with all matters connected to financial allocation. Modeling and experimentation permit us to provide documented answers to management queries, such as:

- What will be the outcome of a deliberate action to open (or close) a new branch office? sales office? factory?
- What change in the company's management efforts may give an increase (or decrease) in diversity of products?
- What if funds are immediately reinvested, thus reducing cash availability but increasing return on assets?

Spreadsheets have been used since the early 1980s to provide an interactive means for answering what-if queries. The challenge now is to include more computer intelligence through knowledge engineering.[1] Knowledge-enriched solutions must be provided in a focused manner, which can best be explained by a return to the fundamentals.

The first major contribution of a budget is that it requires making financial forecasts for the organization as a whole as well as for each of its departments, branch offices, sales offices, factories, foreign operations, and so on. These forecasts will involve a prognostication of demand and standard costs reporting production and distribution. Expert systems can be instrumental assistants[2] to both:

- The *cash budget*, which forecasts direct and indirect cost outlays, balancing them against receipts or other sources of funds, and
- The *capital budget*, which defines the investments the organization plans to make during the coming financial period.

Capital outlays may be financed through retained earnings, loans, or other forms of debt, which

increases liabilities. Loans represent leverage, while retained earnings are the company's own funds. As Exhibit 9.1 shows, when management opts for a low level of retained earnings, it increases the likelihood of default.

Companies whose cash flow is wanting usually are facing a cash crunch. A 2001 example is provided by the steel industry. Because nowadays they are considered to be bad lending risks, steel companies are virtually locked out of capital markets. Banks also more or less refuse to lend them money, even via federally guaranteed loan programs.

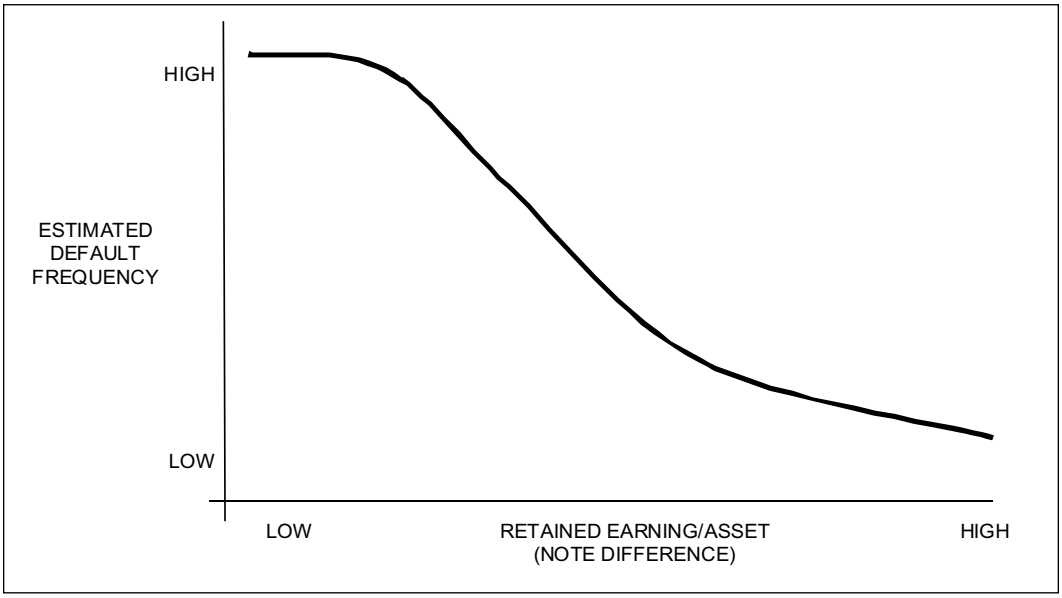
The bond market, concerned by credit ratings at or below junk bond status (BB), is not interested either. For an industry that "eats capital for breakfast," this is a recipe for disaster, says Michael D. Locker.[3] Making matters worse, many of the older, integrated mills face staggering debt and pension obligations.

Another 2001 example on a cash crunch comes from high technology. In February and March 2001, plunging computer chip prices battered South Korea's Hyundai Electronics Industries, the world's second-largest maker of memory chips, leading to financial difficulties. Hyundai Semiconductor America, its U.S. subsidiary, was unable to meet a $57 million repayment on a project finance loan.

In Seoul, Hyundai Electronics informed creditors, led by J. P. Morgan Chase, that it would soon repay the loan on behalf of its U.S. unit. The parent company was expected to capitalize on a decision by state-run Korea Development Bank to roll over $2.3 billion in Hyundai Electronics bonds due in 2001. However, the government-arranged relief program covers no more than half of the $4.5 billion in interest-bearing debt owed by the company and due in 2001.

To make up the difference, Hyundai Electronics planned to slash 25 percent of its workforce, raise $1.6 billion through asset sales, do fresh borrowing (if it finds willing lenders), and one way or

Exhibit 9.1 Low Level of Retained Earnings Increases the Likelihood of Default



another generate at least $600 million in additional cash. There are so many *ifs* in that equation that analysts said Hyundai Electronics is unlikely to avoid a liquidity crunch unless semiconductor prices turn around quickly (which they did to a very limited extent in March 2001). Turnaround in prices is the hope of many companies that find themselves in a cash crunch.

CASH FLOW STUDIES AND THE CASH BUDGET

Management always must be prepared to account for the effects of operations on the cash position of the organization, for two reasons:

1. The timing of cash receipts and disbursements has an important bearing on the attention to be paid to liabilities management, which is indivisible from accounts receivable and payable.
2. The amounts of money needed to execute transactions and finance costs must be determined in advance. This is part of the homework in estimating income and expense accounts.

In daily operations, cash is increased by speeding collection of receivables, delaying immediate payments, and assuming debt. It is decreased by withdrawal of funds to meet obligations. Cash is replenished temporarily if a company is able to obtain a short-term loan or from sale of some of its assets. If management is unable to borrow funds, it must defer payments of maturing obligations until funds are available or until a settlement is made under a compromise agreement. The alternative is bankruptcy.

Cash flow processes must be studied analytically. One of the models developed for cash flow follows a two-state process of transitional probabilities (Markov chains),[4] with positive or negative values. The value of book equity is seen as reserve.

The weakness of this approach (independently of the choice of Markov chains) is that using book equity as a source of future cash flow is not quite satisfactory because book value is rarely, if ever, calculated in an accurate manner. The premise in this particular approach is that the entity will fail *if* either:

- Market equity becomes zero.
- Cash flow stays negative.

Other models have targeted asset volatility, examining it in conjunction with cash flow volatility. The weakness of this approach is that usually only a handful of dependable cash flow observations exist, so the estimation of volatility is based on a weak sample.

There is no perfect method for doing what is described above, because dependable cash flow estimates are most critical in elaborating the cash budget, which focuses on short-term financing, and the capital budget, which focuses on longer-term financing needs. The difference between the two budgets can, to a substantial extent, be explained by analyzing the cash budget. The basic algorithm is:

Receipts minus payments equals the cash gain or loss.

Typically, this figure is added cumulatively to initial cash. The minimum level of prudential cash holdings is added to this figure to arrive at *financing requirements.* The proper definition of financing requirements becomes more complex in times of low liquidity and/or high volatility. Under such conditions, as Exhibit 9.2 suggests, net income has greater impact on the likelihood of default.

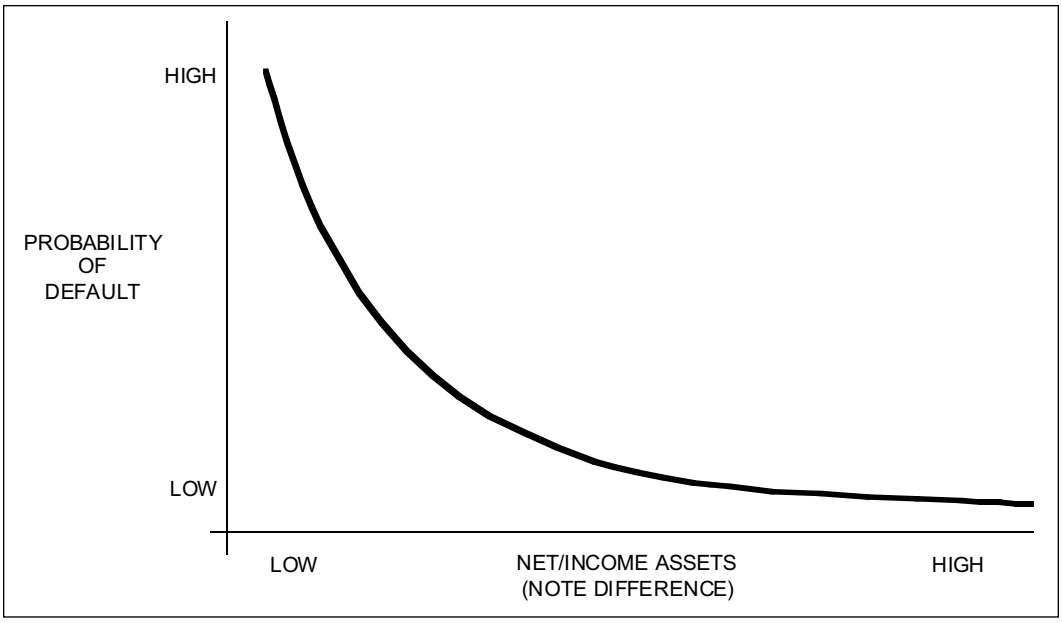
The cash flow problems of power utilities in 2001 provides an example. The volatility of equities of U.S. power utilities is in the background. This fluctuation increased by 220 percent between 1993 and 2001, when the volatility of the Standard & Poor's electric utility stocks reached 22 percent as compared with 10 percent eight years earlier. There is always a market reason behind such effect.

Most important has been the change in the volatility of cash flows of U.S. electric power companies. According to an article by Jeremy C. Stein and associates in the December 2000 issue of *Electricity Journal*, in the early 1990s there was a 5 percent chance that the cash flow would fall below expectations by an amount equal to 1.8 percent or more of a power company's assets. By the end of the 1990s, that potential shortfall had jumped to at least 3.3 percent of assets.[5]

NERA, a New York-based economic consulting firm owned by insurance brokerage Marsh & McLennan, analyzed the utilities using *cash flow at risk* (CFAR) as metrics. For each company, it assembled a group of similarly situated firms. If one member of this group recently had suffered a big cash flow shortfall, this was taken as a sign that the same thing could happen to others. Four key measures were chosen to help in determining how a company is grouped:

1. Market capitalization
2. Profitability
3. Stock-price volatility
4. Riskiness of the product line

Exhibit 9.2 Net Income Impacts the Probability of Default, Particularly at Times of Liquidity and/or High Volatility



The results obtained are quite interesting. Notice, however, that this is not a fail-safe approach. It must be improved through the definition of other critical factors that are sensitive to the cash pattern characterizing electric utilities and their relative weight by particular sector as well as demographics characterizing the market within which the company operates.

Although risk factors should be explicitly identified, NERA lumps all big electric utilities into the same riskiness group.[6] These companies are not necessarily similar to one another in cash flow patterns. Besides this, like value at risk (VAR), CFAR is based on historical data; it cannot forecast the impact of changes in business conditions. Therefore, it could not have foreseen the power shortages and price spikes that occurred in California. In every type of analysis regarding cash flows, care should be taken to properly define instruments that are equivalent to cash. Such instruments include investments in readily marketable securities that are convertible into cash through trading in established exchanges. Such investments and disinvestments are normally done during business operations. If an asset is not used in the normal operation of an entity, it does not represent working capital.

Part of the cash and cash-equivalent instruments are marketable securities with original maturities of three months or less. Usually these are considered to be cash equivalent unless designated as available for sale or classified as investment securities. There is a wide difference of opinion among accountants regarding the classification of prepaid expenses. Many accountants do not include such items among current assets.

A company's cash, deposits in banks, cash-equivalent instruments, short-term investments, and accounts receivable are subject to potential credit risk and market risk. (See Part Four.) Therefore, as a rule, cash management policies restrict investments to low-risk, highly liquid securities. They also oblige periodic evaluations of the relative credit standing of the financial institutions and other parties with which firms deal.

Of course, certain securities are widely considered to be free of credit risk. Examples are Treasury bonds, Treasury notes, and securities of federal agencies—but not necessarily those of states and municipalities or receivables for the sale of merchandise. With or without credit risk, however, all these are *liquid* assets available, day in and day out, to meet maturing obligations by providing the current funds that keep the company running from day to day, week to week, and month to month.

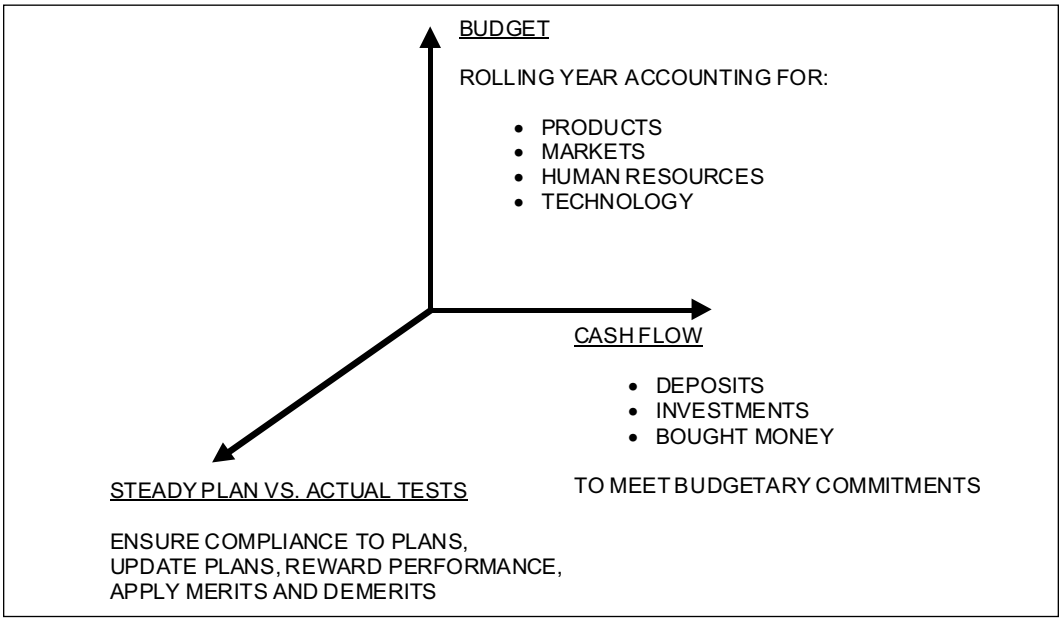
FLEXIBLE BUDGETING AND THE ELABORATION OF ALTERNATIVE BUDGETS

A *budget* is a short-term financial plan, typically applicable to one year, a rolling year (18 months), or two years. Outlays and schedules advanced by the budget have definite functions and meaning for the purpose of planning and controlling a company's authorized expenditures. Cash flow estimates, budgets, and steady plan versus actual evaluations form a three-dimensional coordinate system within which, as Exhibit 9.3 shows, effective financial plans can be made.

The cash budget usually is prepared by first noting the effects of operating expenses and costs on the cash position. Coupled with data from the capital expenditures budget, the cash budget will indicate the disbursements for the budgeted period. Thus the total budget is a formal plan of all the operations of a business over the future period that it defines. As such, it is based on:

- A forecast of the transactions that are expected as well as their semivariable and variable costs

Exhibit 9.3 Frame of Reference Within Which Effective Financial Plans Can Be Developed, Implemented, and Controlled



- An estimate of all fixed costs and overheads, enabling management to keep the latter to a minimum

An income statement must be properly projected and documented over the period of time to which it addresses itself. The processes of budget preparation and of its subsequent evaluation entail the making of many decisions with respect to the functions and relationships that must be maintained in the operations of a company. Direct costs, indirect costs, overhead, and investments must be considered.

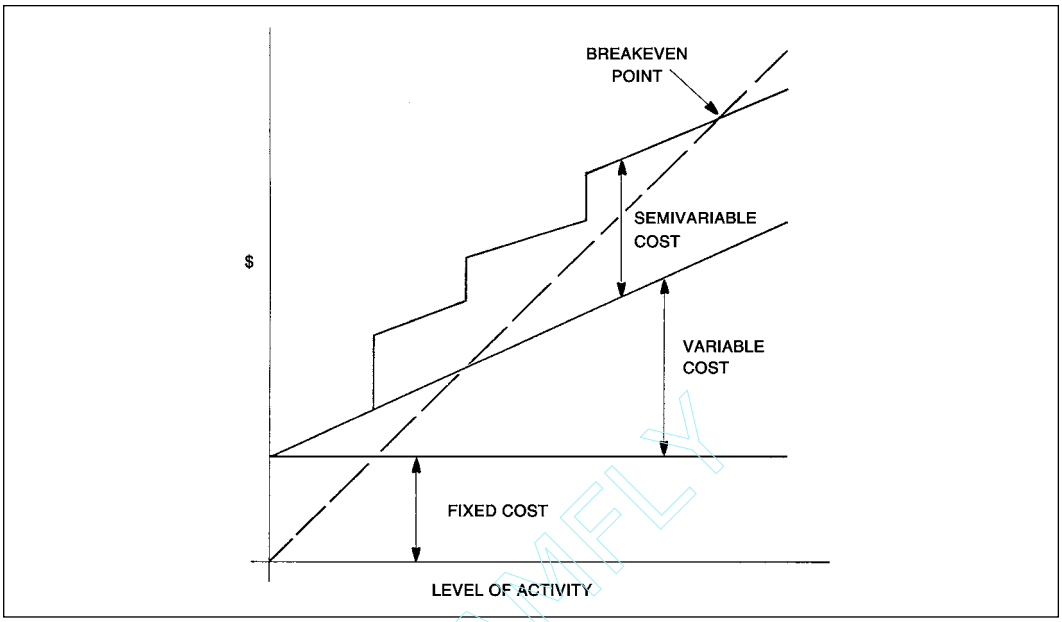
For the purpose of analyzing fixed, variable, and semivariable costs, the executive in charge of budget preparation and administration must steadily maintain accounting and statistical records and make sure that internal control works like a clock, providing the feedback that permits users to decide when to revamp cost standards. He or she must also be concerned with the preparation of fianancial analyses and their comprehensive presentation.

Exhibit 9.4 gives a snapshot of fixed, semivariable, and variable costs entering a budgetary process. The latter two vary by level of activity. Also varying by activity level is projected income. The breakeven point comes when projected income overtakes the cost curve.

After a tentative financial plan has been worked out, its different entries are evaluated, altered if necessary, and accepted by the board as the budget corresponding to the work to be done in a specific time period. The budget should be reviewed regularly to account for the effects of changing conditions, after such conditions have been evaluated properly in terms of their impact on the company's financial plan. For this reason, well-managed firms have learned how to:

- Implement flexible budgeting
- Develop alternative financial plans

Exhibit 9.4 Fixed, Variable, and Semivariable Costs and the Breakeven Point



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Because of requirements underpinning the implementation of flexible budgeting and the development of alternative financial plans, the yearly budget should profit from Monte Carlo simulation. The associated experimentation must make possible a polyvalent analysis under different operating hypotheses. The determination of alternative budgets is most useful in terms of capital allocation decisions as well as in support of return on investment.

- Modeling should be used not only for annual budgeting but also for long-term planning and strategic studies.
- Closely related to the flexible budgeting process is a comparative planning and control model.

In well-managed companies, the yearly budget represents the maximum level of expenditures—not a plus or minus level, which is bad economics. Sound industrial planning and control principles also see to it that the budget constitutes a basis for *plan versus actual* evaluations, which should be focused and steady.

Because financial allocations reflected in the budget are made on the basis of projected business activity, plan versus actual evaluations must consider both outlays and activity levels. It is advisable to have a standard format for plan versus actual presentation. *Budgeted outlays* should appear in the left-most column followed by *actual* expenses. Both *percent deviation* (plus or minus) and absolute figures in dollars must be shown in this comparison:

Plan	Actual	Percent Deviation	Difference in Dollars

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A financial analysis based on *plan* and *actual* figures forms the basis of comparisons entering *performance reporting*. Such comparisons have to be made at regular intervals and in a way that promotes corrective action. Only the plan versus actual evaluations permit the enforcement of the budget in an effective manner and make feasible the analysis of reasons for deviations. Another guiding principle is that a budget is no authorization to spend money. As a financial plan, it provides guidelines but:

- Money spending has to be authorized by specific senior management decisions to this effect.
- Spending excesses have to be sanctioned. Therefore, the sense of *accountability* is very important.

Senior management should determine the tolerances within which planned expenditures have to be registered. Subsequently, for every expense and properly defined timeframe, knowledge engineering artifacts can be used to calculate the manner in which real results diverge from planning. A graphical presentation such as a quality control chart can greatly assist management's sensitivity to deviations.[7]

- *Tolerance limits* can be plotted effectively on a quality control graph in which the cumulative budget statement represents the zero line.
- Day to day, week to week, or month to month, as actual results become known, the *percent deviation is drawn* and immediately brought to attention.

On-line controls permit users systematically to evaluate plan versus actual expenditures as well as pinpoint the origin of differences between projections and obtained results. Annotations can show the reasons for variations. This system permits users to determine in a factual and documented manner the necessary control action.

- As long as values are within tolerance limits, it is assumed that projected aims are on their way to being obtained.
- When an input drops out of tolerance, an audit needs to be made, all the way to personal accountability.

This control process should be complemented by a program that, from one short reporting period to another, finds out the probability that a department or division reaches the year's budget or surpasses it ahead of time. Both planning and control need to be kept in correct perspective. Without this dual action, the organization has no means of supervising the level of expenditures—or, for that matter, the obtained results.

BENEFITS TO BE GAINED THROUGH ADEQUACY OF CASH FIGURES

It is important that management knows at all time how much cash is necessary and how much it actually has on hand. Many of the balance sheet frameworks used by credit institutions and corporate treasuries use this segregation. Cash in banks is more easily verified than cash on hand. Any situation where the amount of cash in bank(s) as shown on the balance sheet is greater or less than the sum actually on deposit calls for an immediate explanation.

On a number of occasions cash on hand is easily misrepresented, particularly in unaudited balance sheets of small companies. If the amount of cash on hand is relatively large, an explanation or investigation should be made, keeping in mind that many discrepancies are the result of deliberate action rather than oversight or accidental error.

Explanations regarding volatility in cash flows are as important as detail in tracking down deviations. The reason for discrepancies between plan and actual in cash inflows and outflows may be fluctuating sales levels, seasonal influences, cyclical level of business activity, and boom-or-bust trends in the economy. Because several of these factors are operating simultaneously, financial management can make serious mistakes in planning cash needs. For instance:

- Seasonal working-capital requirements may not be clearly recognized.
- Management may err in continuing to sell profitable investments to meet calls for working capital.

At the same time it is equally erroneous to assume that all fluctuating working-capital needs are seasonal and therefore fail to recognize cyclical influences and those due to changing levels of economic activity. Problems associated with the cash budget presented earlier had in common the assumption that a certain level of cash would be on hand when needed—but such an assumption was not realistic. Management is responsible for ensuring an adequate amount of cash. As it has already been explained:

- The *cash budget* reflects what has been forecasted as direct and indirect cost outlays.
- The *capital budget* defines the investments *our* company plans to do during the coming financial period.

All concerned parties must know the cash budget well in advance. Only slight differences should exist between the budgetary estimates (at the end of the various reference periods) and the different disbursements. At the end of the year, however, accounts should fully square out.

Credit institutions distinguish between two budgetary chapters:

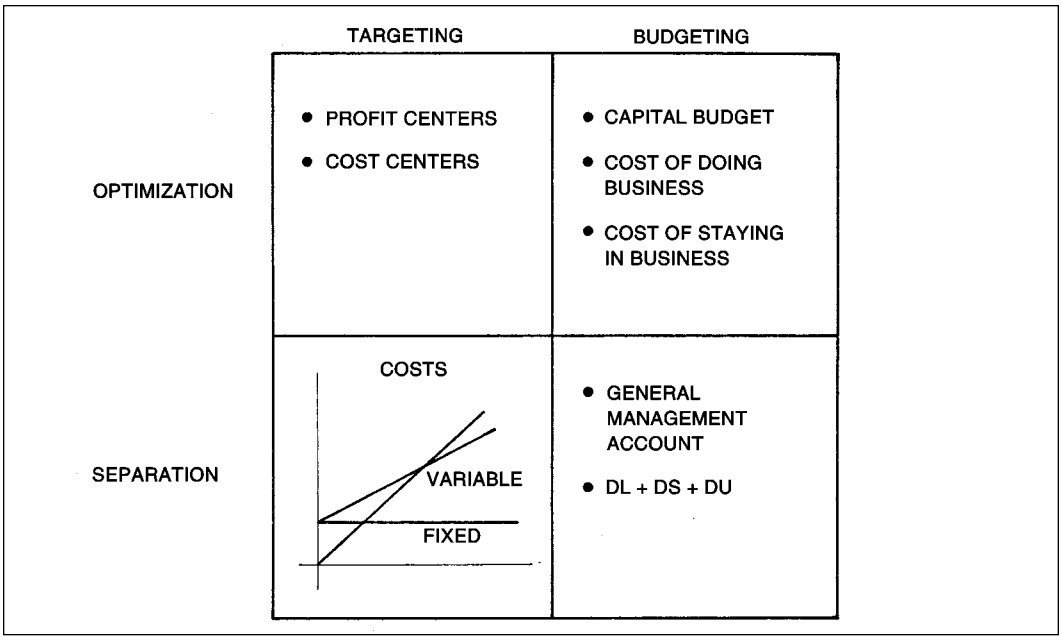
1. The *interest budget*
2. The *noninterest budget*

The interest budget is a cash budget and represents about two-thirds of institutions' annual expenditures. As its name implies, this budget covers the interest paid to depositors as well as to entities such as correspondent banks from which the bank buys money. The noninterest budget addresses all other expenditures.

Good management practice would see to it that the noninterest budget—whose pattern is shown in Exhibit 9.5—focuses on standard costs associated with profit centers and cost centers; covers the overhead as well as direct labor (DL), direct services (DS), and direct utilities (DU); and it includes both cash budget and capital budget chapters. As already stated, the capital budget defines the investments a company plans to make during the coming financial period.

It is possible to forecast such disbursements by estimating projected investments not only over the year but also quarterly, monthly, or weekly over the budgeted period. In general, it is expected that only small differences will exist between budgetary estimates and the different disbursements.

Exhibit 9.5 Noninterest Budget



When only small differences exist, disbursements will tend to equal the budgeted labor, materials, and other costs.

In credit institutions, as in any other industry, the process of budget preparation entails the making of many analytical evaluations and associated decisions with respect to the relationships and functions that should be maintained in the operations of the company, whether it is a financial institution or a manufacturing firm.

- This is as true of direct costs as it is of overhead and of investments. The principle is that only productive items should be budgeted.
- Therefore, budget preparation and administration must steadily maintain not only accounting but also statistical records, to evaluate profitability post-mortem.

Always keep in mind that physical volume—whatever its metrics may be—is not the only variable influencing assets. Price changes cause higher or lower balances in accounts receivable and accounts payable; increases or decreases in inventories and changes in unit prices also impact on cash estimates. I have also mentioned the existence of time lags. Asset levels and financing needs rise in anticipation of increase in sales, but a sales decline does not provide an immediate reduction in money committed to inventories and other chapters.

- An important aspect of cash management is the recognition of cash flows over the life cycle of each product or service.
- A new product or new company typically experiences an initial period of cash flow deficits, which must be financed.

Sometimes, particularly with new ventures, net cash flows are small or negative while the entity completes the necessary preliminary organizational activities that are leading to outlays. Sales result in receivables, but they come with a lag to which is added the collection period. Thus additional time may elapse before positive cash flow takes place.

This is critical to the establishment of financing patterns. The influence of sales on current asset levels must be examined along with fluctuations in sales, product by product. A critical question is whether we are confronted by a decaying or rising long-term trend. Just as important is an evaluation of the consequences of such a pattern.

- Sales increases that can be documented thoroughly should be financed by long-term debt, equity, other liabilities (i.e., accrued taxes and wages), and accounts receivable, which accompany increasing sales.
- Temporary increases in assets can be covered by short-term liabilities. What is dangerous is short-term financing to take care of long-term capital needs.

Leading-edge organizations have a procedure that permits them to synchronize cash inflows and outflows. They also establish a system of internal controls that can be enriched with financial analyses highlighting high performers and low performers among their business units down to the level of a desk and a trader.

If both the financial plans and the accounting system have been established on sound principles, cash flow projections and budget estimates will provide a sound basis for management action, including evaluation of performance. For each department, section, and project, there should be available:

- Projected budget figures
- Cash budget balances
- Authorizations to spend money
- Actual results for the given period

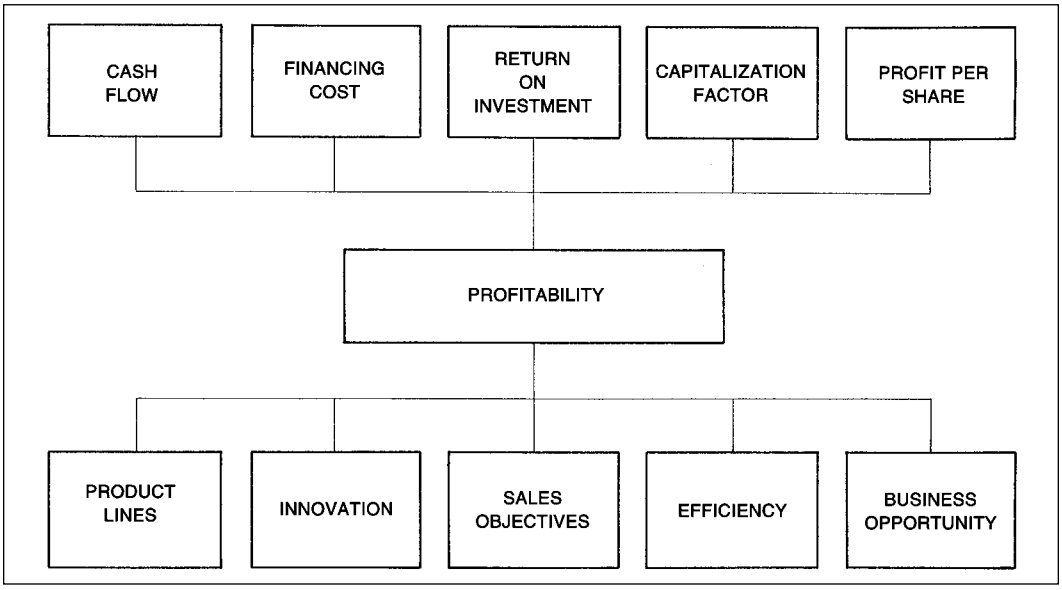
These four sets of figures can form the basis of comparative analysis in *performance reporting*, all the way from cash estimates to expenses and profitability analyses. Exhibit 9.6 shows the component parts of a model I developed some years ago for an industrial company to gauge profitability. Budgetary authorization does not mean the automatic right to spend money. Therefore, comparisons have to be made at both regular and ad hoc intervals. Clearly stated policies serving this purpose of performance evaluation are a must.

CASH FLOW, OPERATING CASH FLOW, AND FREE CASH FLOW

This chapter has referred frequently to cash flow. But which cash flow? There is not one but several types, which must be examined prior to discussing discounted cash flow, intrinsic value, and their use for managerial evaluations and decisions.

Cash flow typically is generated through business transactions. Such transactions are of a cyclical character, which begins with a *cash debit* and ends with a *cash credit*. Such debits and credits

Exhibit 9.6 Components of Profitability



create the basis of a company's cash flow and its computation.

- Productive resources are acquired by bargaining transactions.
- They are used to create products that are sold to the market through other transactions.

Within this cyclical perspective of financing, production, and sales, *cash flow* in its simplest form is *net income* plus items such as depreciation. Net income is both the bottom line and the starting point when figuring out a company's cash flow.

Cash Flow = Net Income + Depreciation + Depletion + Amortization + Deferred Taxes

Through *depreciation* we write down the cost of an asset, such as factory or machine tool, over its useful life. This charge is made for shareholders and tax reporting reasons; it is a bookkeeping charge that does not require cash outlays.

The fact that, in current industrial accounting practice, depreciation costs are subtracted from net income is one of the reasons why many companies are experiencing depressed profits. But this fact also means that much of the cash that would otherwise be visible is hidden from view. The algorithm is as follows: A company that depreciates $100 million, shows net earnings of another $100 million, and pays no dividend actually has generated a cash flow of $200 million—twice its earnings.

The concept of *depletion* is the write-off when the asset being used is a natural resource, such as oil, gas, coal, or minerals. *Amortization* is also a write-down done on specific terms concerning certain resources or intangible assets.

Acquisitive companies often have an entry on the books called *goodwill*, the difference between

what they paid for a firm and the lower book value. Goodwill is amortized over a long period, usually 40 years, and requires no cash outlay. Based on this definition of cash flow, the algorithm for *net cash flow yield* is:

Net Cash Flow Yield = Cash Flow + Interest Expense

Interest expense is added back to the simple cash flow to get the broadest possible measure. In case of takeovers, *income tax expense* is added because it will not have to be paid after the new owner adds so much debt that there is no book profit and hence no tax due. One of the better examples comes from the early 1950s when Kaiser Motors, which was deeply in the red, got a loan from Bank of America. It bought profit-making Willis-Overland (the maker of Jeep), recovered the taxes Willis had paid, and with this money repaid the loan to Bank of America. Willis-Overland operations remained as a net gain.

Because income taxes often distort a company's cash flow pattern, analysts do not necessarily consider simple cash flow a particularly useful figure all by itself. What is important is *operating cash flow* (OCF). Investing in companies based on their price-to-OCF multiples has been one of the best strategies, which can be significantly assisted through analytics.

OCF = Operating Cash Flow = Cash Flow + Interest Expense + Income Tax Expense

Another money indicator to watch is *free cash flow* (FCF); it tells how much cash is uncommitted and available for other uses. Its computation takes cash flow as a basis and adjusts certain balance sheet items, subtracting current debt and capital expenditures.

FCF = Free Cash Flow = Cash Flow + Capital Expenditures - Dividends

To calculate the free cash flow, those capital expenditures are subtracted that are necessary to maintain plant equipment and keep the company competitive, but no optional ones. A similar logic is applied to dividends. While operating cash flow is the broadest measure of a company's funds, some prefer to zero in on the narrower free cash flow, because it measures truly discretionary funds (i.e., company money that an owner could manage at his or her discretion).

- Free cash flow can be used to boost dividends, buy back shares, pay back shares, or pay down debt.
- In terms of acquisitions, companies with free cash flow are those particularly sought after.
- Some businesses that look pricey based on earnings may be bargains when measured by the yardstick of free cash flow.

Many companies estimate their operating cash flow in a way matching their commitments. Some compare this exercise to *resource leveling*, a process of modifying the schedule of their activities in order to reduce any peaks in financial requirements that cannot be matched through cash flow. Such peaks typically are calculated during resource aggregation.

One of the principles of good management is that no one can lose sight of cash flow estimates or of *resource allocation* and prosper. Resource-leveling schedules have been applied in project management. Either of two leveling algorithms is often used:

1. Resource-limited leveling
2. Time-limited leveling

In resource-limited leveling the known capacity, or availability level, of each resource is never to be exceeded by the schedule. Activities are delayed in the resource-limited schedule until the means needed are available. Particular attention is paid to not exceeding the available level.

In time-limited leveling, activities are delayed only if they have float and only if the completion date of the project is not affected. Time-limited leveling will reduce the peaks in the financial resource profiles but it is not guaranteed to reduce the peaks to a level of the known capacities of the resources.

Cash flow is a very useful metric in financial management. However, it is important to recognize that there also are disadvantages in holding excessive cash: The company ties up funds unnecessarily and it reduces the return on its assets. Moreover, if a company is financing temporary needs from permanent sources, it may have idle cash for long periods. Even if the company uses excess funds by investing them in marketable securities, it is not likely to earn as high a rate of return from temporary investments as it pays for permanent funds.

EARNINGS, CASH FLOW, AND PRICE-TO-EARNINGS GROWTH

Earnings per share (EPS) has been classically used as metrics for stock valuation. More recent value-added metrics are *EPS change* (year-to year) and *consensus EPS*. Earnings per share and its improvements are calculated not only on an annual basis but also quarterly, based on the company's financial reporting, or at shorter intervals as information becomes available.

Growth companies typically pay no dividends. Therefore, two other metrics—*dividend rate* and *dividend yield*—are not important to them, although they are used with old-economy companies. Since the majority of entities have a cash flow, the two metrics applicable in this connection are:

1. Cash flow/share
2. Price/cash flow

As an example, in 2000 Microsoft's cash flow/share was $1.90. Financial analysts estimated this ratio at $2.20 in 2001 and $2.38 in 2002. Microsoft's price/cash flow was 31.3x in 2000, with the estimate being 27.1x in 2001 and 25.0x in 2002. Notice that these two metrics are complementary. Their product gives the price per share.

Cash flow per share and price/cash flow complement one another. The same is true about EPS and the other classic measure for stock valuation: price to earnings (P/E). This has been used as a metric for both the shorter-term and the longer-term prospects of a company, but it is no more satisfactory. When in the 1997 to 2000 timeframe analysts used P/E, they found that more or less:

- Old economy industrials traded at 10x to 15x.
- New industrials such as established large-cap tech stocks traded at 30x to 50x.
- Go-go industrials (recently public) traded practically at infinity, since they had no earnings.

Shortly before the year 2000 meltdown of the technology, media, and telecommunications (TMT) sector, some financial analysts believed that the best growth-*and*-value investments were found among the new industrials. It was said that the corrective stage for the go-go industrials would be quite damaging to them. It happened that way.

As these pages are written, the shakedown of TMT continues. But just as the broad market crash of October 1987 did not signal the end of that decade's bull market, a major correction among the go-go industrials would likely not mark the end of the bull market in the first few years of the twenty-first century. The macroeconomic fundamentals for equity investing remain relatively good:

- A federal budget surplus
- Low inflation
- Demographically driven shift into equities

Consistent profit growth, the other pillar of a bull market, is wanting. This situation, however, is a known event. Lessons should be learned from the fate of what were in the past the new industrials, such as the railroad boom, bust, and new take-off of the 1800s and in 1901. The railroad boom was punctuated by several sharp downturns, including a near depression in the early to mid-1890s. But, after each wave of consolidation and bankruptcies, strong railroad growth resumed, and the railroad millionaires, like the steel millionaires after them, benefited humanity through their entrepreneurial activities and their philanthropy.

A slowdown in railroad construction helped trigger the panic in 1873, followed by an economic contraction that lasted until 1879. And that was not all. The failure of railroads in 1893 led to another financial panic that was followed by a near depression and widespread layoffs in the 1890s. But eventually both the railroads and, most particularly, the steel industry prospered.

The automobile industry of the 1920s provides another revealing historical precedent. Like the computer, communications, and software sectors today, autos were *the* technologically innovative industry of their time. The industry was so important in its heyday that its ups and downs produced booms and busts in the larger U.S. economy. Like the boom of the 1990s was promoted by TMT and the Internet economy, the boom of the 1920s was largely propelled by a tripling of automobile sales. Many economists think the depression of 1929 to 1933 was precipitated in part by a plunge in car buying, but:

- The auto market rebounded in the 1930s.
- The motor vehicle industry dominated the post–World War II economy.
- Auto-industry millionaires became among the better-known philanthropists.

The story these precedents tell is that while a major market correction by no means leads to the end of a new technology revolution—in the present case, the wave of change in information and communications industry—it brings to the fore the need for better metrics—for instance, better than just the P/E. While price to earnings will still be used, it should be joined by two other metrics:

1. Discounted cash flow, for a more accurate valuation
2. Projected price-to-earnings growth (PEG), as a shortcut measurement

The PEG is future-oriented and it permits a look at the relationship between the price/earnings ratio and the earnings growth rate. Take company X as an example, and say that averaging its expected earnings growth rate for the next two years gives a growth rate of 25 percent.

Assuming that X is a high-tech company, and its projected P/E ratio for next year's earnings is around 100, the resulting PEG is equal to 100/25 = 4. It is quite high, which is not a good sign. Notice, however, that because projected price-to-earnings growth is a new metric, ways and means for gauging its valuation are still in the making.

- The rule of thumb is that PEG above 2 means that the equity is expensive.
- Company X has the potential to lose 50 percent or more of its capitalization, if market sentiment changes to the negative side.

The analytical models used are not set in stone. Typically, these are a cross between convenient quantitative expressions and a way of measuring the sensitivity of financial factors to market twists. They enable individuals to do valuations that otherwise would not have been possible, but they are by no means fail-safe or foolproof.

APPLYING THE METHOD OF INTRINSIC VALUE

Intrinsic value is a term Warren E. Buffett has used extensively. He considers it to be an important concept that offers the only logical approach to evaluating the relative attractiveness of investments.[8] Because it is based on discounted cash flow, intrinsic value can be used in connection to several banking products and services. By definition:

- Intrinsic value is the discounted value of cash that can be taken out of a business during its remaining life.
- It is an estimate rather than an exact figure, and it must be changed along with interest rate volatility and/or the revision of cash flows.

In the *discounted cash flow* method, the fair value of a share is assumed to be equal to all future cash flows from the company, discounted at a rate sufficient to compensate for holding the stock in an investor's portfolio. The problem is not that discounted cash flow is more complex than PEG (which it is) but, rather, that this approach to share valuation suffers from two flaws:

1. The end result is highly sensitive to the discount rate one chooses.
2. Any forecast of cash flow for more than two years ahead is a guess.

In principle, with discounted cash flows analysts only need to apply a discount rate of "x" percent. This is equivalent to the credit risk-free Treasury yield of "y" percent, plus a risk premium of "z" basis points to justify current credit rating of the entity we examine. If y = 6 percent and z = 1 percent (100 basis points), then:

$$x = y + z = 7\%$$

The trouble is that these assumptions do not leave much margin for error. An earnings growth rate of 30 percent, like that which characterized personal computer companies in 1996 to 1998 and some telecoms the next couple of years, may be 10 times the likely annual increase in the gross domestic product over the next five years. Very few larger companies have achieved such a rate over a sustained period.

Furthermore, an analysis of this type applies only to companies that are actually making a profit. Many high-tech and most particularly Internet-related firms have no profits to show. Consider Amazon, the larger of the dot-coms, as an example. When stock market euphoria is widespread, investors ignore the absence of profits, accepting the idea that it is more important for management to spend money to establish market share and brand name.

But this is no longer true in nervous markets and lean years, when investors want evidence that profits will be made at least in the foreseeable future. In spite of this shortcoming, discounted cash flow, or *intrinsic value*, is a good metric, particularly when applied to stable, old economy companies with healthy cash flows —companies that sometimes have been characterized as *cash cows*.

Used as an evaluator, the concept of intrinsic value can be applied to a client's portfolio and to the bank's own. From this can be calculated a fee structure, because it is possible to demonstrate to the client how much the intrinsic value of his or her portfolio has grown. One participant in a study I did on intrinsic value emphasized that he often used this metric because a successful banker must have a more informed method of setting prices than imitating what his competitors do.

Mathematically, it is not difficult to apply the intrinsic value. It consists of the cash flow's discounted value that can be taken out of a company during its remaining life, or during a predetermined time period—for instance, 10 years comparable to 10-year Treasury bonds. But there are two problems with this method. First, this estimate must be updated when interest rates change or when forecasts of future cash flows are revised. Second, the calculation of intrinsic value presupposes that the analyst knows very well the industry under examination and understands what makes the market tick in connection to its products, services, and valuation at large. This is the reason why Warren Buffett has so often said that he is not interested in technology because he does not understand that market.

Compared to intrinsic value, *book value* is a much easier but less meaningful computation. Although it is widespread, many analysts consider that it is of limited use. Book value in connection to a portfolio can be meaningful *if* its contents are carried in the book at current market value (fair value) rather than accruals. A rule of thumb is that:

- Intrinsic value can be significantly greater than current value if the business is able to generate a healthy cash flow.
- It is less than current value if the opposite is true.

To explain intrinsic value, Warren Buffett uses the case of college education. A simple algorithm would ignore the noneconomic benefits of education, concentrating instead on *financial value*. Consider the cost of college education as book value. Include in this fees, books, living expenses, and current earnings—as if the student were employed rather than continuing his or her studies.

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- Estimate the earnings the person would receive after graduation, over a lifetime—say for 45 productive years.
- Subtract from this the earnings that would have been received without a diploma, over the same timeframe.
- The resulting excess earnings must be discounted at an appropriate interest rate, say 7 percent, back to graduation day.

The result in money represents the intrinsic economic value of education. If this intrinsic value of education is negative, then the person did not get his or her money's worth. If the intrinsic value is positive above book value, then the capital invested in education was well employed. Notice, however, that noneconomic benefits were left out of the computational algorithm. Yet in connection with education, cultural aftermath and quality of life are too important to be ignored.

NOTES

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4. D. N. Chorafas, *Statistical Processes and Reliability Engineering* (Princeton, NJ: D. Van Nostrand Co., 1960).
5. *Business Week*, February 19, 2001.
6. See D. N. Chorafas, *Managing Derivatives Risk* (Burr Ridge, IL: Irwin Professional Publishing, 1996).
7. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley, 2000).
8. *An Owner's Manual* (Omaha, NE: Berkshire Hathaway, 1996).

CHAPTER 10

Cash on Hand, Other Assets, and Outstanding Liabilities

Cash is raw material for banks, and they get into crises when they run out of it. Take as an example the blunder the U.S. government made in the 1970s with the savings and loan industry. The S&Ls were restricted to investing in long-term assets, such as mortgages, while paying volatile market rates on shorter-term deposits. Then came a partial phased-in deregulation of the S&Ls. When the S&Ls were confronted by record interest rates of the early 1980s, the industry was turned on its head.

To avoid a shortage of liquidity, the financial industry as a whole, and each bank individually, must time cash flows for each type of asset and liability by assessing the pattern of cash inflows and outflows. Estimating the intrinsic value might help in this exercise. Probability of cash flows, their size, and their timing, including bought money, are an integral part of the construction of the maturity ladder. For each funding source, management has to decide whether the liability would be:

- Rolled over
- Repaid in full at maturity
- Gradually run off over the coming month(s)

Within each time bracket corresponding to each cash outflow should be the source of cash inflow, its likelihood, cost, and attached conditions. An analysis based on fuzzy engineering can be of significant assistance.[1] Money market rates can be nicely estimated within a certain margin of error. Experimentation on the volatility of these rates should be a daily event, based on the excellent example of the policy practiced by the Office of Thrift Supervision (see Chapter 12).

Well-managed financial institutions work along this line of reference, and they are eager to exploit their historical experience of the pattern of cash flows along with their knowledge of changing market conditions. Doing so helps to guide the bank's decisions, both in normal times and in crises.

- Some uncertainty is inevitable in choosing between possible cash inflow and outflow behavior patterns.
- Uncertainty suggests a conservative approach that assigns later dates to cash inflows and earlier dates to cash outflows, and also accounts for a margin of error.

Using prevailing money market rates and timing cash inflows and outflows, we can construct a *going-concern* maturity ladder. We can enrich this construction by experience acquired in the market in terms of contractual cash flows, maturity loans rolled over in the normal course of business, CDs, savings and current account deposits that can be rolled over or easily replaced, and so on.

Stress testing would permit experiments on a *bank-specific crisis*. For instance, for some reason particular to its operations, an institution may be unable to roll over or replace many or most of its liabilities. In this case we would have to wind down the books to some degree, commensurate with prudential safety margins. The crux of effective cash management is in synchronizing the rate of inflow of cash receipts with the rate of outflow of cash disbursements.

In this connection, the cash budget is the planning instrument with which to analyze a cash flow problem. The analytical management of cash serves the goal of having the optimum amount of short-term assets available to face liabilities. The exercise is more successful if it accounts for both normal conditions and outliers.

Wishful thinking should be no part of a cash management study. Management may believe that its ability to control the level and timing of future cash is not in doubt. But in a general market crisis, this situation changes most significantly because of institutions that are unwilling or unable to make cash purchases of less liquid assets. Conversely, a credit institution with a high reputation in the market might benefit from a flight to quality as potential depositors seek out a safer home for their funds.

HANDLING CASH FLOWS AND ANALYZING THE LIQUIDITY OF ASSETS

One of the problems with the definition of cash flows and their handling is that they tend to mean different things to different people. That much has been stated in Chapter 9. In banking, cash flows characteristic of a holding company can be entirely different from those of the credit institution itself—a fact that is not always appreciated.

This sort of problem was not in the front line of financial analysis during and after the massive creation of banking holding companies in the early 1970s. It was kept in the background because it was masked by issues connected to fully consolidated statements at holding company level and by the belief that growth would take care of worries about cash flows by individual unit or at holding company level. The cases of Drexel, Burnham, Lambert, and many others shows that this is not true.

Cash available at bank holding companies and their profitable subsidiaries must do more work than service leveraged debt and pay for dividends to shareholders. Rigorous scheduling algorithms are necessary by banks, bank-related firms, and other companies to cover operating losses of the parent and assist in funding new affiliates.

Money flows from subsidiaries to the holding company should perform several jobs even though these dividends often are limited. Therefore, the analysis of consolidated earnings power is the cornerstone of effective parent company evaluation. This process is essential to a significant number of stakeholders:

- Senior managers
- Shareholders
- Lenders
- Large depositors

- Regulators
- The economy as a whole

Cash inflow/outflow analysis and other liquidity management techniques are vital for their influence on assumptions used in constructing a financial plan able to enhance the liquidity of a credit institution or any other entity. Senior management must review liquidity accounts frequently to:

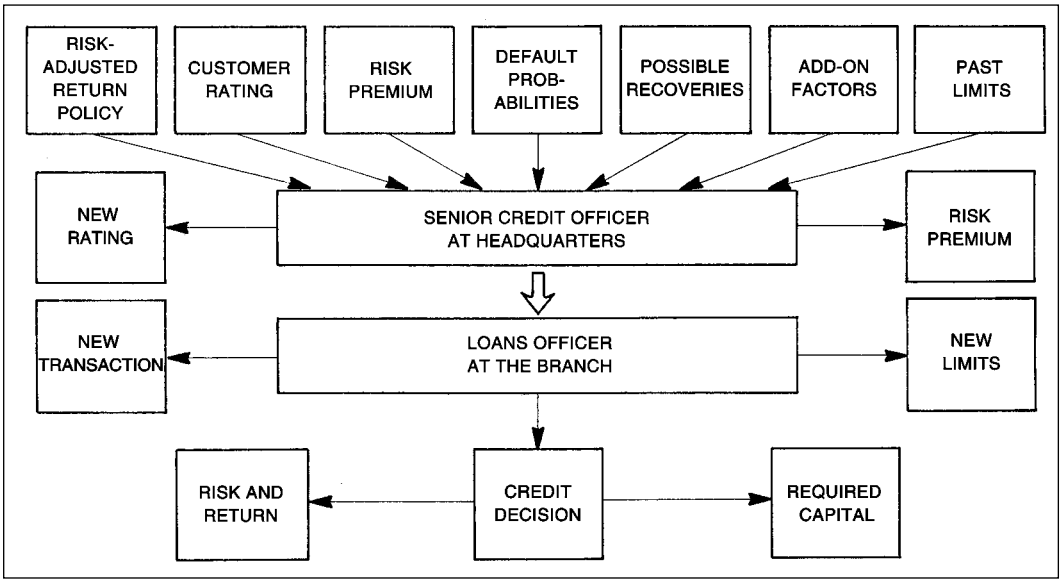
- Position the firm against liability holders
- Maintain diversification of liabilities' amounts and timing
- Be ahead of the curve in asset sales, when such disinvestments become necessary

Setting limits to the level of liabilities one is willing to assume within each time bracket is a good way to ensure effective liabilities management. This is not a common practice. The few institutions that follow it emulate, to a significant extent, the practice of limits with loans that is explained in Exhibit 10.1.

Building strong relationships with major money market players and other providers constitutes a sound line of defense in liquidities. Regular reviews and simulations provide an indication of the firm's strength in liabilities management. Experimentation definitely should cover at least a one-year period, including cash inflows and outflows during this time period, plus other income. Cash flow and other assets that can be converted into cash without a fire sale are two critical subjects that are closely related, and they should be analyzed in conjunction with one another.

Cash inflows and the servicing of liabilities correlate. To check for adequate diversification of liabilities, a bank needs to examine the level of reliance on individual funding sources. This, too, should be subject to analysis and it should be done by:

Exhibit 10.1 Web of Inputs and Outputs Characterizes the Dynamic Setting of Limits



- Instrument type
- Nature of the provider of funds
- Geographic distribution of the market

The examination of markets and business partners for possible asset sales should follow similar guidelines. Senior management also must explore arrangements under which the bank can borrow against assets. This reference underlines the wisdom of including loan sale clauses in loans being made, since such inclusions enhance a bank's ability to securitize or outright sell loans if the need arises.

Due to these considerations, the board must establish a policy obliging the bank's management to make factual assumptions about future stock(s) of assets, including their potential marketability, their use as collateral, and their employment as means for increasing cash inflows. Determining the level of *potential assets* is not easy, but it can be done. It involves answering questions such as:

- What is the expected level of new loan requests that will be *accepted*?
- What proportion of maturing assets will the bank be able and willing to *roll over* or renew?

The treasury department must study the expected level of draw-downs of commitments to lend that a bank will need to fund in the future, adding to the projected market demand and the likelihood of exceptional requests resulting from relationship management. Such study should follow the framework of committed commercial lines without *materially adverse change clauses*, for future deals the bank may not be legally able to turn away even if the borrower's financial condition has deteriorated. Beyond this, stress tests should consider likely materially adverse changes and their aftermath.

On the heels of this basic homework comes the job of timing the two-way *cash flows*. In this connection, heuristics are more helpful than algorithmic solutions because a great deal of assumptions underlie the calculation of discounted cash flows. (See Chapter 9.) Management can model best the occurrence of cash flows through the use of fuzzy engineering, albeit in an approximate way.[2]

Equally important is the study of phase shifts in the timing of cash inflows and outflows. Chapter 9 explained through practical examples how several industries suffer from lack of liquid assets as well as the fact receipts and expenditures never exactly correspond with one another. For instance:

- Commitments regarding capital investments are made at the beginning of the year.
- Operating flows (revenues and expenses) occur throughout the year.

A rigorous analysis of cash flows and of the likely use of other liquid assets requires the study of their characteristic pattern through a statistically valid time sample, with operating cash flow defined as the most important measure of a company's ability to service its debt and its other obligations, without any crisis scenarios.

This is current practice, except that time samples are rarely valid in a statistical sense. In estimating their normal funding needs, banks use historical patterns of rollovers, draw-downs, and new requests for loans. They conduct an analysis, accounting for seasonal and other effects believed to determine loan demand by class of loans and type of counterparty. Deterministic models, however, do not offer a realistic picture. Fuzzy engineering is better suited for judgmental projections and individual customer-level assessments. Particularly important is to:

- Establish confidence intervals in the pattern of new loan requests that represent potential cash drains.
- Determine the *marketability of assets*, segregating them by their level of relative liquidity.

Degree by degree, the most liquid category includes cash, securities, and interbank loans. These assets have in common the fact that, under normal conditions, they may be immediately convertible into cash at prevailing market values, either by outright sale or by means of sale and repurchase.

In the next, less liquid class are interbank loans and some securities, which may lose liquidity in a general crisis. These are followed at a still lower degree of liquidity by the bank's salable loan portfolio. The challenge lies in establishing levels of confidence associated to the assumptions made about a reasonable schedule for the disposal of assets.

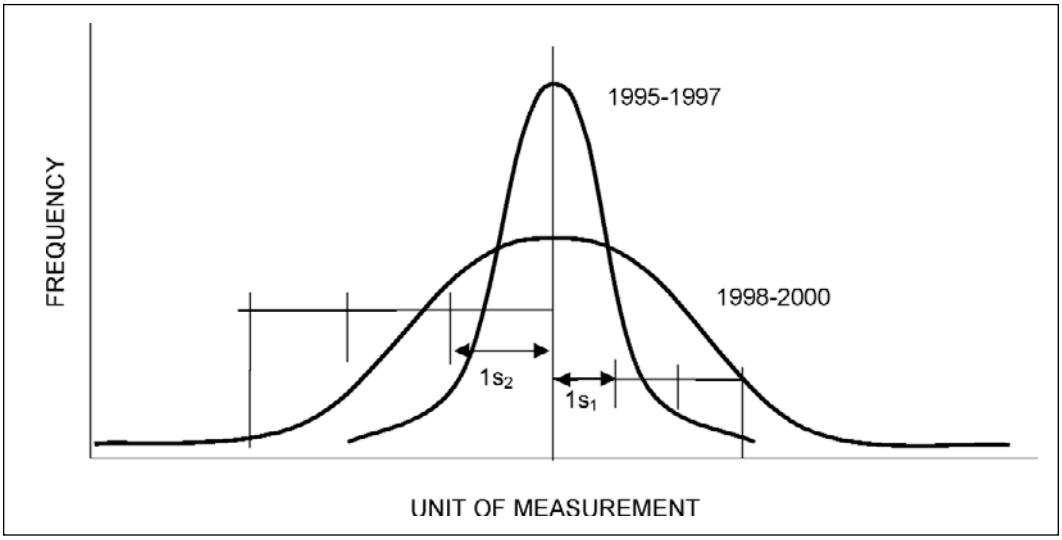
Liquidity analysis must be even more rigorous with the least liquid category, which includes essentially unmarketable assets, such as bank premises and investments in subsidiaries, severely damaged credits, and the like. No classification process is good for everyone and for every category of assets. Different banks might assign the same asset to different classes because of differences in their evaluation and other internal reasons.

Not only is the classification of assets in terms of their liquidity not an exact science, but changing financial conditions may force a reclassification. For instance, this is the case with a significant change in market volatility. Exhibit 10.2 shows the significant change in market volatility characterizing two consecutive three-year periods: 1995 to 1997 and 1998 to 2000. From the first to the second three-year period, the standard deviation nearly doubled.

ART OF ESTIMATING CASH FLOWS FROM LIABILITIES

During the last few years, the attempt to estimate cash flows from liabilities has led to some fertile but fragile ideas. Many people doing this sort of evaluation jump into things that they do not

Exhibit 10.2 Market Volatility Has Increased Significantly from One Timeframe to the Next



quite understand because they try to bring into liability analysis tools that are essentially assets-oriented.

At least in theory, it is not that difficult to focus on an analysis of liabilities as disposal items for cash reasons or for downsizing the balance sheet. To project the likelihood of cash flows arising from liabilities, we should first examine their behavior under normal business conditions, including rollovers of current account deposits and other cash sources such as savings, time deposits, certificates of deposit, and money market money. Both the effective maturity of all types of deposits and the projected growth in new deposits should be evaluated.

Financial institutions pursue different techniques to establish effective maturities of their liabilities. A frequently used tool is historical patterns of deposits, including statistical analysis that takes into account interest-rate sensitivities, promotional campaigns, new branches, seasonal factors, and other factors permitting assessment of the depositors' behavior.

Both normal conditions and a variety of crisis scenarios should be considered in examining cash flows arising from the bank's liabilities. Under normal and well-defined crisis conditions, important counterparties should be classified on a client-by-client basis; others should be grouped in homogeneous classes to be tested statistically. It is wise to differentiate between:

- Sources of funding most likely to stay with the bank under ordinary circumstances
- Sources of funding likely to run off gradually if no new conditions are provided, and/or new products
- Those sources of funding that are very sensitive to deposit pricing
- Those expected to run off at the first sign of trouble
- Those retaining a withdrawal option they are likely to exercise
- Core of funding that will remain even in a crisis scenario

Several other classes may be projected for sources of funding depending on the institution and its practices. Both historical and more recent cash flow developments should be taken into account. Spikes in outflow are important, and so are the bank's capital and term liabilities not maturing within the timeframe of a given liquidity analysis. The latter provide a useful liquidity buffer.

A graphical presentation can be very helpful, starting with core deposits, which generally stay with the bank. These deposits typically belong to individual clients and small business depositors who rely on guaranteed deposits by the Federal Deposit Insurance Corporation (FDIC), the $100,000 public-sector safety net, to shield them from loss. Other core deposits stay because their owners are weary of the cost of switching banks, or they may have associated with their account automatic payment services (transactions accounts), and so on.

It is quite important to be able to identify beyond the $100,000 liabilities likely to stay with the bank. These funds serve as a buffer if there is a period of certain difficulties or a run-off because of a crisis. Equally important is to evaluate types of interbank and government funding that remain with the bank during difficult periods, even if interbank deposits often are viewed as volatile.

A critical element in these studies is the institution's own liability rollover experience as well as case studies on the experiences of troubled banks. Statistics relevant to these events help in developing by timeframe a pattern for cash inflows and outflows that may be valuable for management control reasons. Different scenarios should be developed:

- Adopting with each scenario a conservative policy.
- Assuming that remaining liabilities are repaid at the earliest possible maturity.
- Accounting for the fact that money usually flows to government securities as a safe haven.

As with the case of estimating asset cash flows, simulation and experimentation are very important with liability cash flows. Design elements such as diversification and relationship banking should be accounted for in evaluating the extent of liability run-off and the bank's ability to replace funds. In connection to these scenarios, the treasury department must preestablish credit lines that it can draw down to offset projected cash outflows. The principle is that:

- The diversity of financial obligation to be faced through the company's cash flows requires very careful study and analysis.
- Both simulation and knowledge engineering can be of significant assistance to the institution's professionals and senior management.

Working parametrically, an expert system might deduce from past practice that management typically discounts cash inflows and outflows back to the middle of the year, using this measure, by default, to specify the *present value date*. The expert system then will experiment on the results of discounting at different timeframes, evaluating obtained results and interpreting their significance.[3] Both short-term and long-term interest rates associated with cash inflows and outflows should be analyzed carefully and compared to interest rates charged for loans and investments. The difference in interest rates is a major component of the profit figures of the bank. Different categories of cash inflows and outflows should be considered, each with its corresponding interest rate as shown in Exhibit 10.3.

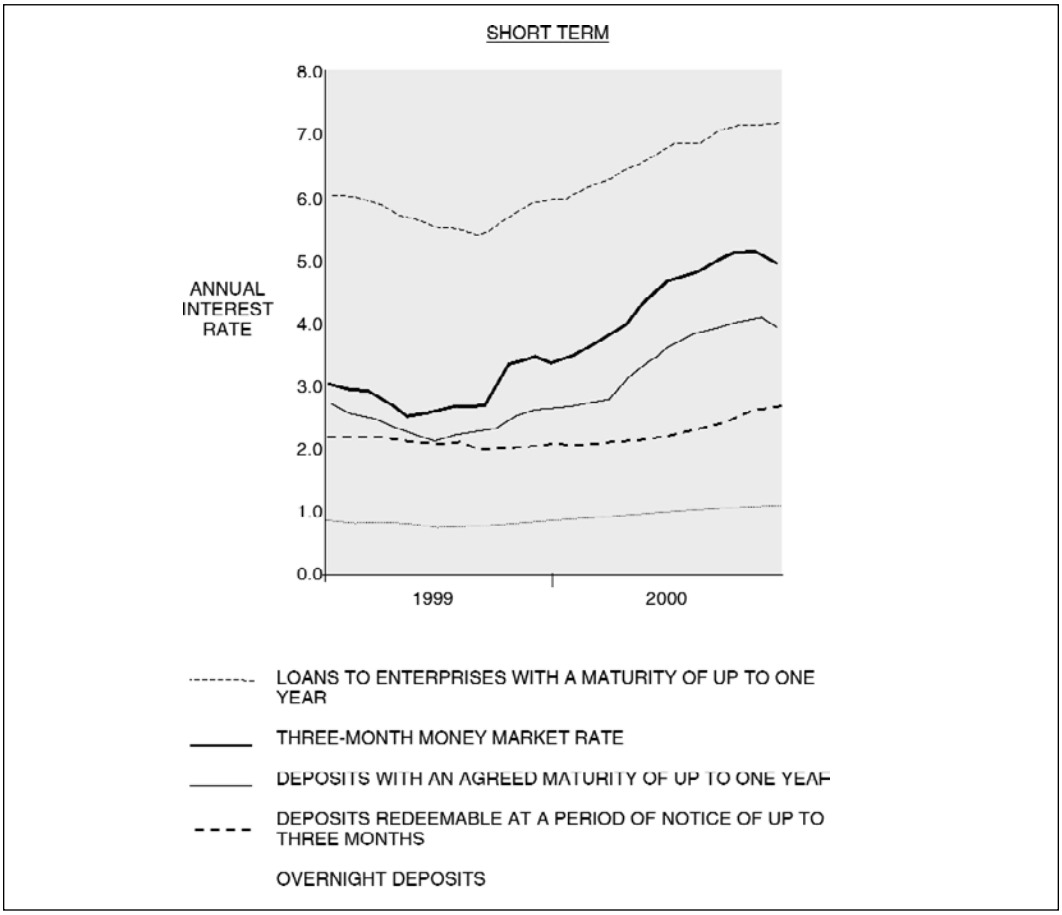
Another module of the expert system may optimize commitments in function of interest rates and interest rate forecasts. For instance, by missing the database knowledge, the artifact would reveal that, starting in the 1980s, inflationary booms have been quickly dampened by rising interest rates, with market forces keeping the economy from overheating.[1]

- In the global credit markets, bondholders pushed yields up rapidly when they perceived an inflation threat.
- Such preemptive interest-rate strikes reduced the chances that inflation would become a serious problem in the immediate future.

Today, booms and busts are not necessarily engineered by the monetary authorities but by market response. This is one of the reasons why some reserve banks, such as the German Bundesbank, look at cash flow as a means for controlling undue exposure with derivatives. Leading-edge banks with a premier system for risk management are taking a similar approach.

Off–balance sheet activities must be examined in connection with the potential for substantial cash flows other than from loan commitments, even if such cash flows have not always been part of the bank's liquidity analysis. Because, as already noted, a characteristic of derivatives is that, according to an item's market value, the same item moves from assets to liabilities and vice versa, such experimentation must be made often, with the assistance of expert systems.

Exhibit 10.3 Two Years of Statistics on Euro Short-Term Loans and Deposits, by the European Central Bank



Potential sources of cash outflows associated with derivatives include swaps, written over-the-counter options, and futures and forwards, including both interest-rate and foreign exchange rate contracts. If a bank has a large swap book, for example, then it should definitely examine circumstances under which it could become a net payer, and whether the payout is likely to be significant or not.

A similar statement is valid in regard to contingent liabilities, such as letters of credit and financial guarantees. These liabilities represent potentially significant cash drains and usually are not dependent on the bank's financial condition at any given moment in time. A credit institution may ascertain a normal level of cash outflows on an ongoing concern basis, then estimate a likely increase in these flows during periods of stress.

Repurchase agreements, too, could result in an unforeseen cash drain if the hedges made cannot be liquidated quickly to generate cash or if they prove to be insufficient. It is also important to account for the likelihood of excess funds being needed beyond normal liquidity requirements arising from daily business activities. For instance, excess funds might be required for clearing services to correspondent banks that generate cash inflows and outflows which are not easily predictable, or other fluctuations in cash volumes that are difficult to foresee.

CHANGES IN LOANS POLICIES AND THEIR AFTERMATH

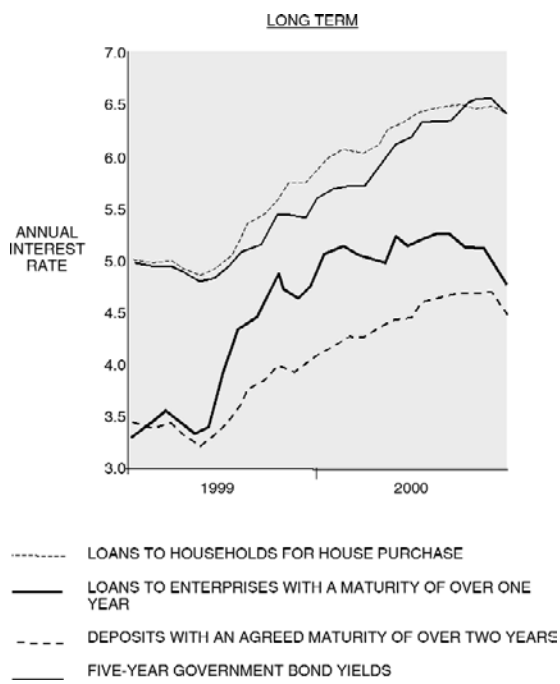
It is not so easy to predict how quickly things may go bad under the influence of two or more heavyweight factors that impact on intermediation and/or the state of the economy. For many industrial companies, a big change in loans policy comes when they first forgo traditional bank loans in favor of tapping the capital markets. Embracing of new techniques for financing can lead to a chain of events that impacts on the management of the enterprise.

- A bond issue tends to encourage management to produce better accounts and seek credit rating.
- Bond issues also lead to a closer focus on costs at large and particularly on cost of capital.

Intermediation by banks in lending to commercial and industrial companies has been rooted in the use of deposits for funding loans, and it involves specific procedures regarding credit assessment and monitoring. These procedures change not only because of competition by capital markets and ratings by independent public companies, but also because the credit institutions' depository functions have been reduced. The public now favors higher yield with liquid securitized assets.

The rapid growth of money market instruments took place in the period from 1989 to 1993, as shown in Exhibit 10.4. While this development has continued throughout the rest of the 1990s, during these formative years different segments of the money market found no parallel in economic history, establishing a pattern that characterizes the market to this day.

Exhibit 10.4 Two Years of Statistics on Euro Long-Term Loans and Deposits, by the European Central Bank



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The change that took place in money market instruments which substituted for deposits had a major impact on what used to be the exclusive domain of bank intermediation. This change pressured the boardroom for reforms and for changes in accounting standards. For instance, the foreign economies tapping the U.S. capital markets had as a prerequisite their compliance with SEC financial reporting rules and adopting a dual basis of both the home country's norms and U.S. GAAP standards.[4]

In other countries, the shift from bank lending to financing through the capital markets is still evolving. According to some estimates, in continental Europe about two-thirds of debt is still with banks. This compares with 50 percent in the United Kingdom and less than that in the United States.

Experts also believe that the desire to acquire a credit rating from independent agencies leads to interesting organizational changes, because independent rating agencies are likely to pose questions about corporate governance to which companies were not accustomed. Although it is not their job to prescribe how the company is run, rating agencies are interested in knowing management's objectives, intent, and unwritten policies.[5] In the past, certified public accountants have not asked such questions.

The desire for a credit rating leads firms to need to reveal more details regarding their finances than is otherwise the case. Once companies have both debt and equity in the capital market, questions arise about using both of them efficiently. Active investors are liable to start pressing companies to strike the right balance, by focusing not only on rates of return for capital invested but also on the security of their investment. Increased shareholder pressure is also a strong incentive for companies to choose debt over equity when raising funds, lending to leveraging.

Companies seek a rating by an independent agency because an integral part of the strategy of more and more firms is to make sure they have the financing for the future in an environment of increasing globalization and fierce competition. European Union companies have an added incentive because the euro is creating a pool of investors who were formerly restricted to their own domestic market.With currency risk out of the way, they are now looking to buy paper from across Euroland.

- Gradually, the single market is promoting cross-border competition and restructuring.
- It also obliges management to understand and appreciate the financial markets as a whole.

In continental Europe, this attrition of the bank's role in intermediation has had only a minor impact on lending so far. Bank lending still occupies a preeminent position,[6] as the significance of corporate bonds is rather negligible. By contrast, bank debt securities are used increasingly to refinance loans while many credit institutions set a strategy of moving out of loans and toward other instruments, such as trading in derivatives.

If all loans made by the banking sector are analyzed, major differences in the structure of indebtedness can be seen. The extreme ends of the scale are formed by households and the public sector. Households raise external funds in the form of loans, mainly to finance consumption. In the late 1990s bank loans for consumption purposes made up 90 percent to 95 percent of borrowing, and loans extended by insurance companies accounted for another 3 percent to 5 percent. For housing reasons:

- Bank lending makes about 84 percent of overall liabilities.
- Loans from savings and loan associations account for 10 percent.
- Loans from insurance companies make up the other 6 percent of debt.

Statistics on lending vary from one country to the other. The public sector is an example. At the end of the 1990s in Germany, bonded debt stood at 59 percent of overall liabilities, accounting for a much larger share than funds borrowed from banks, which was at the 37 percent level. By contrast, in other European countries, banks still held a big chunk of public debt.

Statistics of this type permit a closer look at cash outflow analysis. In the continental European banking industry, deposits accounted for 74 percent of all liabilities. They have been the most important form of external capital to credit institutions. Also within the European financial landscape, bank debt securities accounted for just under 21 percent of all liabilities, but they have gained ground since 1990, when they stood at 18 percent.

In continental Europe, corporate bonds play only a minor role in the financing of manufacturing companies from external sources. At the end of the 1990s in Germany, only 2 percent of liabilities were in bonds and money market paper. Most of these were a special kind of bonds (postal bonds) assumed by Deutsche Telekom. As these statistics suggest, two structural features of indebtedness in Germany stand out.

1. Corporate bonds and money market paper play a relatively minor role in corporate financing.
2. Bank debt securities are used intensively to refinance lending, leading to indirect borrowing on the capital markets with intermediation by banks.

This dual pattern of indirect capital market lending by industry, which retains within it bank intermediation, requires a dual process of analysis that further underlines the need to emphasize cash flow from assets and from liabilities. Economic theory teaches that in the bottom line, the key factor in choosing a form of financing is not only the question of what is more cost effective on the whole but also how sustainable this solution is.

Classic concepts of economic theory are influenced by the hypothesis of perfect markets characterized by the absence of transaction costs and of information differentials between creditors and debtors. This is nonsense. Whether we obtain funds directly from the capital market or have a credit institution as an intermediary, we must do a great deal of analytical studies. In that analysis, simplification often proves to be counterproductive if not outright dangerous.

DRAINING CASH RESOURCES: THE CASE OF BANK ONE

On July 20, 2000, Bank One, the fifth-largest U.S. credit institution, took a $1.9 billion restructuring charge and halved its dividend. This move was part of a strategy to sort out problems created by merger results, underperforming credit card operations, Internet investments that did not deliver as expected (Wingspan.com), information systems incompatibilities, and other reasons that weighed negatively on the credit institution's performance.

This huge $1.9 billion charge was supposed to clean up Bank One's balance sheet and stem four quarters of earnings declines. In his first major move since becoming the CEO of Bank One, in March 2000 James Dimon said he planned to cut costs by $500 million to help revive the company's stock, which had dropped 50 percent in a year when the New York stock market was still flourishing. At the time, Bank One's equity has been the worst performer among large bank shares.

Given the number of problems and their magnitude, at Wall Street analysts suggested that a decisive move to get the bank back on its feet could entail charges up to $4 billion. Investors and the

capital market as a whole lost confidence in Bank One after the second profit warning in the autumn of 1999 tarnished its credibility. This is a clear example of how internal managerial problems can become a major drain of cash.

In terms of financial results, in 2000 Bank One posted a second-quarter loss of $1.27 billion, counting the charge, in contrast to a profit of $992 million a year earlier. To bring costs under control, the institution had already cut 4,100 jobs. This reduced overhead but did nothing for the fact that a good deal of the ongoing problems stemmed from the bank's credit card operation. First USA began losing customers in 1999 when it shortened the required time for paying bills and imposed fees and higher rates for those late on payments.

Bank One's former chairman, John McCoy Jr., was forced out toward the end of 1999 after the board decided that there had been no clear strategic improvement during the year. After a search, the board hired James Dimon, at one time heir apparent to Sandy Weill at Citigroup, with the mission to turn the bank around. After the choice of the new CEO, the stock immediately rallied almost $10 to nearly $38.

In announcing the $1.9 billion charges, Dimon delivered a withering critique of the way business was done at Bank One, formerly a midwestern powerhouse formed by the 1998 union of two very different companies: the freewheeling Bank One and the staid First Chicago. He criticized the Chicago-based company's financial reporting and said its computer systems were a mess and its efforts at cost control were inept.

The new CEO also said that that expenses at Bank One were sort of self-approved. Senior management was not informed of expenditures until they reached $5 million. Correctly, Dimon emphasized that the threshold would be lowered to $50,000. The bank had 22,000 pagers, 12,000 telephones, and more outside consultants than it needed, Dimon said, outlining $500 million in savings.

Along with the restructuring plans, James Dimon announced a policy of reducing the company's banking charters from 20 to three. That alone was expected to save $25 to $30 million in accounting and other costs. The CEO underlined that he would begin work to integrate the seven computer systems at Bank One, saying: "If we don't put those systems together we will die a slow death."

Not everyone, however, was convinced. Michael Mayo, an analyst at Credit Suisse First Boston who had been advising clients to sell Bank One's stock, did not change his rating. Instead, he said: "Jamie Dimon gave a good presentation today. But you have to realize that this is a battleship to turn around and Jamie Dimon is not Hercules."[8]

Sandra Flannigan, an analyst at Merrill Lynch, said she had always thought Bank One should hand its credit card operations to First USA because it was such a big player in the credit card business and because there were synergies between it and the bank's other consumer businesses. "I think Wingspan is a bigger question mark," she added, expressing doubt about the wisdom of having two bank brands on the Internet.

Flannigan kept a "near term neutral" rating on Bank One stock, suggesting that Dimon and his team had taken steps that should ensure smooth profitability in the short run. She felt that: "Certainly big up-front charges have the ability to pave the way for a nice bounce. But in the long run, can they position this company to be a standout in an industry that is increasingly competitive?"

This kind of query is posed not just by one analyst in regard to one bank and its market future and survivability, but by all analysts in connection to every institution they examine. Ensuring that both market future and survivability are matching requires making the sort of studies promoted by this chapter. Doing so also gives financial analysts the message that an institution is taking its survival as a serious matter and that senior management is in command.

While the analysis of cash inflow and cash outflow regarding commitments with counterparts is very important, this is not the only job that needs to be done. Restructuring requirements and other internal reasons can eat up billions for breakfast and turn even the most elaborate cash inflow/outflow study on its head. Charges of $1.9 billion are also sizeable for a major credit institution, and management should always appreciate that money does not grow on trees.

ESTABLISHING INTERNAL CONTROL AND PERFORMANCE STANDARDS

The problems that hit Bank One had their origin at senior management level. The previous management overextended the bank's reach and did not care enough about control procedures. As an integral part of management strategy, a financial institution should apply internal control through a consistent approach that involves quality control and addresses all of its projects. This strategy is best exercised by means of design reviews that:

- Steadily evaluate the projects under way, killing those that do not perform
- Lead not to one but a series of decisions on whether to continue funding or write off the investment

If Bank One had such a policy when John McCoy Jr. was CEO, it would not have faced the drain of First USA, Wingspan.com, and other nonperforming projects over long stretches of time, projects that drained Bank One's resources and led to hefty losses. Neither would the U.S. savings and loans industry have faced the severe imbalance in the cost of cash inflows versus outflows that threw so many thrifts into bankruptcy at the end of the 1980s.

The concept of *design reviews* applicable to ongoing projects comes from engineering. Like so many other analytical tools, it provides financial institutions with a first-class means of rigorous management. In engineering, from research and development to prototyping and the first manufacturing series, all projects must be evaluated as they progress.

- Corrective action is taken immediately according to the outcome of the inspection done through a design review.
- Quick response leaves absolutely no room for inefficiency, seniority, bureaucracy, and the status quo way of doing things.

In its heyday, Bankers Trust was one of the better examples of a financial institution that followed this approach. It practiced design reviews for all its information technology (IT) projects. It had a six-month development deadline as the maximum permitted timetable to completion compared to the usual two, three, or four years by other financial institutions, which lead to software projects that never end but cost huge amounts of money.

In its fundamentals, the concept underpinning design reviews is very simple, and it is shown in Exhibit 10.5. In every project, independently of the field where it takes place and of the objectives it sets for itself, there is a relation between time and cost: The cost tends to increase significantly as the project nears completion.

- Successive design reviews target efficiency all along the progression of a project.
- Projects that do not perform should be killed early in their life cycle, when costs are still minor and no precious time has been lost.

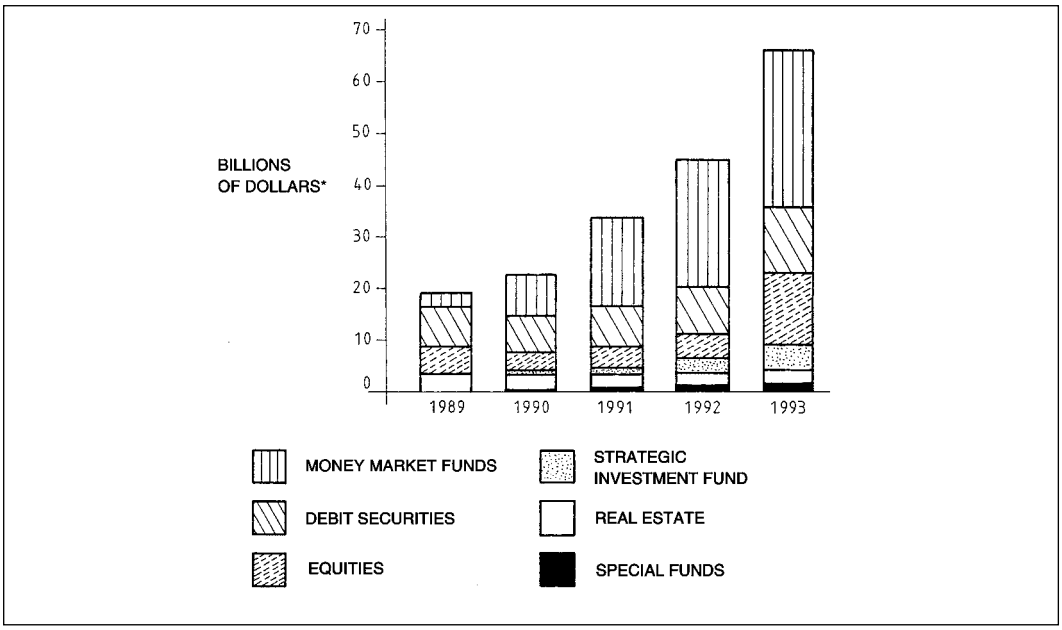
This concept comes from financial management: It is silly to throw good money after bad money. All projects in financial analysis—software development, new product launch, major product line overhaul, and any other domain—should be subject to regular design reviews, with the project leader and his or her immediate superior responsible and accountable for the results.

Plans must be rigorous, not sketchy. Projects that do not perform according to plan must be killed at the first or second design review level, as soon as their flaws become apparent. The manager of flawed plans should be fired. *If* the killed project is still of vital importance to the bank, then it should be reinstituted under new management and a tighter timetable for deliverables, with more rigorous inspection procedures.

Bankers Trust has followed this policy, as does General Electric. (Do not forget that nearly 50 percent of GE's business and more than 50 percent of its profits comes from GE Capital—a financial institution.) Apart from the regular design reviews, policy at GE calls for four major design reviews during the project's life cycle prior to the final design review. These are done at financial milestones:

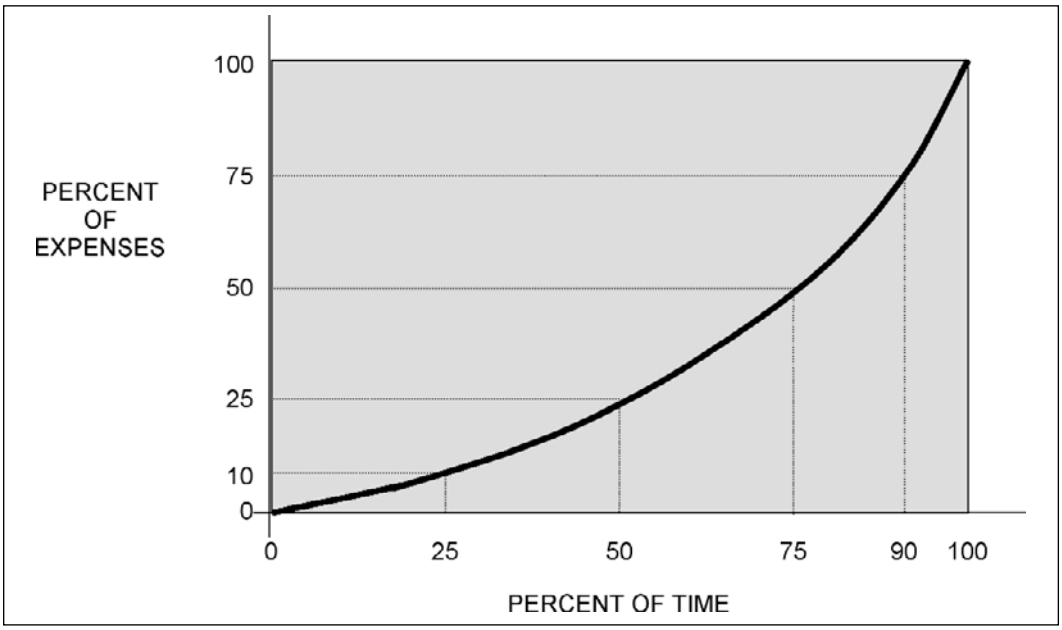
- 10 percent of the budget
- 25 percent of the budget
- 50 percent of the budget
- 75 percent of the budget

Exhibit 10.5 Rapid Growth of Money Market Instruments Is Unparalleled in Economic History



* The scale has been slightly changed.

Exhibit 10.6 Design Reviews Should Be Frequent and Rigorous, and Point to Corrective Action



Nonperforming projects are killed at one of the major design reviews, as soon as the evidence of underperformance becomes visible. Top management believes that it is better to write off part of the budget than all of the budget and also lose precious time in this process.

These references are emphasized because they are directly applicable to cash management. The analytical solutions presented here and in Chapter 9 in connection with cash inflow and cash outflow studies, as well as the procedures concerning the management of liabilities, cannot be performed without sophisticated software and/or in the absence of rigorous management control.

The solutions that have been presented are highly competitive and cannot be found in off-the-shelf software, no matter what their vendor says. These solutions have to be developed in-house and backed up by sharp policies. The concepts underlying the General Electric and Bankers Trust design review policies have been that:

- Anything short of an immediate control action breeds inefficiency, and
- Organizations which do not reward merit and punish incompetence find themselves obliged to deal with second raters, which bends their competitiveness.

Organizations that want to survive simply cannot afford to employ the unable, the unwilling, the arrogant, and the unnecessary. This is true not only of projects like cash management but also of internal control at large—in all its aspects. Let us consider budgetary control as an example.

The principle in budgetary control is that no matter to which category they belong, expenditures should be subjected to a rigorous evaluation, answering Cicero's critical questions: *What? Why? How?* and *When?* This can be done effectively through analytical means.[9] Causal explanations or questions of meaning play a very important role in budgetary control, and they may be concerned with:

- *What* really happens, but also with
- *Why* it happens,
- *How* it happens, and
- *When* it happens

Banks supposedly have experience with budgetary control matters and they employ people who can do objective evaluations. But in a large number of cases, banks lack both the will and the policies to put such experience into practice; therefore they are not able to uncover areas that require further investigation and/or immediate correction. This leads to a number of questions:

- What criteria are used in selecting the out-of-control expenses?
- What specific evidence is there that the criteria which are used are the most appropriate?
- What specifications should a statement of objectives include in order to answer efficiency questions?

Budgetary control is facilitated by the fact that the financial plan is a combination of all types of estimates, including a complete set of management objectives, that the budget sets out to accomplish. As stated in Chapter 9, the budget can be studied analytically both:

- A priori, before being finalized
- A posteriori, in a plan versus actual sense

The board should seek comprehensive ways to perform post-mortems, enabling it to see whether the bank's managerial and financial plans have been carried out as effectively as intended. Therefore, management control must be able to determine what kind of corrective action is necessary, where, and when. Cicero's critical queries are essentially the tools for budgetary enforcement.

Experience with for-profit and not-for-profit organizations demonstrates that the enforcement of approved financial plans can be effected in several ways, but all require keeping close check on actual results and insisting on explanations for differences from plans that exist every time such differences:

- Show up in plan versus actual comparisons
- Manifest themselves as trends
- Become visible in output and/or controllable charges in specific budgetary chapters

In conclusion, the board should put in place a system of design reviews that makes possible discovery and corrective action. For instance, in connection with budgeting, it should use the bank's financial plan as *a performance standard*, hold each department head and each project responsible for the fulfillment of its specific part of the company's program, and see to it that the manager of that department is directly and personally held accountable.

Each department head should hold his or her subordinates accountable for their specific performance. Each member of the organization must definitely be aware of what *results* are expected of him or her as well as be in a position to initiate plans for controlling the operations under his or her responsibility. This statement about budgetary matters is just as true in connection with all types of analytical studies, such as the interest-rate studies discussed in Chapter 11.

NOTES

1. D. N. Chorafas, *Chaos Theory in the Financial Markets* (Chicago: Probus, 1994).
2. Ibid.
3. D. N. Chorafas and Heinrich Steinmann, *Expert Systems in Banking* (London: Macmillan, 1991).
4. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley, 2000).
5. D. N. Chorafas, *Managing Credit Risk*, Vol. 1: *Analyzing, Rating and Pricing the Probability of Default* (London: Euromoney Books, 2000).
6. Loans are mainly granted by credit institutions and to a lesser extent by other financial intermediaries, such as insurance firms.
7. *Financial Times*, July 21, 2000.
8. *International Herald Tribune*, July 21, 2000.
9. D. N. Chorafas, *Commercial Banking Handbook* (London: Macmillan, 1999).

CHAPTER 11

Money Markets, Yield Curves, and Money Rates

TEAMFLY

The money market usually handles short-term transactions. It is the counterpart of the capital market, where longer-term securities are traded. Financial contracts handled through the money market often are intraday and overnight agreements. Nevertheless, a clear dividing line between the shorter and longer term cannot be drawn using strictly economic criteria because, in the last analysis:

- Shorter term and longer term are determined rather subjectively.
- Much depends on the planning horizon of economic agents and their financing needs.

In principle, deposits, advances, and short-term loans are traded in the money market and are subject to going money rates. The common practice in money market deals is to count maturities of one year or less. However, this definition is elastic. Some reserve banks, such as the Banque de France and the Banca d'Italia, consider the short term to be six months.

The answer to the question "Where can we buy cash, if we are short of it?" is: "At the money market." Such transactions are used by market participants, such as commercial banks, producing enterprises, public authorities, and institutional investors for liquidity management. A distinction should be made between:

- Money market transactions that are central bank money, such as credit balances with the central bank, and
- Those involving demand deposit accounts (current accounts) with commercial banks and retail banks.

Bank deposits enter into the computation of the money supply. (See Chapter 10.) They provide raw material to credit institutions and enable them to synchronize their payment flows among themselves and with nonbanks. Additionally, however, credit institutions need central bank money to feed into the currency in circulation and comply with their minimum reserve requirements.

Different forms of securitized lending and borrowing in the money market have emerged besides the pure money market transactions that predominate. These forms include paper that is bearer or order bonds; short-term government paper; commercial paper; and certificates of deposit (CDs).

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- Generally money market paper is issued in the form of discount instruments.
- The yield of such instruments is representative of money market rates for similar maturities.

The yield of such instruments is conditioned by credit quality. The yield is representative of market rates *if* the entity's credit rating is sufficiently high and market liquidity is good.

Floating-rate notes have a comparable yield and risk profile to those of money market paper. A similar point can be made about money market fund certificates. In principle, these are issued for an unlimited period of time, but they generally are considered as indirect money market fund investments.

Securities are used as collateral for money market lending and borrowing. The main transactions of this type are of sale and repurchase (repo) types, whereby liquid funds are provided against the temporary transfer of securities. Account also should be taken of transborder money flows because of globalization. Unless these money flows address capital investments, they consist largely of money market money.

Opinions on international money flows are divided. Many economists see them as the global market's seal of approval on a country's policies and prospects and as a force of economic change, particularly for less-developed countries. These economists also point out that transborder money flows are, most often, a fiat of:

- Capital
- Contracts
- Technology
- Managerial skills

The contrarian opinion held by other economists is that 90 percent or more of international money flows are speculative capital in search of quick gains. The possible effects of these money flows on economic development, these economists say, are complicated and not always able to be measured. By contrast, the negative aftermath is visible, because international money flows contribute to leveraging of countries and companies that are not in a position to repay and thus go bankrupt—as the East Asia blow-up of 1997 and subsequent years documents.

MONEY MARKET INSTRUMENTS AND YIELD VOLATILITY

Money market paper can be seen as a securitization of potential central bank money. This is the case when the central bank purchases money market instruments in circulation or if the reserve institution is required to meet the liabilities arising from short-term paper issued on its initiative. Such policies are not universal, and they usually vary from one country to the next.

Some reserve banks, for instance, the German Bundesbank, operate in this way. The guiding principles of the German central bank are set by section 21 of its constitutional act, which provides the legal basis for repurchase agreements concerning specified money market paper with a commitment to purchase it. This gives the holders of such instruments the option of converting them into central bank balances at any time. In addition, the act entitles the Bundesbank to buy and sell specified debt instruments in the open market at market prices as a way to regulate the money market.

Furthermore, section 42 of the Bundesbank act provides the option of issuing short-term debt instruments for the purpose of managing the money market, independently of the issue of financing paper. The Bundesbank is liable to the German federal government for meeting all obligations arising from these and other statutory rights.

The reason for emphasizing the differences that exist between different reserve institutions in terms of statutory rights and obligations is to show that nothing is cast in stone. Rules guiding the hand of regulators change over time. Since the move to flexible money market management in the mid-1980s, the Bundesbank has used the instrument of securities repurchase agreements almost exclusively to meet its operational objectives in the money market.

- These are *open market* operations, and they are reversible at short notice.
- Through them the central bank can rapidly bring to bear desired money market conditions.

As far as national financial markets are concerned, regulators look after liquidity through their action in the money market, and they do so by having at their disposal a few preferred instruments. A parallel method is that of influencing the velocity of circulation of money by:

- Setting interest rates
- Changing the reserve requirements of commercial banks

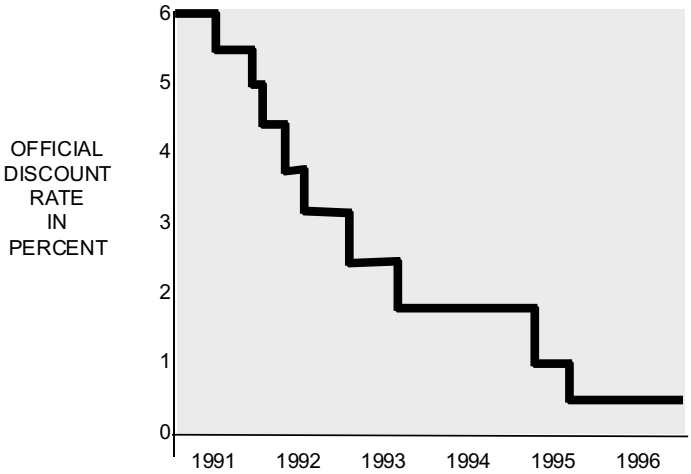
The Federal Reserve's two big moves in January 2001, and those which followed, can be viewed in this light. They were a psychological "plus" for investors and consumers, and were intended to shore up future readings on confidence. The real impact of those and additional moves, such as the cut of 50 basis points in interest rates in late March 2001, is to help the American economy, but they generally are expected to have an effect only by the end of 2001.

Stimulus by the reserve authorities, however, does not always work as intended. Take Japan as an example. In its drive to jump-start the Japanese economy after the collapse of 1990, over a five-year period the Bank of Japan slashed interest rates. This pattern is shown in Exhibit 11.1. With the official discount rate being at 0.5 percent for nearly a year and a half since early 1997, the debate has shifted from *if* interest rates will rise to *when*. Contrary to market expectations, however, in an effort to jump-start the economy, the Bank of Japan brought the interest rate to zero in 2001. This is a good example of the uncertainties faced by central bankers. The Bank of Japan did not tinker with rates until it had seen a decent batch of economic data and then, for a short period, it raised interest rates slightly. But the inference based on this data has been misleading. The Bank of Japan increased interest rates as the government engaged in a huge deficit financing program. This failed to revive the economy, and in March 2001 the reserve bank again cut interest rates to nearly zero.

The lesson to be learned from this experience is that interest rates alone cannot turn around market psychology or revive consumer confidence. They cannot even do minor miracles in conjunction with huge deficit spending by the government. It takes structural change to improve an overwhelmingly bad situation, where liabilities are way ahead of assets.

Despite this fact, interest rates often are used as a monetary tool by the reserve bank. In 1992, in the United States, the Federal Reserve had to lower the federal funds rate to 3 percent to reflate the banking system and slow the credit crunch. That 3 percent figure was about in line with the then-current rate of inflation, which meant that yield just compensated for the depreciation of capital. Then in 1994 the Fed increased the discount rate in six consecutive steps. Shown in Exhibit 11.2,

Exhibit 11.1 Official Discount Rate by the Bank of Japan During the First Half of the 1990s

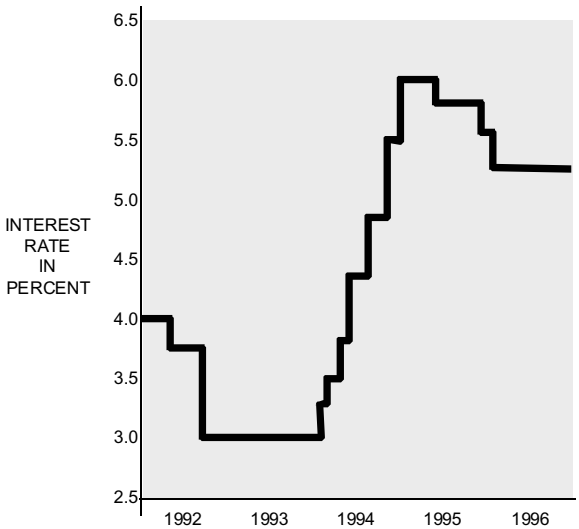


this escalation in the cost of money turned the bets by hedge funds and by investors on their head and led to some spectacular losses.

The examples we have just seen lead to a dual definition of money rates and their aftermath. The one regards their use as regulatory instruments, targeting the velocity of circulation of money. Yields act as boosters or brakes to the economy. The other definition of money rates is that of being the *price* for financial sector *liabilities*.

Companies and consumers are exposed to interest-rate risk associated with their loans, if these are contracted at floating rates—for instance, if yield is tied to the London Interbank Offered Rate

Exhibit 11.2 Tightening Bias Shown in the Federal Reserve's Interest Rate Rises in 1994



(LIBOR). When this happens, treasurers and investors are well advised to evaluate different hypotheses about changes in interest rates affecting their obligations.

As we will see through practical examples in Chapter 12, a sound modeling technique is to measure hypothetical changes in lease obligations arising from selected changes in LIBOR or some other index: for instance, shifts in the LIBOR curve of plus or minus 50 basis points (BPs), 100 BPs, and 150 BPs over a 12-month period. The outcome of this analysis is most material to financial results. The Office of Thrifts Supervision (OTS) follows this policy, although the thresholds are not the same as the one just mentioned.

The following references constitute basic principles. *Interest-rate risk* is the risk that changes in market interest rates might adversely affect an institution's financial condition. By and large, there are two types of interest-rate risk. Each has a number of challenges.

- One type of risk is associated with products that have defined cash flows, such as fixed rate mortgages.

Living with interest rates is relatively easy if their volatility is low. Nor is this job difficult from a hedging perspective, except for the fact that significant optionality can be embedded in the products, also in the process of selling them through securitization. The problem with optionality is that it is not always rationally exercised.

Companies enter into forward rate swaps to offset the impact of yield fluctuations on their assets and liabilities. The total notional values of such contracts represent roughly half the notional principal amount of off–balance sheet instruments in a bank's trading book.

- The other type of interest-rate risk is associated with products that do not have defined cash flows.

This is the case with many current account, savings, and credit card products and services, as well as investment capital. In this connection, market behavior is the key driver. Market behavior is hard to model, but patterns can be developed within a certain level of confidence.

We also can capitalize on the fact that central banks try to take interest-rate decisions in a forward-looking manner. They decide to raise interest rates if they are convinced doing so will help to sustain noninflationary growth over the medium term, on the hypothesis that a timely rise in interest rates will prevent the need for stronger measures later.

For instance, an interest rate rise of 25 or 50 basis points might prevent uncertainties regarding the future course of monetary policy. The Fed makes such a decision if it believes that this move can contribute to reducing any uncertainty potentially prevalent in financial markets and also to help contain a possible increase in volatility in money markets. It does not always happen that way because usually there is a difference between theory and practice.

SPILLOVER EFFECTS IN THE TRANSNATIONAL ECONOMY

Globalization has made the money market much more volatile than it used to be. One reason is that globalization has increased the number of unknowns affecting decisions that concern money rates. It also has an impact on the likelihood of a spillover effect. (This is discussed in more depth later.)

Still another reason for interest-rate aftermath can be found in the fact that today there is no regulator of the global financial market even if:

- Regional efforts like the Basle Committee on Banking Supervision, particularly concerning the Group of Ten countries, are successful, and
- At the global level, the International Monetary Fund took it upon itself to act as lender of last resort to countries in distress, thereby avoiding systemic risk.

To better understand the weight of the transnational economy on the money market and money rates, let us consider the concepts underpinning it. Rather than being moved by trades in goods and services, a transnational economy is shaped mainly through money flows, which have their own dynamics. The most important decisions regarding these money flows are not being made by the so-called sovereign governments but by:

- Treasurers
- Traders
- Investors

These treasurers and traders are working for transnational corporations and global financial institutions. Their companies have market clout and are able to address money markets and capital markets in a worldwide sense. They are searching for a quick return; trying to hedge their exposure; looking for new opportunities and profits they represent; and using transborder cash flows as their weapon.

While major profits are seen as the bait, such gains are usually in the background while risks are in the foreground. Treasurers, traders, and their companies often face fairly significant exposures because while the deals are transnational, global rules and regulations that can ensure an orderly transborder behavior are being put in place only slowly. The economy in which transborder transactions are executed is polycentric and pluralistic.

- It is controlled by no one in particular, let alone being controlled single-handed
- All players together that form the system contribute to the way this is functioning and malfunctioning.

The companies that constitute the major players in this global system have little to do with the international organizations that have existed for about 100 years. These entities, often called multinationals, consisted of a parent company with foreign subsidiaries or daughters. The parent was clearly in command of designing, manufacturing, and exporting. The daughter(s) simply distributed or manufactured and sold these products, each to the market to which it appealed.

The practice of the industrial-type transnational company that started emerging in the 1960s and really took hold in the 1980s is the antithesis of the elder multinational form. Research and development is no longer done exclusively in the country of origin but where the best knowledge workers can be found. Design takes place anywhere within the global market, and the same is true of production. The daughters manage significant amounts of money and are answerable on a profit-and-loss basis, just like independent business units in domestic operations.

This model of globalization has been both enlarged and made more sophisticated by the financial industry because of deregulation, technology, rapid innovation, and the sort of raw material that the financial industry uses for its products and services.

- The produce of the manufacturing industry is for the real economy, and it is based on assets.
- By contrast, what the financial industry produces is for the virtual economy and, to a large extent, it rests on liabilities.

Liabilities are much more universal and liquid than assets. They also are more flexible and easier to manipulate, but they carry a greater amount of risk than assets do. This risk spills over faster because of the *global liquidity highway* put in place through real-time networks and database mining.

- Networks accelerated the practice of international transborder cash flows.
- Even within the same country, a lot of inhibitors to cash flow have been eroded.

An example is the shrinkage in settlements time from T+5 to T+3, T+1, and eventually T. Real-time execution and immediate payment have destabilized the buffers that classically existed between a transaction and the moment the money was due. Networks carry good news and bad news instantaneously around the globe; the sun never sets on the international financial landscape.

Increasingly, the global financial market operates out of the hands of national governments. No longer can regulations be contained within national borders, either because countries belong to major regional trading and financial groups, such as the European Union (EU) or the North American Free Trade Area (NAFTA), or because key players affect the global financial market and its political setting.

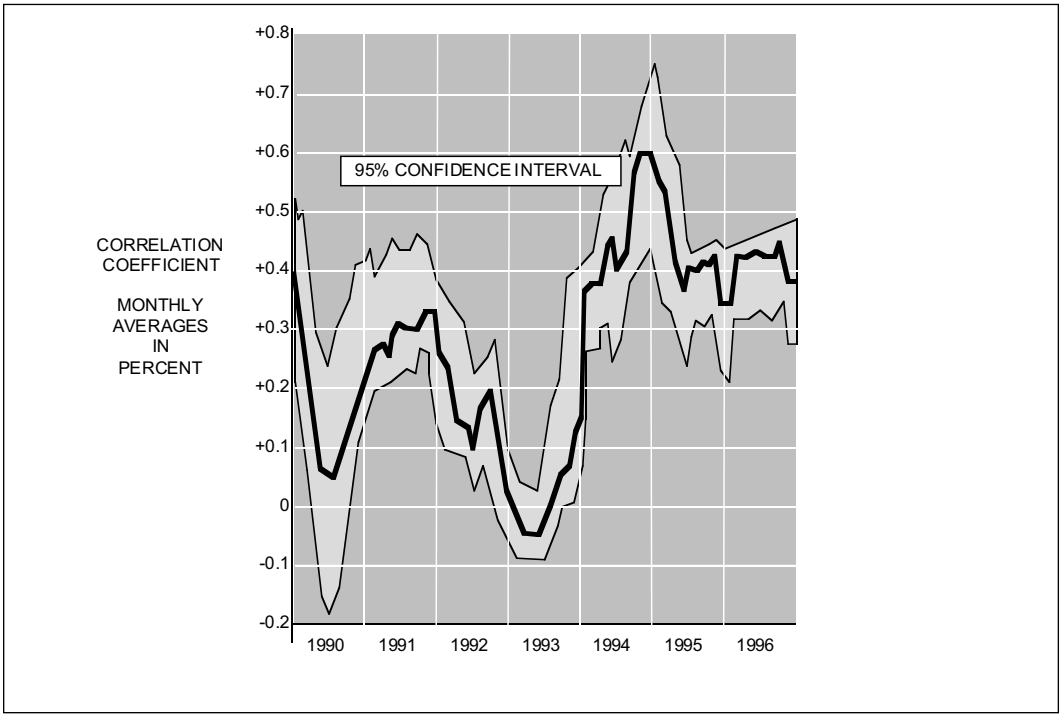
Increasingly, transnational organs lacking clearly defined accountability try to cope with yield fluctuation in the global market. To a significant extent, in the 1980s and 1990s the spillover of short-term yield volatility between markets increased independently of the correlation between capital markets. Because of the size of its capital market, the United States created strong stimuli to interest-rate movements in European debt securities.

- This interaction between transcontinental interest rates can be measured by means of correlation analysis.
- Analysis shows that the resulting volatility is subject to phase-dependent fluctuations that become increasingly apparent.

In terms of central tendency, at the 95 percent level of confidence, the spillover of yield volatility from the American debt securities market is shown in Exhibit 11.3. This plot is calculated as the coefficient of the lagged German 10-year yield over a moving 130-day period. Note that the interest-rate differential compared to the United States largely remains within a range of one decimal point, with two decimal points as a spike.

This and similar examples help to document the fact that the transnational financial world is structured by new instruments, global players, and real-time information systems, none of which any longer knows national boundaries—or, for that matter, strong parent-daughter dichotomies. Each player has goals that must be accounted for as partially independent variables interlinked but not controlled by either party in a direct way. The result may not have been planned but is today a genuine, almost autonomous world economy of:

Exhibit 11.3 Spillover of Yield Volatility from the American Debt Securities Market to the German Market*



Source: German Bundesbank

- Money markets
- Capital markets
- Liabilities trading
- Financial credit
- Cash flows
- Investments

Any financial analysis done within this landscape has to consider not only specific instruments and the evolution of new organizational concepts, but also technology, since computers, communications, sophisticated software, and financial models play a very significant role in transborder money flows. The new environment is very knowledge intensive. The effective application of new know-how has changed old concepts, not the least among them being those connected to energy and raw materials.

Since the first oil crisis of the early 1970s, Japan has multiplied its industrial production but barely increased its raw material and energy consumption. The Japanese manufacturing products of the early 1990s contained half as much raw material and half as much the energy input as was required 20 years earlier. The difference was made up through:

- Knowledge
- Innovation
- Information

As a result, the First World's economy has been uncoupled from that of the Third World, which traditionally counted on raw materials as a means of income but also on political and social pressure. In turn, the new financial landscape caused the classic relations between the First World and the Third World to turn upside down, and those Third World countries unable to adjust to the new realities have been marginalized. The coming years will magnify this effect.

MAJOR FACTORS CONTRIBUTING TO GLOBAL "CAPITAL AND BRAINS" FLOWS

Classically, global capital flows depend on a variety of factors, such as investment opportunities, lust and greed, interest rates, legal barriers to transborder flows, legal provisions protecting the investor, possibilities to take the money out of the country again, and so on. However, when assuming a long-term view of how global capital will be allocated in the future, three factors are outstanding because they set the pace of transborder money flows.

1. Rapid return on investment (ROI)
2. Political stability
3. The demographic evolution of countries and regions

All three of these factors greatly influence decisions by individual investors, institutional investors, banks, and other entities on *how* and *where* capital becomes available as well as *when* and *how* the prime demand for it originates. While plenty of fuss is being made about international money flows flooding the less-developed countries, the number-one beneficiary is the United States; Great Britain is the number-two beneficiary, with China in third position.

As Exhibit 11.4 shows, foreign direct inflows to the United States are projected to be larger than those in the next five countries in the list—Britain, China, Germany, France, and the Netherlands—because investors and traders appreciate the three factors just listed. These factors are in a way interrelated, but at the same time they contradict one another.

- The shrinking of the populations of developed countries contrasted to the high growth rates in developing ones would seem to suggest capital flows toward the latter.
- However, countries in the process of development are financially and politically unstable, their legal system is wanting, and longer-term ROI is questionable.

What about capital flows to less developed but heavily populated countries? As far as sheer numbers are concerned, reproduction rates favor those countries. By contrast, political and economic instability works against them in a big way. That is why the direction of twenty-first-century transborder money flows will, in all probability, be more volatile than it was at the end of the twentieth century and increasingly directed toward the rich countries.

Exhibit 11.4 Projected Annual Average of Foreign Direct Inflows in the 2001–2005 Timeframe

Country	Percent of World Inflows	Inflow in Billions of Dollars
United States	26.6	236.2
Britain	9.3	82.5
China*	8.8	78.1
Germany	7.8	68.9
France	4.7	41.8
Netherlands	4.1	36.1
Belgium	3.4	30.2
Canada	3.3	29.6
Brazil	2.1	18.8

* Including Hong Kong
Source: By the European Union, *The Economist*, February 24, 2001.

Historical precedence plays a role in international money flow decisions. In the second half of the 1990s, as far as investors were concerned, the highest ROI was to be found in the United States. In this timeframe, behind the stock market boom and the strength of the dollar, was the money flow swollen by the rising tide of wealth around the world coupled with a new culture of investing.

- American start-up companies received nearly $50 billion in venture capital in 1999, 25 times as much as in 1990.
- The amount of money raised in U.S. initial public offerings during 1999 was roughly $70 billion, 15 times the amount in 1990.

Analysts had predicted that both records were certain to be broken in 2000 due to the huge capital flows toward the United States. But some economists felt that the sheer abundance of capital could be bad for the capitalists themselves, because money, the commodity they supply, is no longer scarce. What is scarce are the good investment possibilities.

Contrarian financial analysts who studied the transnational economy and its money flows were also concerned by the fact that 95 percent or more of global financial transactions related to financial products, particularly trades in off–balance sheet instruments. They did not represent the flows compensating the trade in hard goods. This is how, on average, every night half the gross national product of the United States is traded in New York.

Under classic conditions and their textbook cases, these statistics should have been unsettling to investors. Few, however, appreciated that the huge capital flows toward the United States had created a stock market bubble and that shareholders were likely to lose a lot of money as the capitalization of highly leveraged firms collapsed.

Today contrarians also point out that, quite independently of stock market blues, shareholders will be losing some power in the twenty-first century while entrepreneurs and idea-generating employees gain it. Fast bucks aside, this is what the boom in venture capital is all about. Big bonuses and option grants to key employees are evidence of the trend toward innovation and its rewards just mentioned. Slowly we come to appreciate that shareholders are only one group of stakeholders.

One of the lessons learned from the emphasis now placed on the liabilities side of the balance sheet is that the changing nature of assets turns on its head much of what was used in the past as a yardstick for market valuation. When assets were physical things, such as iron mines and railroads, shareholders truly owned them. But when the vital assets are people and their ideas, there can be no true ownership, and the best that companies can do is to create an environment that makes the best people want to stay.

Transborder capital flows and the rising importance of people and ideas correlate; they reinforce one another and will continue to do so in the years to come. At the same time, the transborder movement of learned people makes higher education and intellectual property the big issue to fight for in the coming decade. Brains, Robert McNamara once said, are like hearts. They go where they are appreciated.

Not only are the fundamentals confronting transborder money flows being recast; the agents behind the movement of capital have changed. Up to and including the two oil crises of the 1970s, the agents were commercial banks and multinational companies. In the 1970s, commercial banks performed beautifully in recycling the glut of petrodollars, but in the twenty-first century the agents are institutional investors.

- Commercial banks and industrial companies are relatively stable investors, because their horizon is the medium to longer term.
- By contrast, institutional investors have no interest to continue operating in a less-developed country. They are there for fast profits.

At the same time, less-developed countries are their own worst enemies because they do not watch their finances and they do not limit their population growth. Fertility rates of 3 percent per year are unsustainable in terms of infrastructural investments, which are necessary to find work for people coming into the labor market. Even with fertility rates of 2.1 percent, the amount needed for a stationary population, it is tough to preserve the existing standard of living because infrastructural decay also must be accounted for.

The risk, therefore, is not that capital from developed countries will massively migrate to less-developed countries, except perhaps in some speculative plays, but rather that there is a disequilibrium leading to strong migration pressures: The illegal immigrants are unwanted because they lack needed skills; the legal immigrants are engineers and scientists—and they are very welcome. Societies whose populations are shrinking are more affluent than societies whose populations are growing, a fact that creates an additional incentive for people to migrate.

YIELD STRUCTURE AND YIELD CURVES

Earlier it was said that interest rates are the cost of money. A *yield structure* maps the cost of money conditions in the capital market as a function of residual maturity of debt securities. Yield curves are established on the basis of a usually limited number of available yields on the securitization of debt. To estimate yield curves, economists are estimating a continuous function that often turns out to be a close enough approximation.

Yield curves typically are calculated under what is considered "normal conditions." The slope of the U.S. Treasuries and U.K. gilts yield curves in the semilogarithmic graph in Exhibit 11.5

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accounts for the cost of money during the farther-out 30 years. This cost typically is included in the pricing equation, as it happens with any other commodity. Yield curves also may be flat or even inverted; the latter condition is known as backwardation.

For instance, since the end of the 1980s the yield structure in the German capital market has nearly completed an entire cycle. Starting from a slightly inverse curve, the economic policy uncertainties in connection with reunification at the beginning of the 1990s led to an increase in long-term interest rates and therefore to a fairly flat curve.

The fact that in Exhibit 11.5 the shape of the 30-year yield curve of U.S. Treasuries and British gilts is not the same reflects the particular economic conditions in each country. Usually a significant amount of inference about financial and economic conditions can be made by studying the prevailing yield curve(s). For this reason, yield curves have been one of the financial industry's most powerful predictors.

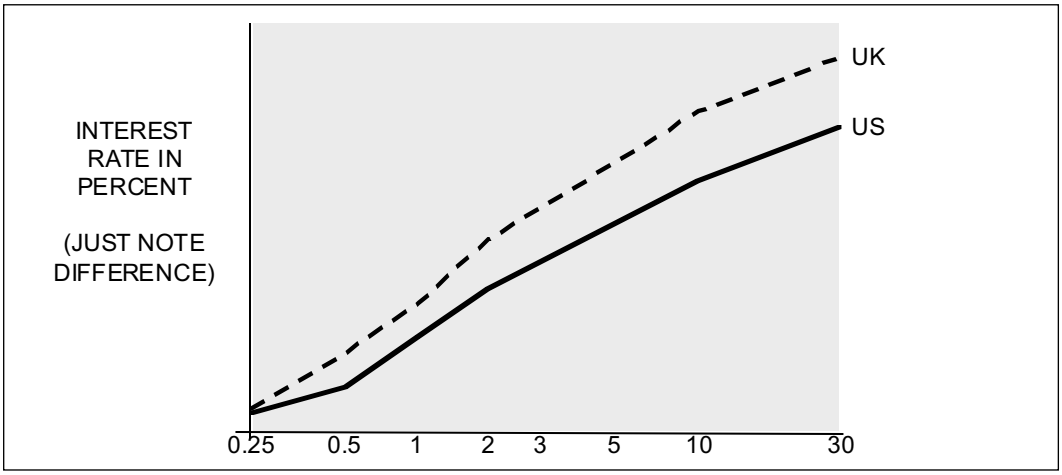
If short-term interest rates are expected to rise relative to long-term interest rates, *then* a curve flattening strategy will involve the selling of short-term interest-rate futures and buying of bond futures on a duration weighted basis. By contrast, *if* short-term interest rates are expected to fall relative to long-term interest rates, *then* curve-steepening trades are recommended. These involve the:

- Buying of short-term interest rate futures
- Selling of bond futures on a duration-weighted basis

This is an example of how knowledgeable analysts and traders can use derivatives to fine-tune risk and return trade-offs. Such deals, however, are not free from exposure. Therefore, they should be made within established and accepted risk tolerances.

Investors with high risk tolerance could use derivatives to leverage their portfolios for higher returns. In turn, doing this requires them to manage their investment risk very effectively and in real time. For example, some investment banks leverage bond, equity, and currency deals with gearing raised to:

Exhibit 11.5 Yield Curve of Treasuries and Gilts (Semilogarithmic Scale)



- 600 percent for the bond module
- 300 percent for the currency and equity modules

Bankers and investors who take this path usually have a high threshold for market pain. They leverage their bets and also try to hedge them, but with no assurance that the hedge will work as intended when the critical moment comes. Because yields are volatile, they can be both speculative and hedging instruments.

One observation we can make from the graph in Exhibit 11.5 is that in normal times, long-term bond yields are higher than short-term interest rates. This fact helps to compensate investors for the higher risk of parting with their money over a longer time period. But just before recessions or sharp slowdowns:

- Yield curves flatten out or get inverted.
- Short-term rates rise above long-term bond yields.

Typically, only listed government securities are used in constructing yield curves. This fact helps to ensure that the financial paper on whose basis the yield pattern is established is homogeneous and that no credit risk effect biases the curve's shape. Analysts are particularly interested in studying this credit-risk-free structure because of its information content.

For instance, the inverse shape of the yield curve at the beginning of the 1990s revealed the impact of the Bundesbank's anti-inflationary policy. This policy was reflected in rising short-term money market rates. Then, from September 1992, the Bundesbank began to relax its interest rate policy, and short-term and long-term capital market rates initially declined in step with each other.

Subsequently, starting in February 1994, the German capital market was caught in the wake of an international upsurge in longer-term interest rates, with long-term interest rates distinctly above short-term rates. Since then, the interest differential between the short end and the long end of the market increased. From the beginning of 1996, on the yield differential between German government debt securities with a maturity of 10 years and of one year became quite large.

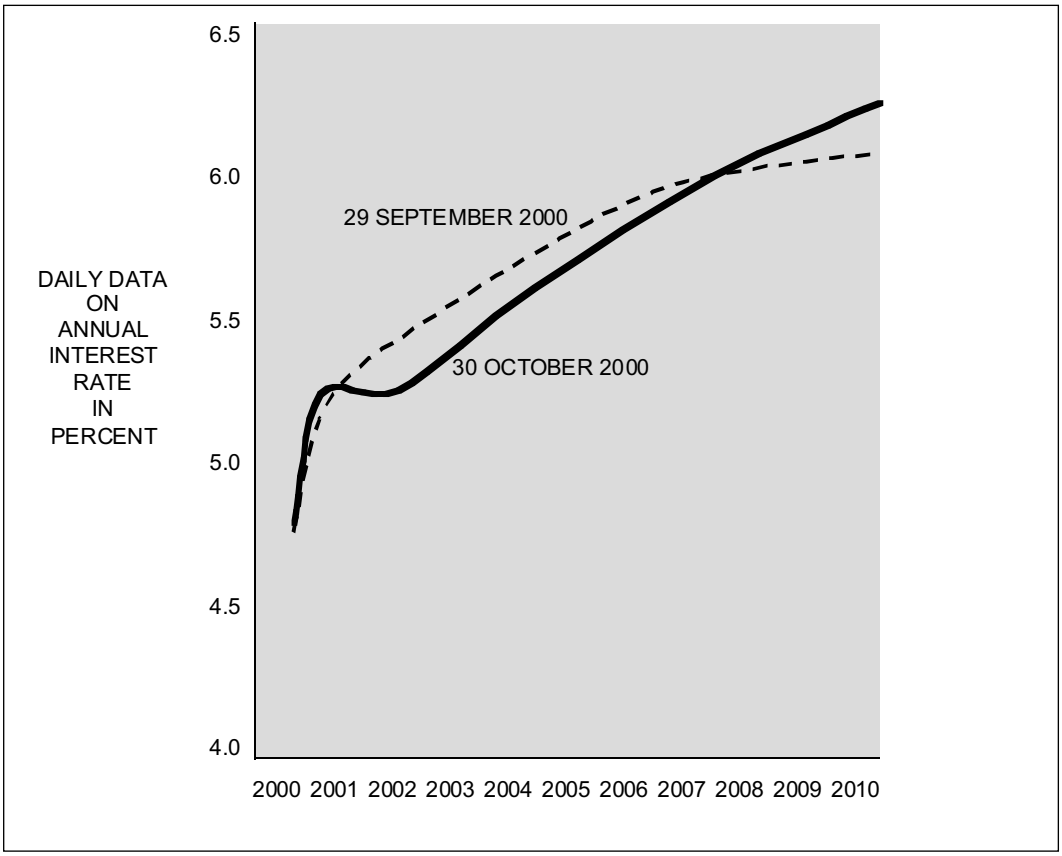
In conclusion, the shape of the yield curve is never static. It changes continuously, and even one month's difference may be significant. This is seen in Exhibit 11.6, which maps the yield curves of implied forward euro overnight interest rates as of September 29 and October 30, 2000. The implied forward yield curve in this figure is derived from the term structure of interest rates observed in the euro market. These rates reflect the market's expectation of future levels of short-term euro interest rates.

NOMINAL VERSUS REAL INTEREST RATES

One of the metrics used to judge the general interest-rate conditions in the market is the yield on domestic debt securities. This figure is established as the weighted yield on all bearer debt securities outstanding with a residual maturity of more than three years. Such a yardstick shows the average nominal financial costs that arise *if* direct recourse is taken to the debt securities market. Two observations are in order:

1. This metric correlates with bank interest rate for long-term loans.
2. It can serve as an indicator of the long-term financing costs of enterprises.

Exhibit 11.6 Yield Structures of Implied Forward Overnight Euro Interest Rates



Statistics by the European Central Bank derived from swaps contracts.

Nominal interest rates also tend to correlate with inflation rates, but the correlation coefficient is far from being equal to one. The basis for valuation of inflation-indexed securities is the expected real rate of return. This is important both to the issuer and to the buyer.

What attracts the issuer is the lower nominal cost on inflation-indexed bonds, reflecting the avoidance of the need to pay an inflation uncertainty risk premium, as the real rate is guaranteed. Also, other things being equal, the longer maturity achievable using inflation-indexed bonds influences investment decisions.

Buyers are looking for inflation protection and some other factors. For example, inflation-indexed products can assist investment managers to develop long-term savings and retirement income or provide them with the ability to enter into an inflation swap to convert the funding into either a fixed or a floating rate basis at an acceptable cost.

Among the negatives is the fact that the credit risk profile of inflation-indexed debt creates a natural limitation on the type and range of issuers. Credit risk premium demanded for lower credit

quality may be significantly higher than for a conventional bond, with the result that the cost advantage of the inflation-indexed financing is reduced or altogether eliminated.

One of the major problems is the pricing of inflation-indexed bonds. The theoretical approach is that derivation of a real-rate zero coupon curve is not too different from the construction of a nominal interest rate zero coupon curve. This might be true, provided there is a reasonably liquid market with a sufficient range of inflation-indexed securities characterized by differing maturities. Such an event, however, does not happen frequently. Therefore, in practice either of two solutions is used:

1. A term structure is chosen to derive the real-rate yield curve assuming forward inflation rates.
2. Assumptions are made about the shape of the real-rate curve able to approximate its zero coupon equivalent.

The first approach permits the valuation of options. The implied inflation term structure is computed by solving simultaneous equations of price as a function of the nominal discount factor, through interpolation. However, the relatively small size of this market presents the challenge that investor participation is restricted. This restriction leads to:

- Lack of liquidity in these securities
- Computational results that are not statistically significant

To simplify the model, in many cases a trend in inflation is assumed based on past statistics. Nominal interest rates are adjusted by simple or weighted averages of past inflation rates, and this helps to obtain an approximation of the expected real interest rate. On a longer-term average, this type of adjustment can be acceptable, but it is rather difficult to estimate the trend in real interest rates for short periods. This reference is particularly true:

- In periods of decidedly low or high inflation rates
- During a fundamental reorientation of monetary policy by the central bank

Still another problem has to do with transparency in accounting and with tax treatment. There is a continuing debate about whether inflation-indexed securities constitute a separate asset class, even if inflation-indexed instruments have been in existence since the mid-1980s.

These problems see to it that nominal rather than real interest rates are the dominant ones in the market, even if investors think in terms of real interest rates expected over the maturity of an instrument. Because inflation may escape the control of governments and central banks, there are risks involved in estimating inflation expectations, as they are not directly observable.

CHALLENGES ARISING FROM THE USE OF ELECTRONIC MONEY

Electronic money, or virtual money, is an electronic store of monetary value on a technological device that may be widely used for making payments to entities other than the issuer, without necessarily involving the intermediation of bank accounts in the transaction. Electronic money usually acts as a prepaid bearer instrument representing monetary value through a claim on the issuer.

- Electronic money is issued on receipt of funds or through account debits.
- Its amount is stored on an electronic device.
- The corresponding credit is accepted as means of payment by parties other than the issuer.

Such funds must be able to be handled by third parties who accept them by debiting the amount stored on the device and crediting the third parties' accounts. Such an operation should be done in a secure way (which is not always the case) and at low cost.

This and similar definitions recognize that single-purpose electronic payment instruments, which are accepted as payment only by their issuers, do not fall under the concept of electronic money. Single-purpose payments, such as smart cards or chip-in-card devices issued by telephone companies, are essentially down payments for goods or services that the issuer is expected to deliver at a later time. Chip-in-card solutions are used with credit cards, but do not make them safer. On the contrary, in 2000, after credit cards with chips were introduced in France, their theft increased by 50 percent.

Such distinction between prepayments for services stored in electronic form and electronic money proper is important, even if both use—for instance—chip-in-card. The term *electronic money* is reserved for products used to make payments to entities other than the issuer, implicitly incorporating within this definition two different concepts:

1. Multipurpose electronic money
2. Limited-purpose electronic payment instruments

Under the multipurpose classification, the stored purchasing power can be used widely in making payments. Limited-purpose instruments confine the purchasing power to a small number of clearly identified points of sale within a well-defined location—for instance, electronic payments accepted only for public transportation that is provided by several different companies within the same city or adjacent cities.

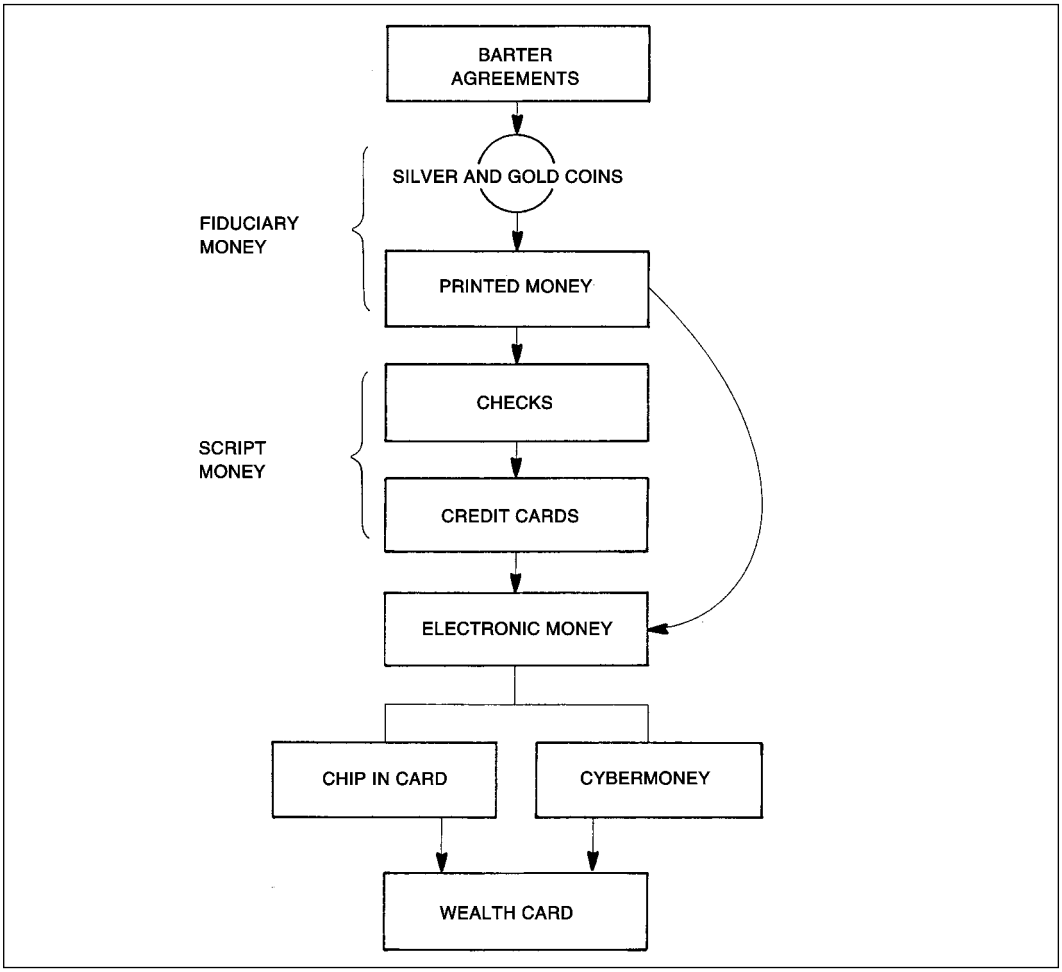
A subcategory of multipurpose electronic payments is those solutions connected to the Internet. Whenever electronic money is transferred via telecommunications networks, the term *network money* is employed, regardless of whether the electronic money is software-based or hardware-based (i.e., smart cards).

As Exhibit 11.7 suggests, electronic money can be seen as the end—but by no means as the ultimate development—of an evolutionary cycle that started at the dawn of civilization with barter agreements and was followed by silver and gold coins as fiduciary money. In terms of support, electronic money may be stored in smart cards or transit through networks.

- It can extend all the way into what some expect to become a *wealth card* carrying information on personal assets and liabilities.
- It benefits its user by facilitating payments but involves security risks because money cards can be stolen or lost.

The issuers of electronic money benefit because they capitalized on float, gaining on the interest rate—a practice well known with travelers' checks. They also can use electronic money to hold their client base. At the same time, however, they too suffer from security lapses, which may

Exhibit 11.7 Transition in the Form of Money Over 3,000 Years



become quite costly as courts tend to side with consumers who suffer from the insecurity of electronic money. (This topic is discussed in more detail later.)

Security issues aside, among the currently existing limitations that differentiate electronic money from greenbucks (paper money) is the fact that, in the majority of cases, electronic money received by the beneficiary cannot be used again. It has to be forwarded to the issuer for redemption. This process is known as closed circulation of electronic money.

The opposite is open circulation of electronic money, which functions in a similar way as banknotes and coins, allowing a number of transactions to be carried out without the involvement of the issuer. In terms of practical implementation, open circulation would be more cost effective than closed circulation, but it poses many challenges, the most important being that of needing security solutions.

Another characteristic of electronic money is the need for journaling the transactions. Theoretically, electronic money can provide varying degrees of anonymity, from total anonymity to full disclosure of the identity of the user, depending on the technical features of the individual

system. Security reasons, however, necessitate the identification of both parties to a transaction and that the keeping of a record of every transaction for auditing.

Because electronic money offers both advantages and limitations, its development and wider implementation will depend on whether consumers and merchants like it as a payment instrument. So far, from the early test of smart cards in Norway in the late 1980s, to the intensive tests in the United States in the late 1990s, the answer has been negative.

It is appropriate to examine security connected to electronic money, because its absence is a major roadblock to the acceptance of new forms of payments. Theoretically, but only theoretically, smart cards provide a higher level of security. Practically, however, this is not so. If it were, smart card crime would not have increased more than 25 percent in France in the year 2000.

From time to time, some new approaches are adopted to improve security. The latest is biometric identification, which can be incorporated into a smart card. One of the features in biometrics is the fingerprint. It can be stored as a binary data string or as a template. Another biometric is the retina. Smart cards also can store signatures and voice. None of these approaches is fool-proof.

Visa and Mastercard, among others, have done trials in the United States using smart cards with fingerprint biometrics. Other firms examined solutions for rewriting information with smart cards in a way that cannot be read by unauthorized persons. Any cryptographic code can be broken. All these security measures, however, fail to consider the fact that smart cards can get easily lost or stolen. When this happens, all biometrics information of the legitimate user is wide open to thieves.

Protection through the now-substandard personal identification number (PIN) is most unreliable, because these numbers easily fall into the hands of third parties. On the positive side, PINs can be changed easily, but fingerprints cannot be. Once the smart card is in the hands of a gang, the true owner of the new smart card—and his or her account—cannot be safe at any time, in any place. Security is a truly major challenge with electronic money, including network money. Thus far no solution available solves the security problem.

When asked "What does one do with virtual money?" Walter Wriston, the former CEO of Citibank, suggested: "One pays his bills." But then he added: "The problem with this kind of money is the *security* of the networks. There exist too many 16-year-olds with gold chains around the neck, who break into the data system."

Wriston pointed out that it is possible to work on more secure solutions through an ingenious use of hardware and software. But technology changes so fast that it would be impossible to say which system is really secure in the longer term. The world today has become so transparent in an information sense that nothing can be properly secured anymore, much less secured in a lasting way.

CHAPTER 12

Mismatched Risk Profiles and Control by the Office of Thrift Supervision

The events that led to the meltdown of the savings and loan (S&L) industry in the United States in the late 1980s/early 1990s are recent enough that they do not need to be retold. What is important in connection with the salvage of the thrifts industry is the action that followed its restructuring—and, most particularly, ways and means established for controlling its interest-rate profile.

Wise people learn from their mistakes, and the wisest people are able to capitalize on the mistakes of others to help them face challenges presented in the future. Here is, as an example, how chroniclers described the way Romans reacted in the aftermath of their defeat in the third century B.C. at the hands of the Gauls: "The ascendancy acquired by Rome in 100 years was lost in a single campaign. But the Romans with characteristic doggedness set to work to retrieve their losses. With equally characteristic sagacity they studied their own failure and drew profitable lessons from it. A great disaster was the prelude to far-reaching victories.[1]

This quotation applies to the action taken by the regulators of the S&L industry right after the disastrous events of the late 1980s. Guidelines set by the Office of Thrift Supervision (OTS) see to it that senior management ensures the bank's exposure to the volatility of interest rates is maintained within self-imposed limits. A system of interest-rate risk controls elaborated by OTS:

- Helps in setting prudent boundaries for the level of interest-rate risk chosen by the institution
- Provides the capability to set and control limits for individual portfolios, activities, and business units

The financial reporting system examined in this chapter ensures that positions exceeding limits, or other predetermined levels, receive prompt management attention and are directly communicated to regulators. Established procedures ensure that senior executives of the institution are notified immediately of any breaches of limits. The OTS also has been instrumental in promoting clear policies as to how the board and top management of a thrift must be informed so that timely and appropriate corrective action is taken.

To keep exposure under control, the OTS steadily monitors the entire S&L industry—and this monitoring is proactive. When supervisory authorities follow this policy, they help the banks they control to confront their problems. It is no coincidence that the best-managed financial institutions are way ahead of all other banks in solving their challenges before they become too big and too risky.

Timothy J. Stier, the chief accountant of the OTS, explained in a factual and documented manner why proactive information and experimentation is so important to the proper conduct of the thrifts' business. With the world of the mortgage loans changing and with interest-rate risk being under the spotlight more than ever before, the S&L (and all other credit institutions) always must watch out both for generalized exposure and for specific risks of individual investments.

INTEREST-RATE RISK MEASUREMENT AND OFFICE OF THRIFT SUPERVISION GUIDELINES

After the events of the late 1980s, the Office of Thrift Supervision paid a great amount of attention to interest-rate risk. Ninety percent of the regulated 1,119 S&Ls, specifically the larger thrifts, file a report providing the OTC with interest-rate risk information. This report uses a regulatory compliance model.

The concept behind this model is important to every financial institution. It integrates *what-if* hypotheses on the movement of interest rates and integrates maturity ladders. The OTS runs the submitted results through Monte Carlo simulation. Over the years, the thrifts have learned how to perform:

- Worst-case scenarios
- Sensitivity measurements
- Capital-before-shock calculations
- Capital-after-shock calculations

As a matter of policy, the OTS strongly recommends that institutions have in place interest-rate risk measurement systems able to capture all material sources of interest-rate risk. Such measurement systems should incorporate sound assumptions and parameters, which are both understood by senior management and followed by the operating units.

The following paragraphs describe in a nutshell what an interest-rate risk measurement system must assess. First and foremost is the amount of interest-rate risk that has been assumed by type of loan and interest-rate bracket. The next most important issue is the effect of interest-rate changes on both earnings and economic value. Financial reporting required by the OTS addresses all material sources of interest-rate risk including:

- Repricing
- Yield curve
- Basis risk
- Option risk exposures

While all of a bank's holdings should receive appropriate treatment, financial instruments whose interest-rate sensitivity may significantly affect the institution's overall results must be subject to special attention. For an S&L, for example, this is true of mortgages. The same concept is valid with other instruments whose embedded options may have major effects on final results.

The thesis of the OTS is absolutely correct: The usefulness of any interest-rate risk measurement system depends on the validity of the underlying assumptions. Management assumptions have significant impact on accuracy; therefore they must follow a prudent methodology, and they should be

validated through real-life data. In designing interest-rate risk measurement solutions, banks must ensure that:

- The degree of detail regarding the nature of their interest-sensitive positions is commensurate with the complexity and risk inherent in those positions, and
- Senior management assesses the potential loss of precision by determining the extent of aggregation and simplification used by the measurements and in hypotheses.

Senior management, the OTS suggests, should see to it that all material positions and cash flows, including off–balance sheet positions, are incorporated into the interest-rate measurement system. Where applicable, this data must include information on coupon rates and cash flows of associated instruments and contracts.

Few thrifts—only 76 out of 1,119—have entered the derivatives market. "Once in a while we find a thrift who bought a reverse floater, but the majority of the savings and loans keep out of this market," said Timothy Stier.

Regulators insist that management pay special attention to those positions with uncertain maturities. Examples include savings and time deposits, which provide depositors with the option to make withdrawals at any time. To increase sensitivity to factors of timing, basic assumptions used to measure interest-rate risk exposure should be re-evaluated at least annually:

- Hypotheses made in assessing interest-rate sensitivity of complex instruments should be explained properly and reviewed periodically.
- Any adjustments to underlying data should be documented, and the nature and reason(s) for the adjustments should be explicit.

The OTS believes that all these basic policy steps are necessary for rigorous interest-rate risk management. For a commercial bank—and even more for a thrift—interest-rate risk significantly increases the vulnerability of the institution's financial condition to market liquidity and volatility.[2] Savings and loans, as well as practically all commercial banks, have experience with deposits and loans, but senior management does not always appreciate that while interest-rate risk is a part of financial intermediation, an excessive amount of such risk poses a significant threat to an institution's earnings and capital:

- Changes in interest rates affect a bank's earnings by altering interest-sensitive income and expenses.
- Such changes also impact on the underlying value of the bank's assets, liabilities, and off–balance sheet instruments.

Future cash flows change when interest rates change, and the interest-rate risk banks are confronted with comes from several sources: repricing, yield curve, basis risk, and options risk. All these are factors affecting the level of exposure and must be confronted in an able manner.

Both the guidelines and the models developed by the OTS are, in their basics, quality control measures. They both complement and are complemented by the statistical quality control principles and charts[3] as well as by approaches based on behavioral science.

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PRACTICAL EXAMPLE ON THE ROLE OF BASIS POINTS IN EXPOSURE

A *risk point* represents the amount of gain or loss that would result from a given movement in interest rates. In some cases this is a fixed movement; for instance, 1 percent. In others, a changing estimate of likely movements is used, and it is regularly adjusted in light of recent historical data.

Several banks have an overall risk point limit, which often is suballocated to different trading desks and portfolio positions. Others find that this is not necessarily the best approach because the planning and control of risk point limits is no exact science. Instead, top management wants to know the change in value in inventoried positions, if and when interest rates increase or decrease by x basis points or 1/100 of 1 percent.

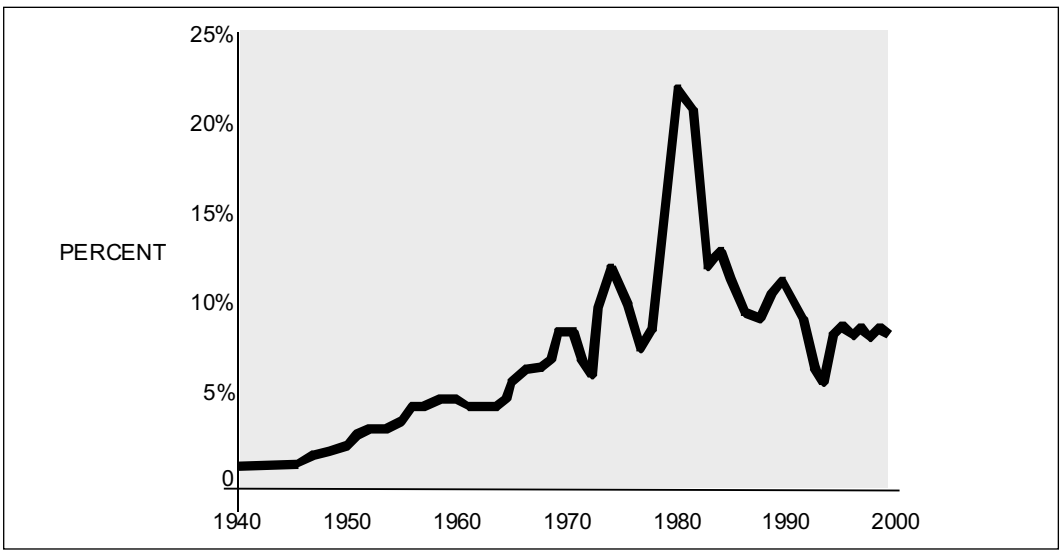
This concern is perfectly justified because interest rates are volatile. They vary intraday, daily, weekly, and monthly, often upsetting the most carefully laid out plans, unless an entity exercises utmost vigilance over its portfolio positions. Macroscopically speaking, volatility is shown in Exhibit 12.1 over a 60-year timeframe.

The experimental method that has been implemented and applies to all thrifts takes current interest rates and changes them 100, 200, 300, and 400 basis points up and down. The *adverse condition* is the 200-basis-point shock level. For the U.S. banking industry, the Office of the Comptroller of the Currency also has developed models that assist in handling interest-rate risk.

The OTS has developed a standard reporting methodology for S&Ls. Prudential financial reporting by the thrifts now distinguishes between:

- Trading, and
- Risk management

Exhibit 12.1 Volatility in U.S. Prime Interest Rate from 1940 to 2000



The assumptions made by thrifts regarding the impact of interest-rate volatility on earnings and cash flow is not public knowledge, but basis points provide a good example. Cisco's 1988 Annual Report elaborates a hypothetical change in fair value in the financial instruments held by the company at July 25, 1998. While Management said that these instruments were not leveraged and were held for purposes other than trading; still, they have significant sensitivity to changes in interest rates. The method used by Cisco is, to my judgment, an excellent paradigm for financial institutions as well.

The modeling technique used measures change in fair values arising from selected potential changes in interest rates. The market changes entering this simulation reflect immediate parallel shifts in the yield curve of plus or minus 50 BPs, 100 BPs, and 150 BPs over a 12-month time horizon.

- *Beginning fair values* represent the market principal plus accrued interest, dividends, and certain interest-rate–sensitive securities considered cash and equivalents for financial reporting purposes.
- *Ending fair values* comprises the market principal plus accrued interest, dividends, and reinvestment income at a 12-month time horizon.

Exhibit 12.2 estimates the fair value of the portfolio at a 12-month time horizon. There are rather minor differences in valuation at the 50 BPs, 100 BPs, and 150 BPs level. The importance of this example derives precisely from this fact, which demonstrates a well-balanced portfolio.

In its 1998 annual report, Cisco observed that a 50-BPs move in the federal funds rate has occurred in nine of the last 10 years; a 100-BPs move has occurred in six of the last 10 years; and a 150-BPs move has occurred in four of the last 10 years, with the last reference being on September 30, 1998. In other terms:

Exhibit 12.2 Estimated Fair Value of a Portfolio (in $Millions) at a 12-Month Time Horizon

Issuer	Valuation of Securities Given an Interest Rate Decrease of X Basis Points			No Change in Interest Rates	Valuation of Securities Given an Interest Rate Increase of X Basis Points		
	(150 BPs)	(100 BPs)	(50 BPs)		50 BPs	100 BPs	150 BPs
U.S. Government notes and bonds	$1,052	$1,050	$1,047	$1,045	$1,043	$1,040	$1,038
State, municipal, and county government notes and bonds	3,530	3,488	3,488	3,409	3,369	3,330	3,292
Foreign government notes and bonds	33	33	33	33	33	33	33
Corporate notes and bonds	810	809	809	807	806	805	804
Total	$5,425	$5,380	$5,336	$5,294	$5,251	$5,208	$5,167

- Volatilities of 50, 100, and 150 BPs are fairly frequent, and senior management must be always ready to face them.
- The 200 BPs volatility, which is an OTS benchmark, is not as frequent but neither is it an outlier.
- By contrast, the 300 and 400 BPs volatilities (both plus and minus) used by the OTS model can be seen as outliers; therefore they are benchmarks for stress testing.

Notice that 100 BPs is not an extreme event but a reference value. As the Russian meltdown of August 1998 demonstrates, the sky may be the limit. Exhibit 12.3 presents movements of yield spreads in the bond markets and associated risk premiums for Russian, Brazilian, and Argentine bonds.

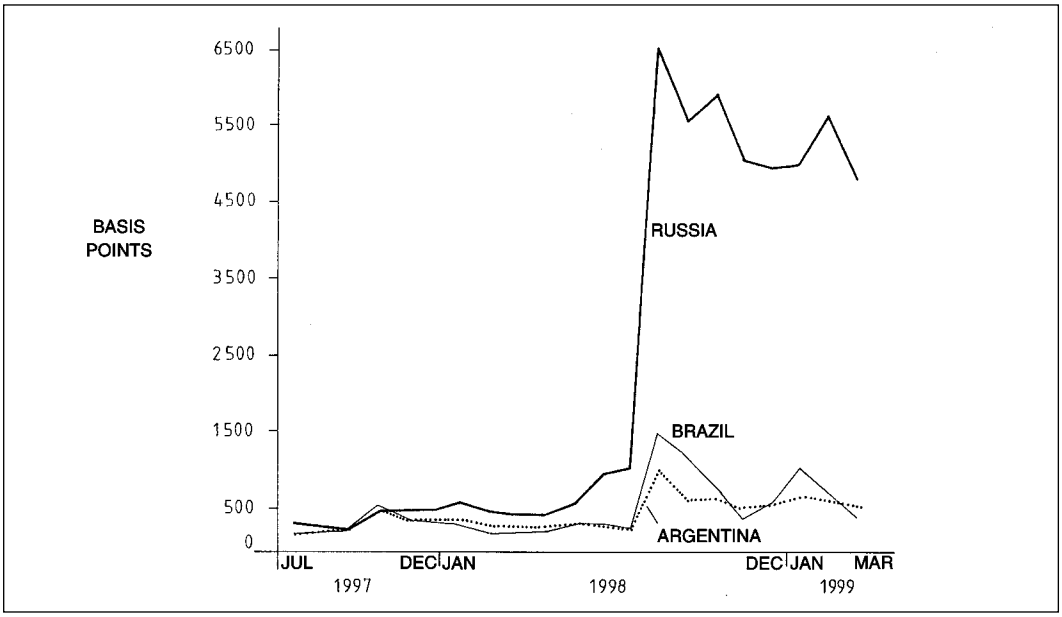
- The risk premium for Russian bonds jumped 5.500 BPs practically overnight.
- Argentine debt suffered a yield spread of 700 BPs, while neighboring Brazil saw a 1200 BPs jump.

All three are extreme interest-rate events, although the Russian panic beats the Latin American ones by a large margin. As the figures show, this event threatened the Russian economy in its foundations at a time when some sort of economic and financial recovery was crucial, because such recovery was the only way to avoid a deep recession.

A rigorous analysis of interest-rate risk exposure must consider not only extreme events in yield spread but also risk-adjusted duration. *Risk-adjusted duration* is a metric in which effective duration is augmented for negative convexity, interest-rate volatility, incremental prepayment risk, spread risk, currency risk, hedging, and gearing.

For instance, spread risk estimates reflect percentage change in the portfolio's market value

Exhibit 12.3 Change in Risk Premiums Through Extreme Events Characterizing Spreads in the Bond Market



because of changing yield spreads. A growing yield spread reflects a risk premium demanded by the market for holding securities of a lesser quality than risk-free U.S. Treasuries. Corporates are an example.

One of the reasons that led to the near bankruptcy of Long-Term Capital Management (LTCM) in September 1998 was that its partners and Nobel prize–winning rocket scientists misjudged the direction of yield spreads.[4] Corporate bonds always feature a premium over credit-risk-free Treasuries. As shown in Exhibit 12.4:

- The premium demanded by investors is much higher for BBB-rated corporates than for AAA ones.
- In the second half of 1998, market nervousness saw to it that all premiums increased, and with them the spread.

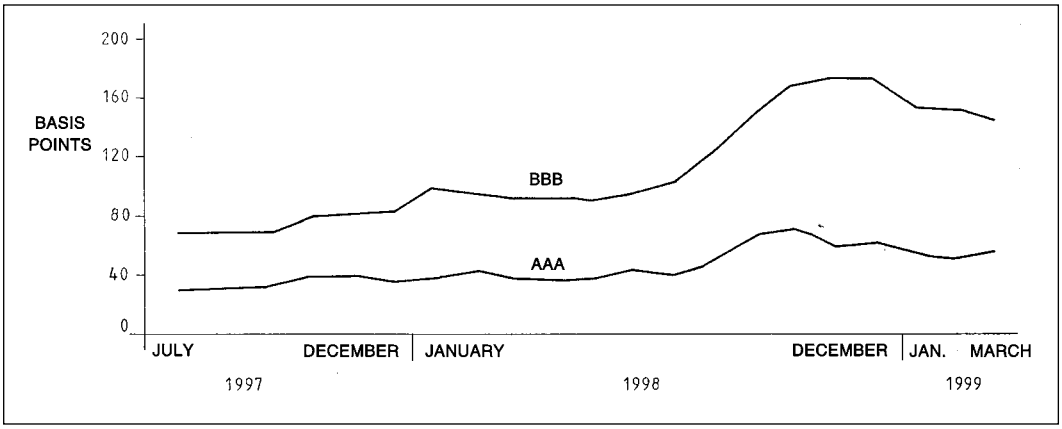
Yield spreads are volatile. They narrow and widen in response to a number of factors, including liquidity, changes in credit quality, market volatility, supply and demand pressures, perceived future conditions, and investor sentiment. The bank that plans its loans and investments without paying attention to these factors prepares itself for major disappointments—and eventually for bankruptcy.

SENSITIVITY TO MARKET RISK AND POST-SHOCK PORTFOLIO VALUE

The primary form of interest-rate risk to a deposit-taking bank that gives loans arises from timing differences in the maturity and repricing of assets, liabilities, and off–balance sheet positions. Down to the fundamentals, this is structural risk, or *mismatch risk*. Mismatches are part and parcel of commercial banking, and they can expose the institution's income and economic value. If interest rates change, a credit institution that funded a long-term fixed rate loan with a short-term deposit is liable to face a decline in both:

- Its future income arising from loans and investments
- Its capital position, which is of value to shareholders and society

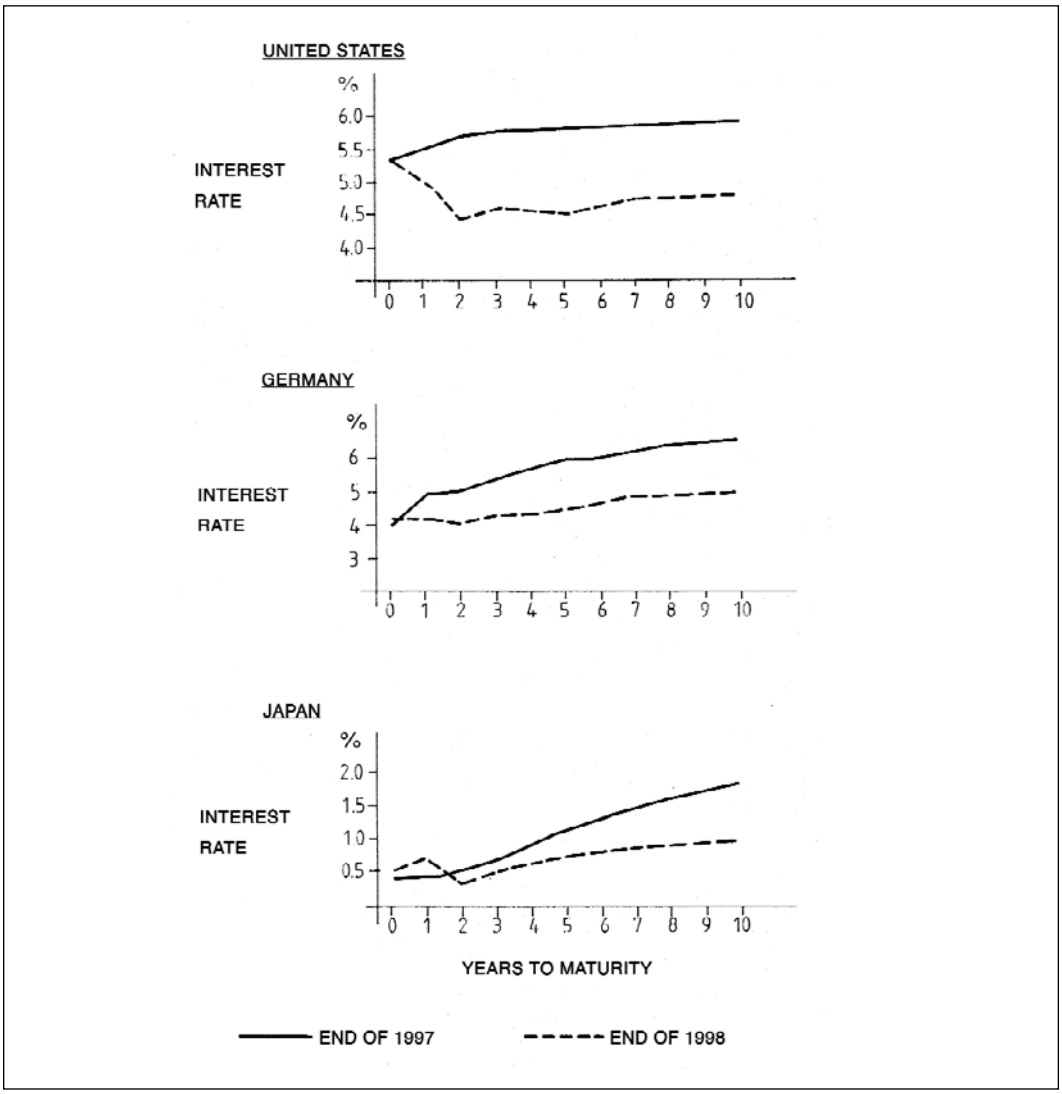
Exhibit 12.4 Risk Premiums for American Enterprises with AAA and BBB Ratings



Repricing mismatches also can expose a bank to changes in both the slope and the shape of the yield curve. Yield curve risk arises when unexpected shifts of the yield curve have adverse effects on an institution's income. "Unexpected risks" is of course a misnomer. Management should never be taken by surprise when the yield curve changes significantly. It should attack the issue head on through experimentation.

Short-term and long-term bond yields may rise or plunge significantly at short notice. As an example of yield changes on U.S., German, and Japanese bonds, Exhibit 12.5 presents statistics for 10-year government securities. Bond yields have plunged over 1998, reflecting:

Exhibit 12.5 Yield Curves for 10-year Government Bonds



- Lower inflation expectations
- Investors' flight from risky equities

Over the same timeframe, short-term yields also were generally lower because interest-rate cuts were in the offing. Another source of interest-rate risk comes from imperfect correlation in the adjustment of the rates earned and paid on different financial instruments with otherwise similar repricing characteristics.

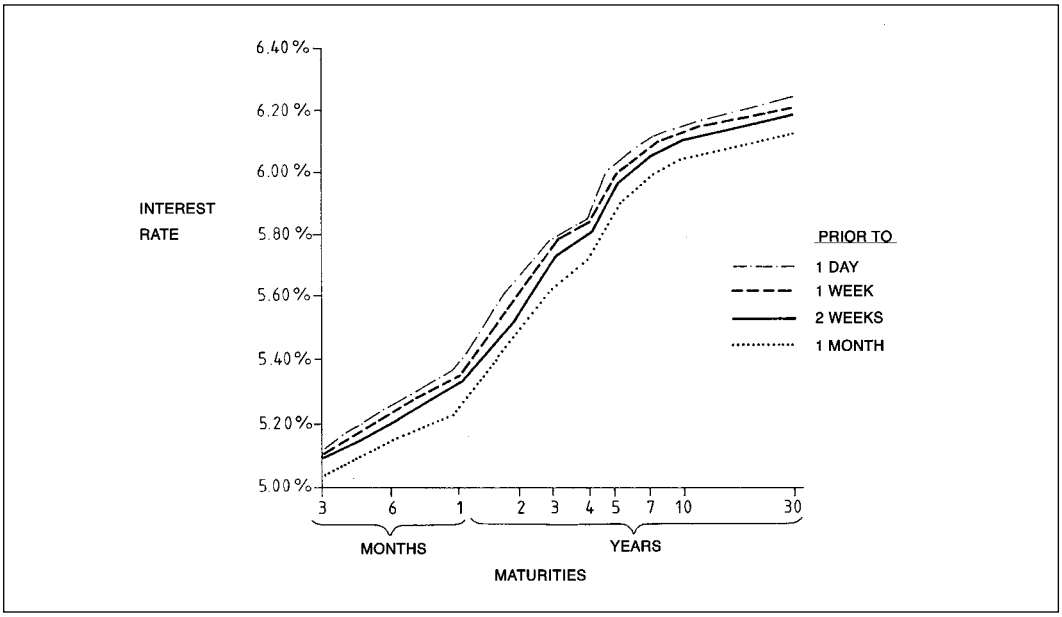
When interest rates change, these differences can cause changes in the cash flows and earnings spread among assets, liabilities, and off–balance sheet instruments of similar maturities or repricing frequencies. For instance, funding a five-year loan that reprices quarterly based on the three-month U.S. Treasury bill rate with a four-year deposit that reprices quarterly based on three-month LIBOR exposes the institution to the risk that:

- The spread between the two index rates may change unexpectedly, and
- Without appropriate tools and real-time systems, management does not have time to hedge.

Volatility has always been a characteristic of the financial markets, and the yield curve against which interest-rate exposure is measured can change fairly rapidly before a bank is able to reposition itself. Exhibit 12.6 dramatizes how investor uncertainty alters the yield curve of U.S. Treasury bonds within one day, one week, two weeks, and one month.

Interest-rate risk also arises from options embedded in many financial instruments. Products with embedded options include bonds and notes with call or put provisions, loans that give borrowers the right to prepay balances, and adjustable rate loans with interest-rate caps or floors that limit the amount by which the rate may adjust.

Exhibit 12.6 Yield Curves of Treasury Bonds at Different Time Intervals



Other examples of sources of exposure to interest-rate risk are various types of nonmaturity deposits that give depositors the right to withdraw funds at any time, often without any penalties. While each one of these rexamples is different from the others, they all have in common exposure related to interest-rate risk.

The OTS has developed two tools to help the thrifts industry, and by extension commercial banks, face the challenges resulting from interest-rate volatility, which is part of their core business: *Sensitivity to Market Risk* ("S"-rating) and *Post-Shock Portfolio Value Ratio*, which is essentially a *Net Present Value Ratio* (NPVR). Rating a financial institution in terms of sensitivity to market risk is based on two dimensions evaluated by OTS examiners:

1. The bank's levels of market risk
2. The quality of its risk management practice

These tools are of interest to any financial system because they apply well beyond OTS. They have been elaborated by the Federal Financial Institutions Examination Council (FFIEC), which represents the major regulators: Federal Reserve System, Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency, Office of Thrift Supervision, and National Credit Union.

The FFIEC is a U.S. interregulatory agency that has provided the infrastructure for a uniform ratings system. Its work has established several qualitative characteristics of risk and is used for describing the five levels of the "S" component ratings applied by the OTS in its supervisory model. These levels are:

1. Minimal
2. Moderate
3. Significant
4. High
5. Imminent threat

Interest-rate risk levels are very helpful in keeping a close watch on exposure taken by OTS-regulated institutions. Computed results are based on a combination of each bank's post-shock NPVR and interest-rate sensitivity measure. The four interest-rate risk management levels in connection to interest rates used by the OTS are summarized in Exhibit 12.7 along with the corresponding quality of risk management practices. This matrix is for guidance; it is not mandatory.

Examiners can exercise judgment in a number of issues. Generally, however, an institution with a post-shock portfolio value ratio below 4 percent is entering an area of turbulence. An interest-rate sensitivity measure of:

- More than 200 basis points is ordinarily characterized as high risk—a danger zone
- 100 to 200 basis points tends to be more controllable through good management
- Zero to 100 basis points is an acceptable variation

A moderate-risk institution typically will receive a rating of 2 for the "S" component. Provided that the institution's sensitivity to interest-rate changes is extremely low (an example being that of Cisco discussed earlier), a rating of 1 may be assigned. A condition for such a rating is that the

Exhibit 12.7 Guidelines for "S" Component Rating Evaluated Relative to an Institution's Size, Complexity, and Level of Interest Rate Risk

Quality of Risk Management Practices*	Level of Interest Rate Risk			
	Minimal Risk	Moderate Risk	Significant Risk	High Risk*
Well Controlled	S = 1	S = 2	S = 3	S = 4 or 5
Adequately Controlled	S = 2	S = 2	S = 3	S = 4 or 5
Needs Improvement	S = 3	S = 3	S = 3	S = 4 or 5
Unacceptable	S = 4	S = 4	S = 4	S = 4 or 5

* To get a component rating of 5, an institution's level of interest rate risk must be an imminent threat to its viability, having a high level of risk and being critically undercapitalized.

institution is not likely to incur larger losses under rate shocks other than parallel shocks depicted in the OTS model. (The next section explains the meaning of a rating of 1, 2, 3, and so on.)

By contrast, in the case of an interest-rate sensitivity measure of 100 to 200 basis points, the institution will typically receive a rating of 3 for the "S" component. This is well below the rating of 1. If the interest-rate sensitivity measure is more than 200 basis points, it will receive a 4 or 5 rating for "S," which is very bad indeed.

LEVELS OF INTEREST-RATE RISK AND QUALITY OF RISK MANAGEMENT

The OTS has elaborated a set of quality control guidelines used by its examiners in assessing the level of risk taken by a savings and loan. These guidelines include the quality of the S&L's risk management policies and practices as well as how prevailing conditions help to combine these assessments into an "S" component rating for the institution. A rating of 1 corresponds to an "A" rating in college grades, and it indicates that:

- Market risk sensitivity is well controlled by the thrift's senior management.
- There are few reasons to believe that earnings performance or capital position will be adversely affected.

Market risk may not be very well controlled, but the examiner may consider that it is adequately managed or needs only minor improvement. In this case, the institution does not qualify for a component rating of 1, but 2 might do. The level of market risk, however, might be more than minimal: moderate, significant, or high—leading, respectively, to ratings of 3, 4, and 5.

Applying the same approach to the descriptions of the 2, 3, 4, and 5 levels of the "S" component rating results in a framework of ratings guidelines. These guidelines were presented in Exhibit 12.7, which summarized how to translate into a rating various combinations of examiner assessments about an institution's:

- Level of interest-rate risk and
- Quality of risk management practices.

The results of an examination can be translated into a rating. Notice, however, that in this exhibit the first two dimensions are not totally independent of one another, because the quality of risk management practices is evaluated relative to an institution's level of risk.

A logical conclusion is that an institution's risk management practices are more likely to be assessed as well-controlled if it has minimal risk. Always subject to the examiners' direction, the OTS also has established guidelines for level of interest-rate risk as a function of:

- Sensitivity measures
- Post-Shock Portfolio Value Ratio

These are shown in Exhibit 12.8. There are four graduations in NPVR: Below 4 percent; 4 percent to 8 percent; 8 percent to 12 percent; and over 12 percent. Expressed in hundreds of basis points, the sensitivity measure changes with each post-shock NPVR.

Other things being equal, the higher the NPVR, the better the rating for the "S" component tends to be. For instance, if an institution has a post-shock NPVR between 8 percent and 12 percent, then an interest-rate sensitivity of 400 basis points typically will receive a rating of 3 for "S." This is summarized in Exhibit 12.8.

The quantification of criteria just explained has made a significant contribution to objectivity in terms of quality control evaluation related to interest-rate risk. Typically examiners base their conclusions about a bank's level of interest-rate risk on the sensitivity of the bank's net portfolio value to interest rates, but thanks to standardization of the net portfolio value, measures are more readily

Exhibit 12.8 Office of Thrift Supervision Guidelines for Level of Interest-Rate Risk

Post-Shock Net Portfolio Value Ratio (NPVR)	Interest Rate Sensitivity Measure			
	0–100 BP	100–200 BP	200–400 BP	Over 400 BP
Over 12%	Minimal Risk (1)	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)
8% to 12%	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)
4% to 8%	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)
Below 4%	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	High Risk (4 or 5)

The numbers in parentheses represent the preliminary "S" component ratings that an institution would ordinarily receive barring deficiencies in its risk management practices. Examiners may assign a different rating based on their findings.

comparable across institutions in terms of exposure and earnings sensitivity. Net portfolio value, according to the OTS, focuses on longer-term analytics than other methods.

- Interest-rate sensitivity of earnings is usually measured in the short-term horizon of up to one year.
- Interest-rate sensitivity alone is not enough to gauge a bank's likelihood of survival.

Because a bank's risk of failure is closely linked to capital, which enhances its ability to absorb economic adversity, institutions with a high level of economic capital—hence high net portfolio value—are better positioned to support a higher sensitivity measure. That is what the supervisors' requirements for capital adequacy are all about.

In discussions, Stier pressed the fact that the post-shock net portfolio value ratio is a more comprehensive gauge of risk than other sensitivity measures, because it incorporates estimates of the value of an institution's portfolio in addition to the reported capital level and interest-rate risk sensitivity. If the NPVR is low, it is risky. The reasons for the risk may be:

- Capital inadequacy
- High interest-rate sensitivity
- A significant unrecognized depreciation in portfolio value

Several critical factors should be evaluated to establish the causes of the problem faced by senior management: capital adequacy, asset quality, and earnings. When an institution's low post-shock ratio is, in whole or in part, caused by high interest-rate sensitivity, an interest-rate risk problem is likely.

In drawing conclusions about the quality of an institution's risk management practices, which is the other dimension of the "S" component rating, examiners assess all vital aspects of the institution's risk management practices. To aid in that assessment, the OTS provides guidelines on sound practices for market risk management, suggesting the methodology that institutions of varying levels of sophistication may utilize. Such guidelines evolve as:

- The overall level of interest-rate risk at the institution expands
- The size of the institution increases
- The complexity of its assets, liabilities, and derivatives grows

Quality of management criteria include awareness of market risk and credit risk at all management levels; establishment of and adherence to limits; a rigorous methodology for measuring net portfolio value sensitivity; and a system for earnings sensitivity based on database mining. Financial analysts will appreciate that these are also the criteria through which they evaluate the quality of management of a financial institution.

SENSITIVITY MEASURES AND LIMITS ON DEALING WITH COMPLEX SECURITIES

It should be absolutely evident—even if it is not common practice—that the board and senior management of a bank must understand the various risks associated with loans, investment securities,

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and derivatives financial instruments. The board and senior management also should understand and appreciate the metrics of exposure, associated sensitivities, and the testing procedures.

A sound policy requires that prior to taking an investment position or initiating a derivatives transaction, managers and traders ensure in a factual and documented manner that:

- The projected transaction is legally permissible.
- The terms and conditions of the security are properly defined.
- The proposed transaction is consistent with the institution's portfolio objectives and liquidity requirements.

Throughout this exercise, bankers should prove due diligence in assessing the market value, liquidity, interest-rate risk, and credit risk of their loans and other investments. They also should conduct a preexecution portfolio sensitivity analysis for any trade involving securitized loans, bonds, stocks, or derivatives. This is particularly important with complex deals, which can be:

- Significant transactions in monetary terms, and/or
- Complex securities structures and new, less-well-known instruments

A *significant transaction* is any transaction, including one involving simpler financial instruments, that might reasonably be expected to increase an institution's sensitivity measure by more than 25 basis points. The OTS requires that prior to undertaking any significant transaction:

- Management should conduct an analysis of the incremental effect of the proposed transaction on the interest-rate risk profile of the institution.
- This analysis should show the expected change in the institution's net portfolio value, with and without the proposed transaction.

A thorough evaluation would consider the change that would result from an immediate parallel shift in the yield curve of plus and minus 100, 200, and 300 basis points. These are test levels making feasible stress analysis of the institution's lending portfolio and other interest-sensitive instruments.

Complex securities are a different ballgame. An example is derivative financial instruments beyond swaps, forwards, futures, and options, such as: exotic options, loopback options, swaptions, synthetic derivatives, long straddles, long condors, and all-or-nothing options. The OTS requires that prior to taking a position in any complex security or financial derivative, a thrift institution should conduct a price sensitivity analysis of that instrument.

At a minimum, this prepurchase analysis should show the expected change in the value of the instrument that would result from an immediate parallel shift in the yield curve of plus and minus 100, 200, and 300 basis points. Where appropriate, the yield curve analytics should encompass a wider range of scenarios, including:

- Nonparallel changes in the yield curve
- Increases or decreases in interest-rate volatility
- Changes in credit spreads
- Changes in prepayment speeds in the case of mortgage-related securities

The general guideline by the OTS is that an institution should conduct its own in-house pre-acquisition analysis. Such analysis is doable; it is not always easy because many institutions lack the appropriate skills. Therefore, the OTS guidelines should also be interpreted as an invitation by the regulators to the thrifts to acquire the needed know-how.

The OTS places great emphasis on the sensitivity to market risk because it reflects the degree to which changes in interest rates, currency exchange rates, equity prices, or commodity prices can adversely affect a bank's assets or earnings. A major contributor to successful financial activities is management's ability to:

- Identify
- Measure
- Monitor
- Control

market risk. Critical to this process is management's know-how and skill in comprehending the complexity of the instrument—as well as in evaluating the adequacy of capital and earnings in connection to market risk exposure. As explained earlier, the OTS has established a ratings scale whereby a score of:

- 1 indicates sensitivity is well controlled
- 2 tells that sensitivity is adequately controlled
- 3 suggests that it needs improvement in sensitivity measures
- 4 says current practices are unacceptable
- 5 warns of an imminent threat to the thrift's viability

Given the right know-how, this classification of sensitivity scores in terms of interest-rate risk can be of invaluable assistance to the board and senior management. But it cannot be repeated too often that one of the problems the financial industry faces today is that, as a rule, significant transactions and investments in complex securities are not being matched by adequate risk:

- Measurement
- Monitoring
- Management control

Derivatives and other complex securities with high price sensitivity should be subject to a thorough precommitment analysis. They also should be limited to transactions that lower an institution's interest-rate risk as measured by the sensitivity of net portfolio value to changes in interest rates.

The OTC has gone to great pains to explain to the institutions it supervises that the use of derivatives or other complex securities with high price sensitivity constitutes a risky enterprise. Such complex securities should be used only for the purpose of reducing risk, not for leveraging. Furthermore, any and every institution that does not meet the conditions set forth for prudential management may be considered to be indulging in an unsafe and unsound practice if it uses any type of derivatives, no matter for what reason.

A similar statement can be made in connection to counterparty risk. With the world of finance rapidly changing, credit institutions and investors at large have to substitute the generalized crisis

risk for the specific risks of individual investments—whether these are loans, securities, or derivatives. The proper evaluation and reevaluation of exposure may defy the past labels of prudence, substituting for them new directives that need to be tested continually for efficiency and effectiveness.

TUNING EXAMINATION FREQUENCY TO THE QUALITY OF AN INSTITUTION

In April 1998 the Office of Thrift Supervision and other U.S. federal banking regulators made final an interim rule that permits less frequent examinations for relatively small but well-run thrifts and banks. This decision is significant because it essentially applies the concept of normal inspection, tightened inspection, and reduced inspection, which was developed by Columbia University for the Manhattan Project, to provide a rigorous basis for statistical quality control.[5]

- When reduced inspection is applied, this rule shifts the exam cycle for eligible institutions to every 18 months from every 12 months.
- To be eligible for the 18-month frequency, a thrift or bank must have both first-class internal control and $250 million or less in assets.
- In the OTS case, the quality criteria will be a rating of 1 or 2 (as discussed earlier), good capitalization, and a first-class management.

These quality characteristics can be nicely plotted on a quality control chart by variables through long time series. As far as the regulators are concerned, a longer examination cycle for less risky institutions permits them to focus their resources on thrifts and banks that present the most immediate supervisory concerns.

To guide the board and senior management toward sound banking practices, the OTS and the other U.S. regulators have spelled out the six deadly sins of investment and trading decisions. The supervisory agencies believe the practices identified by these managerial and financial misbehaviors should not occur in available-for-sale or held-to-maturity securities portfolios:

1. Gains trading
2. When-issued securities trading
3. Pair-offs
4. Extended settlements
5. Repositioning repurchase agreements
6. Short sales

Gains Trading

Gains trading consists of purchase and subsequent sale of securities at a profit after a short holding period, while other securities acquired for this purpose that cannot be sold at a profit are retained in the available-for-sale or held-to-profit portfolio.

When-Issued Securities Trading

In when-issued securities trading, securities are bought and sold in the period between the announcement of an offering and the issuance and payment date of the securities; these are essentially arbitrage-type transactions.

Pair-offs

Pair-offs consist of purchase transactions that are closed out or sold at or prior to the settlement date. Few banks appreciate that more money can be lost than made with pair-offs.

Extended Settlements

An example of an extended settlement is the use of a settlement period in excess of what is generally considered normal. This usually is done to facilitate speculation and/or to bypass prudential limits.

Repositioning Repurchase Agreements

Repositioning repurchase agreemens is a funding technique offered by a dealer in an attempt to enable an institution to avoid recognition of a loss or at least delay the day of reckoning.

Short Sales

Short sales are sales of securities that are not owned by the institution. Short sales are made on the prognostication of a bear market and on the hope that the securities will be repurchased later on at a lower price. Short sales are dangerous because the bottom may fall off the market.

Typically, these transactions are databased, and database mining permits to flash them out. Other examinations require a computational approach to assessment. For instance, assuming the bank's interest-rate risk limits are prudent, examiners will assess the degree to which management, traders, loan officers, and investment executives adhere to those limits.

- Frequent exceptions to the board's limits indicates weak internal control and management practices.
- Recurrent changes to the institution's limits to accommodate exceptions to the limits reflect ineffective board oversight.

Interest-rate exposure and percent changes in equity capital should be examined in synergy in order to reach valid risk management decisions. Based on statistics from the OTS in the March 1994 to December 1997 timeframe, Exhibit 12.9 offers a visual presentation of the variation in unrealized capital.

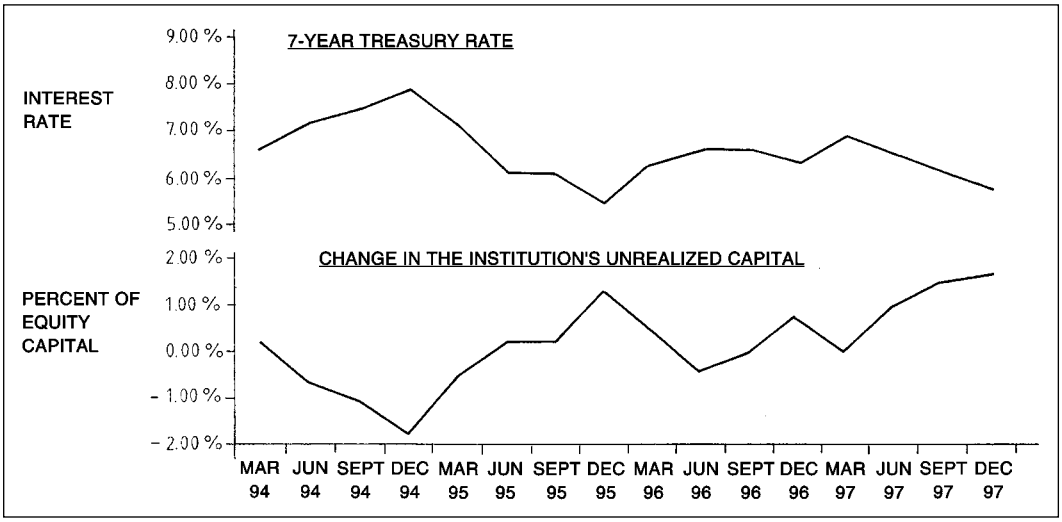
- The effect of falling interest rates is an increase in percent of equity capital.
- By contrast, rising interest rates bring the percent of equity capital into negative territory.

In order to reach a factual and documented decision on the ability of management, examiners also consider whether the quality of the institution's risk measurement and monitoring system is commensurate with its size, the complexity of its financial instruments, and its level of interest-rate commitments.

The strategy followed in connection with dynamic examination procedures is in synchronism with the fact that the OTS places considerable reliance on net portfolio value analysis in assessing an institution's interest-rate risk. Other measures are also considered in evaluating risk management practices. For instance, a well-supported earnings sensitivity analysis is viewed as a favorable factor in determining an institution's component rating.

Both depth and range of analytical techniques can provide useful information to steer the decisions of the bank's senior management and guide the hand of the examiners. Because methodologies used in measuring earnings sensitivity vary considerably among different institutions, the OTS requires

Exhibit 12.9 Office of the Thrift Supervisor Statistics: U.S. Thrift Industry Unrealized Capital: 7-Year Treasury Rate and Percent of Equity Capital



thrifts to have clear descriptions of the methodologies and assumptions used in their models, in order to assist the examiner in reviewing the earnings modeling process.

Particularly important are:

- The type of rate scenarios used
- Assumptions regarding new business

Also critical, according to the OTS, is the ability of the bank to seamlessly integrate risk management with day-to-day decision making. Examiners consider the extent to which the results of the bank's risk measurement system are used by senior management in tactical and in strategic decisions. Examiners also concentrate on whether management evaluates the effects of significant operating decisions on the bank's exposure.

New directives put the board of directors and senior managers at the center of the risk control process. "Failure to understand and adequately manage the risks in these areas constitutes an unsafe and unsound practice," states the OTS's Supervisory Policy Statement on Investment Securities and End-User Derivatives Activities.

This strong wording reflects the belief that both the board and senior management should provide oversight to an effective risk management program. The board of directors must approve major policies for conducting investment activities, establish risk limits, and make sure that management has the skills to control the risks taken by the institution. The board also should:

- Review portfolio activity and risk levels at fairly frequent intervals
- Require that management is complying with approved risk limits
- Understand the institution's overall loans, investments, and derivatives activities

For its part, senior management must:

- Manage the institution's investments on a daily basis—or, even better, intraday
- Establish and enforce policies and procedures on both a longer-range and a day-to-day operational basis
- Understand the nature and level of various risks
- Segregate the responsibilities for managing investment activities to maintain operational integrity

From a senior management perspective, this is synonymous with ensuring that the people responsible for backoffice, settlement, and transaction reconciliation are separate and independent from those who take the risk positions. The Basle Committee on Banking Supervision also has been pressing this issue because segregation of duties is a fundamental good management practice. It is also a sound criterion for controlling the quality of the institution's management.

NOTES

1. M. Cary and H. H. Scullard, *A History of Rome* (London: Macmillan, 1975).
2. D. N. Chorafas, *Understanding Volatility and Liquidity in Financial Markets* (London: Euromoney Books, 1998).
3. D. N. Chorafas, *Reliable Financial Reporting and Internal Control: A Global Implementation Guide* (New York: John Wiley, 2000).
4. D. N. Chorafas, *Credit Risk Management*, Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
5. D. N. Chorafas, *Reliable Financial Reporting and Internal Control*.

PART FOUR

Credit Risk, Market Risk, Leverage, and the Regulators

CHAPTER 13

Credit Risk, Daewoo, and Technology Companies

TEAMFLY

Every financial institution and every other entity is exposed to credit-related losses in the event of nonperformance by counterparties. Therefore, it is absolutely necessary to monitor the creditworthiness of counterparties and estimate the likelihood they may default prior to completing their contractual operations toward a company.

The credit exposure resulting from all types of financial transactions is the fair value of contracts with a recognized positive fair value. As we will see in Chapter 14, an entity is exposed to market risk arising from changes in interest rates, currency exchange rates, and prices of equities and other commodities. (For interest-rate risk, see also Chapters 11 and 12.) As Exhibit 13.1 suggests, there is a certain overlap between market risk and counterparty risk.

No company, even the most mighty or fastest growing among newcomers, and no businessperson is free of credit risk. Take as an example Kim Woo Choong, founder of South Korea's Daewoo Group. Until 1998 he was revered as the able manager who built a small textile trading house into Korea's second largest conglomerate. Since then, deep losses, corruption, and mismanagement have crushed Daewoo and shredded its founder's legend.

On one hand, more money can be made by taking credit risks than market risks. On the other, credit risk must be steadily analyzed and controlled. A growing number of financial analysts today look at credit risk in a new light—as an instrument that can be:

- Studied in terms of its exposure
- Designed as a product
- Inventoried for asset management reasons
- Traded over the counter[1]

This is not the usual way people approached credit risk, which has existed as a concept and as a set of rules for 3,700 years. Indeed, credit risk is the oldest form of commercial and financial risk ever examined. In about 1700 B.C., Hammurabi, the great lawgiver and ruler of the first Babylonian dynasty, included credit risk in his code. By all evidence, these were the first rules addressing regulatory issues in the ancient world.[2] That same millennium also is credited with the first known legislation and administration of justice.

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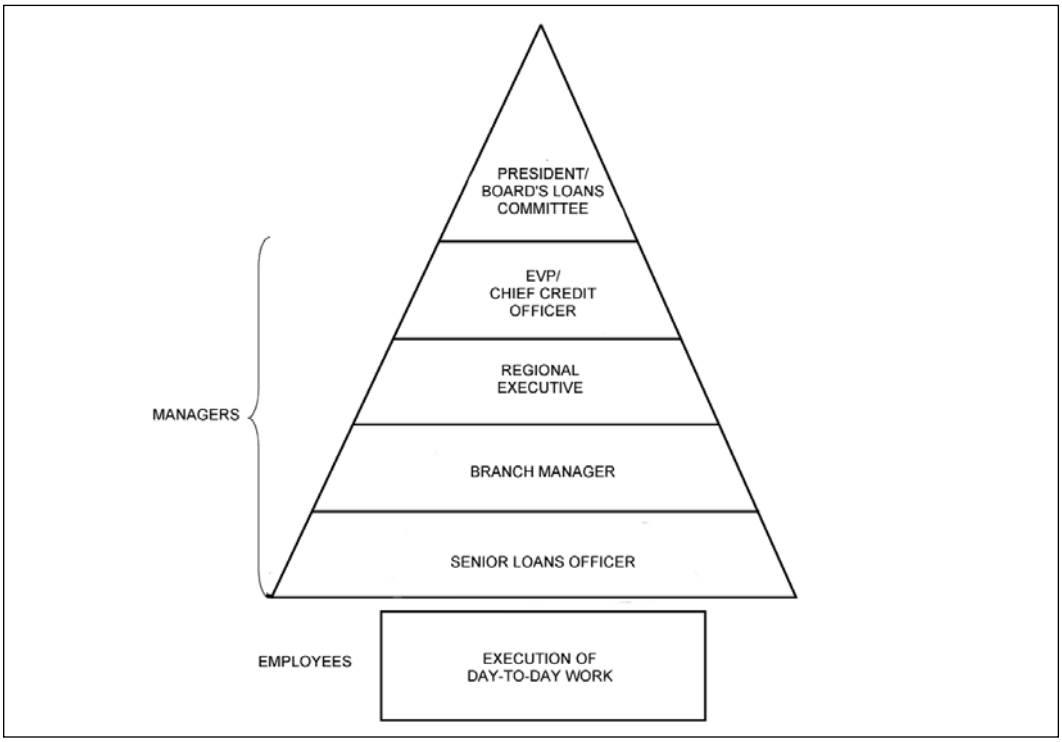
Exhibit 13.1 Five Levels of Supervision Should be Enough in Banking—An Example From Product Channel Loans



Credit practice in the twentieth century and, most particularly, in the last decades has moved a long way from the traditional definition of credit risk. However, these practices were an extension and application of the first major step forward from the ancient world's notion of credit risk. This first step was made in the Renaissance by banks that acted as exchanges and clearinghouses. In so doing, the banks brought to life the practice of using a structural hub that had the know-how to act as an intermediary. *Intermediation* altered the one-to-one credit risk relationship by creating a mechanism to handle counterparty exposure.

But not until the last 100 years were the financial instruments that packaged and exploited the concepts embedded in credit invented. These financial instruments enhanced credit with tools that made it possible to manage more effectively counterparty exposure and even to profit from it. These tools may not be fully exploited due to too much reliance on opaque statistical analysis of credit data that often obscures rather than reveals meaningful information.

CRITICAL FACTORS IN THE EVALUATION OF CREDIT RISK

A well-managed institution sees to it that credit risk exposure is monitored every day through counterparty risk information and the marking to market of collateral values. To establish appropriate exposure limits for the different types of transactions dealt with and for the credits made, all counterparties must be reviewed on a periodic basis, with transactions analyzed to:

- Assess the potential exposure
- Determine whether the counterparty has the financial staying power to support such exposure

This type of evaluation must be done both in relative and in absolute terms. It is done relatively by considering market volatility, analyzing trade components that could affect exposure levels. In absolute terms, the counterparty is looked at as a whole entity. Closely associated with this is the establishment of *limits*:

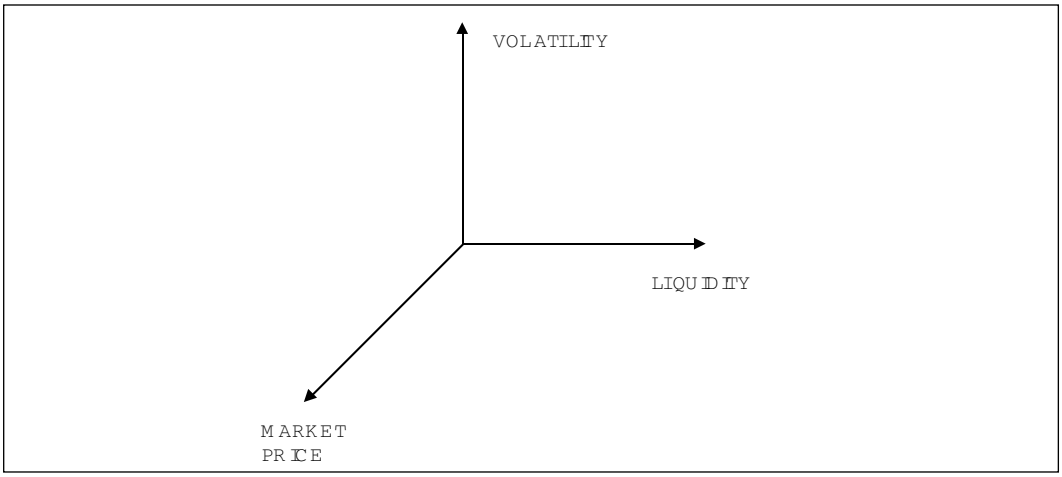
- Size of the trade,
- Maturity of the trade,
- Settlement method,
- Volatility that could affect the value of this trade in a portfolio, and
- The counterparty and its collateral.

In certain cases, to mitigate credit risks we may decide to close out transactions or assign them to other counterparties. In certain cases this strategy is deemed necessary or appropriate. Daily monitoring of credit exposure is so much more meaningful if managers and professionals of the company appreciate that counterparty risk can be affected directly by volatile securities markets, credit markets, and regulatory changes.

The appreciation of the exposure taken with counterparty risk must transcend organizational levels. My experience as consultant to presidents and executive vice presidents of credit institutions documents that the greater the span of control and the fewer the managerial levels, the better the quality of control over credit risk. In principle, as Exhibit 13.2 shows, five layers of supervision should be plenty in every business channel—loans being one example.

Equally critical in credit risk evaluation is the timely use of credit ratings by independent rating agencies.[3] Due to the globalization of banking, financial institutions no longer know the counter-

Exhibit 13.2 Marking Loans Positions to Market is a Complex Task That Must Account for Volatility and Liquidity



party as well as in the past, when operations were local and a financial institution knew, quite often first hand, the different players in its market and their standing. The three major intentional rating agencies are: Standard and Poor's (S&P), Moody's Investors Service, and Fitch IBCA.

Both lenders and investors in credit instruments must decide what credit risk profile they are after and how much financial pain they can afford if credits turn sour or there is a panic in the market. Credit risk investment decisions are not of the all-or-nothing type, although every level of risk corresponds (or, at least, should correspond) to a different return.

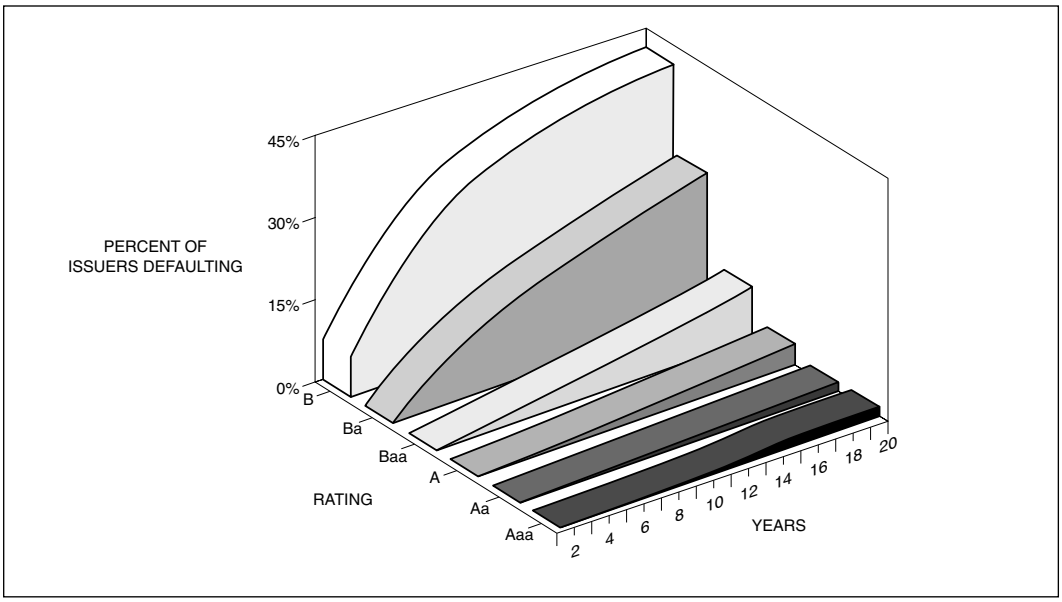
There are graduations in credit risk, well exemplified by the work done by independent rating agencies. Credit risk profiles change over time. An example is given in Exhibit 13.3.

Another critical element in the evaluation of counterparty risk is intimate knowledge of the instruments that are being dealt with and of what these instruments may mean in counterparty exposure. Some of the most modern instruments are old ones that have been redesigned to be more sophisticated and more flexible. Options were invented by Thales of Militos (588 B.C.), who is said to have cornered the market for olive oil through them. Commercial paper and letters of credit date back to the Medici; other credit trading instruments are fairly recent.

Securitization of some form first showed up in the mid-1920s. Syndicated loans developed in the early 1960s. Other structured instruments used in financial transactions are collateralized mortgage obligations (CMOs) and asset-backed securities (ABS). Credit derivatives really found a market in the 1990s. The common ground of these financial products is that:

- They pool assets and liabilities, transferring all or part of the originator's credit risk to other investors.
- They do so through a flexible design, customizing the instrument with or without an intermediate guarantor.

Exhibit 13.3 Cumulative Default Rates for Corporate Bonds



Source: By permission of Moody's Investors Service.

New financial products are being devised at different levels of complexity, from simple to very sophisticated, with each level assuming a certain type and level of credit risk. Therefore, part of their design is the notion of transferring exposure associated to the counterparty's (or counterparties') default. Credit migration is of interest to the capital market for investment purposes, particularly for diversification reasons.

Contrarians say that the capital market as a whole does not have the same commitment to a credit relationship that a bank has. Banks have experience in acting as intermediaries. This is true; but it is no less true that no bank has all by itself the huge amounts of capital needed to finance modern large-scale projects. Nor do banks want to assume the entire associated amount of credit risk. (See also the example of Daewoo in the following paragraphs.)

Beyond this consideration is the fact that the steady introduction of new financial instruments alters market behavior over time, including the willingness to accept a greater amount of leverage than was customary. As shown in Part One, the notion of a growing level of gearing is one of the major changes in market behavior and morals.

- Gearing is increasingly used as a tool to multiply financial power.
- But it also multiplies credit risk and market risk being assumed.

In times of crisis, high leverage may have catastrophic consequences. Opinions are divided on how much is "too much." Some people think of leverage as something to boast about, not something to conceal. They believe that people who know how to gear their assets and liabilities are both clever and skillful. Then comes the day of reckoning, as with LTCM in 1998 and with Daewoo in 2000.

Chapter 3 discussed credit risk in connection with derivative financial instruments. Leveraging and flagrant mismanagement are by no means its only reasons. It may be that a business downturn catches a company off-guard. Its cash flow is impaired, while inventories continue to accumulate. Inventories cost money to carry, and loans become due and there are no receivables.

This is what happened in East Asia at the start of 2001 to thousands of suppliers to American companies. In the vast Asian supply chain workshop, inventories in high-technology products have been piling up as U.S. customers slashed orders, putting local manufacturers under stress. Unless senior management is always on the lookout, supported by high-tech solutions, suppliers have trouble handling a downturn in a world where corporate buyers no longer want to keep weeks of parts and finished goods on hand. While the concept of credit risk is very old, some of the reasons behind it may be very new.

BANKRUPTCY OF DAEWOO

In early February 2001 in Seoul, Korea's top law-enforcement agency, the Supreme Public Prosecution Office, announced that it had arrested seven top assistants of Kim Woo Choong, the chief executive officer of Daewoo, on criminal charges. Fraud and embezzlement were among the charges, but the boss was still missing. Korean missions worldwide have been on alert, and prosecutors asked Interpol for help in finding Kim.

Kim Woo Choong was clearly in trouble, but he was not feeling lonely. South Korean prosecutors had charged 34 former Daewoo managers and auditors in an accounting fraud allegedly masterminded by Daewoo's former chairman. The scam covered up the car firm's losses to obtain bank

loans worth 10 trillion won ($8.5 billion) as the Korean conglomerate teetered on the brink of bankruptcy in 1997 and 1998.

Basically, South Korea has a history of overproducing, and, quite independently of Daewoo, mismanagement showed up in many sectors. Its computer inventories, for instance, jumped 17.9 percent in December 2000, while supplies for chips, cell phones, picture tubes, and display panels were about 50 percent over 1999 levels. Daeduck Electronics, which makes printed circuit boards, watched sales drop 30 percent in January 2001 from the average of the previous six months. Add to this questionable financial reporting and the Daewoo story becomes not so surprising.

The most serious problems the Korean companies faced started with the country's downturn in 1997 because of overleveraging. An estimated $160 billion in foreign loans hit the South Korean economy and its *chaebol (conglomerates)*, particularly in the years thereafter because too many entities and too many people relied on creative accounting to pump up assets and make their business look good in spite of ballooning liabilities. Even by such low standards, however, mismanagement at Daewoo broke all records.

No worst-case scenario needs to be imagined, because the worst happened in real life. Huge credit risk flowed from all sides. Although so far the government prosecutor's office has released only scant details, it is clear that manipulating the books and swapping dubious assets between different Daewoo entities led the company to:

- Create fictitious profits figures
- Cover up failed ventures
- Divert money from one of Daewoo's subsidiaries to another

By reinventing and modernizing the concept of knocked-down cash registers of Thomas Watson, Sr. (when he was sales manager of NCR), the top brass of Daewoo made new strides in creative accounting. To book profitable results for its failed factory in the Ukraine, the local Daewoo Motor received fully built Korean cars, tore them down, reassembled them at the Ukraine plant, and booked the sales as if produced by the Ukraine plant.

Daewoo management cannot be accused of not being inventive; or the company of not being *virtually profitable*. The value of these illegal manipulations by Daewoo Motor has been a cool $3.6 billion.[4] Prosecutors say the company claimed impressive sales and profits from the bogus production and fraudulently obtained loans based on them. For those banks that fell into the trap, this is the purest form of credit risk possible.

Prosecutors also charge that one of Daewoo's fully owned subsidiaries, the British Finance Center (BFC), a London-based shell company, raised slush funds for lobbying at home and abroad. The account amounted to over $4.0 billion including bogus import-export revenues. At least one of the famous bribes was identified. Back in November 1995, Kim Wee Choong and other top Korean executives were charged with paying bribes to Roh Tae Woo, Korea's president from 1988 to 1993. The money came from a $650 million slush fund.

Sooner or later, however, the day of reckoning has the nasty habit of showing up. When in 1999 the entire *chaebol* was declared insolvent, its debt stood at $70 billion—an amount that is missing from the treasury of Korean, Japanese, American, and European banks that helped Daewoo to gear up to unprecedented levels for an industrial company. Japanese banks were particularly hurt. No wonder that the $65 billion for bank bailouts spent by the Japanese government in the 1990s have

been unable to bring back to life those institutions that lent recklessly. (Read: the majority of Japanese banks)

My opinion regarding gearing is contrarian. Under no condition will I choose this irresponsible assumption of credit risk. Temporarily, but only temporarily, through high leverage, some entities impose themselves on others, and on the economy as a whole. They become superstars. They do so through far-reaching mismanagement, but the edifice they build is fragile. Because they do not control risks, they think their complex schemes cannot crash. But they do crash and the entities themselves go bankrupt, like Daewoo, or have to be rescued at the twelfth hour, like LTCM.

CASH FLOWS AS PROXIES OF EXPECTED AND UNEXPECTED CREDIT RISKS

Prudence in credit engagements is in no way synonymous with refusing most of the loans. A professor of banking at UCLA taught his students that a loans officer who had no bad loans was as poor as one who had a lot of bad loans—because that loan officer turned down too many credits that, in the general case, would have been good. Loans performance is a fairly complex issue requiring:

- A policy for risk taking
- Accurate information on counterparties
- Means for timely control

Control of counterparty risk is not always effective because few banks have a clearly defined credit culture. Those that do appreciate that one-size–type procedures cannot fit all of their prospects, while at the same time a policy of zero defects (zero losses) deprives them of some sound business. A valid policy is to price the amount of credit risk one takes, dividing counterparty exposure into three classes:

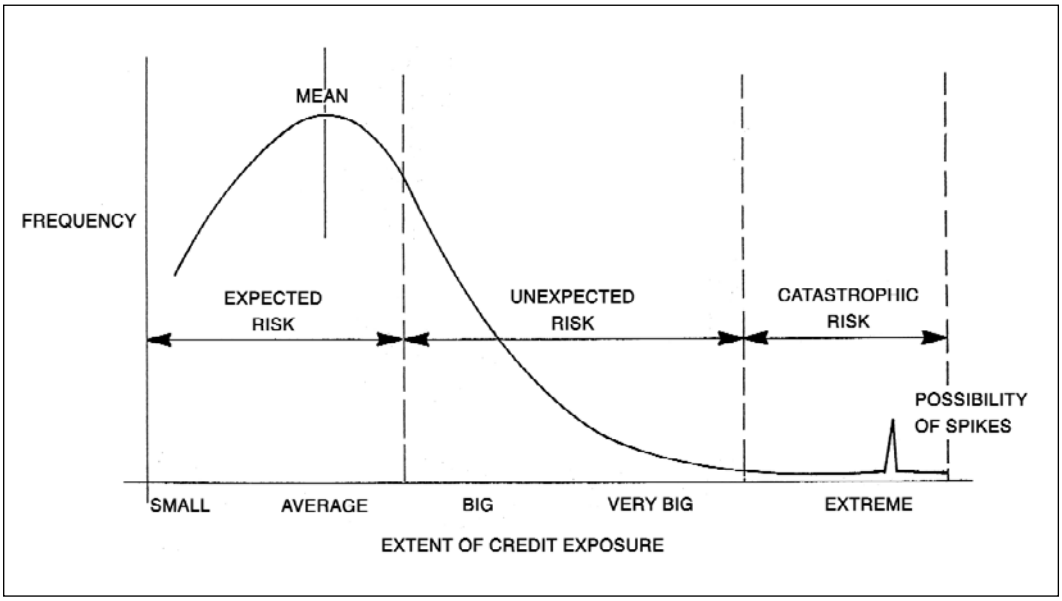
1. Normal or expected, to be covered by ongoing business
2. Unexpected, for which there should be available appropriate reserves
3. Catastrophic, which a credit institution cannot face alone; it needs a reinsurance

Exhibit 13.4 shows a chi-square distribution that represents these three populations. (This topic is discussed in more detail later.) For the last quarter century or so, both syndicated loans and special reserves have provided this insurance. Increasingly, however, banks calculate risk-adjusted return on capital. When the stakes are high, they start asking the capital markets to share in the benefits and the risks.

Working against sound risk policies is the fact that, as many banks are finding out, it is hard to maintain the customer base and market share without bending the rules. Bending the rules obviously increases the level of risk being taken. Many of the better-quality customers, particularly the bigger firms, have found less honorable ways of financing, mainly through commercial paper sold to the capital market.

In the United States, capital markets have replaced banks as the primary source of debt capital for entities with triple A and double A rating by independent agencies. At the same time, there is no reason why banks cannot or should not address the capital market with products that are a form of

Exhibit 13.4 Chi-Square Distribution Helps to Represent the Three Major Classes of Credit Exposure and their Frequencies



reinsurance in case of catastrophic risk. Doing this requires revisiting the concept of securitization and enlarging its perspective.

The more the capital markets assert their importance in the issuance, trading, and management of credit risk, the more they need independent agencies to advise them on the level of counterparty risk being taken. Three major independent agencies mentioned earlier, as well as several others, have assumed this role. Today these agencies rate:

- The better-known companies worldwide
- Bonds of all types, including municipals
- Various government bonds
- Commercial paper and medium-term notes
- Asset-backed securities and other issues

Rating agencies are acquiring significant power as reference organizations, if not watchdogs, of the capital markets. Like regulators, they are becoming part of the system of checks and balances in the management of credit risk. Their scores are used both to exercise vigilance and to fine-tune instruments.

A greater level of sophistication can be obtained by going beyond the AAA to D classification of credit risk for the whole entity. A fine-grain subclassification within each major category is more demanding. Seven rules govern this finer analysis:

1. Determine the purpose of the credit.
2. Analyze the stability of creditworthiness.
3. Research the underlying further-out economics.
4. Price the factors entering credit risk being taken.
5. Evaluate if risk and reward are acceptable (or return to preceding point).

6. Apply the appropriate covenants, collateral, and guarantees.
7. Keep on reevaluating creditworthiness until the contract is consumed.

Cash flows can be a good proxy in sizing up some of these risk factors. An example is the cash flows of telephone carriers that badly wounded themselves because of overgearing. Another reference from 2001 events is the aftermath of financing big names and fledgling start-ups in telecoms by equipment manufacturers. To boost their product sales, they totally forget about credit risk.

During the last couple of years of the twentieth century, telecommunications equipment stocks represented what had been the most dynamic sector of the economy. Even in early 2001 they made up 20 percent of the value of the NASDAQ 100, led by Cisco. Indeed, in 2000 Cisco passed Microsoft and General Electric to hold, albeit briefly, the title of the stock with the biggest market value in the world.

By mid-February 2001, however, Cisco's $220 billion market cap was down 60 percent from its 52-week high, even if it was still the eighth-biggest in Standard & Poor's 500-stock index. Other optical innovators, such as JDS Uniphase, Ciena, and Juniper Networks, have been harder hit. They are followed by semiconductor makers Applied Micro Circuits, Altera, and PMC-Sierra, on the NASDAQ and by fiber suppliers like Nortel and Corning on the New Stock Exchange's technology listings.

- Stock prices of these companies were too high compared with earnings.
- Still, investors hesitated to sell them because they had become the leading growth stocks.

But although investors were always hoping for a turnaround—which did not happen—credit institutions are not forgiven for having continued financing overleveraged companies. Lust and greed made them incapable of estimating the latent major credit risk.

Everyone bet on the unsustainable hypothesis that telecom customers, particularly the mobile telephony species, will keep on spending lavishly, and this lavish spending will ease the equipment manufacturers' cash flow problems. No one seems to have noticed that mobile telephony customers were themselves leveraged and telecoms had run up big debts buying and installing the latest high-tech equipment through gearing rather than the more usual way of retained earnings. At the end of 2000 the global telecom equipment industry was holding as much as $15 billion worth of loans to carriers on its balance sheets, up 25 percent from 1999. The telecoms' exposure reached record levels, and investors finally became worried.

Some of the big lenders to the carriers were the telecom equipment manufacturers themselves, *as if* they were unaware of the meaning of credit risk. In January 2001, after the Globalstar satellite telecom business defaulted on its debt, Qualcomm was forced to write off $595 million out of a credit line of $1.18 billion to telecoms and other clients. Globalstar also said it would not make a $45 million debt payment due to Loral Space & Communications and others.

In 2000 Cisco loaned Digital Broadband Communications $70 million to buy its networking gear. Digital Broadband was a start-up with a contract to provide high-speed Internet service to schools. With that contract, it appeared solid, but as investors soured on the entire telecom sector, Digital Broadband ran out of cash. When it filed for bankruptcy protection in late December 2000, Cisco was left with a big dry hole.

Ericsson provided vendor financing to Thai Telephone & Telecommunication (TT&T), a fixed-line carrier serving rural areas in Thailand. But TT&T went into bankruptcy and left Ericsson hold-

ing the bag. As these and many other examples demonstrate, questionable loans can be found all over the telecoms industry. Motorola, Lucent Technologies, and Nortel Networks financed sales to risky carriers. Too late, Lucent said it was shifting sales away from start-ups. In September 2000 it removed roughly $1 billion in debt from its balance sheet by peddling the loans to investors in much the same way that mortgage lenders package home loans and sell them as securities.

DEVELOPING AND IMPLEMENTING PRUDENTIAL LIMITS

Credit officers advise that there is no alternative to asking the questions:

- What do you want the loan for?
- How are you going to pay it back?
- What sort of guarantees can you give me if you are not able to pay in time the interest and repay the capital?
- What is your strategy if your contemplated investment does not work? If the loan money is lost?

This procedure cannot be followed effectively unless the bank, its loans officers, credit committee, auditors, and other organs are disciplined. Everyone must know and appreciate the boundaries of acceptable credit risk. Similarly, everyone must understand that:

- Appropriate risk pricing is a cornerstone to the bank's survival.
- Feedback on creditworthiness is a qualifying channel of great importance.

Sound procedures for credit evaluation and the setting of limits amount to a rigorous credit analysis that addresses the borrower's ability to pay the interest and repay the principal—as well as the borrower's willingness to do so. (See Chapter 4 on reputational risks.) There is plenty of scope in investigating the counterparty's character, but it is important to remember that while ability to pay has much to do with economic and financial conditions, willingness to face up to one's obligations is a matter of ethics and virtue.

That is why I emphasize that overgearing is harmful. It bends internal discipline and ends by corrupting ethics. The belief that "leverage suggests one is clever" is deadly misleading. One who sought the protection of bankruptcy courts would do so again. In terms of virtue, that person or company should never be viewed as a good credit risk—and the counterparty limits applicable in this case must be more stringent than those designed as a general rule.

It is the responsibility of the board and of senior management to determine the appropriate credit limit structure for the institution. Some financial analysts suggest that the best way to proceed is to establish first the firm's "risk appetite" and the overall framework within which the counterparty risk limits should operate. Among top-tier banks, the credit risk management system involves a two-layered structure:

1. Industry, country, and regional concentration limits
2. Individual credit limits by counterparty

This structure is supplemented by a credit risk provisioning framework, a portfolio pricing and optimization method, and ways and means for portfolio diversification. Concentration in loans means greater exposure to the same counterparty. If diversification throughout the range of instruments being handled cannot be taken into account, then senior management cannot get the right answers that would permit it to implement an effective diversification solution.

- If we do not know in a timely and accurate manner our exposure, talking of prudent limits does not help much.
- Knock-on effects, like those that occurred with LTCM, see to it that the whole market moves the same way— magnifying the company's exposure.

For this reason, concentration and diversification in loans is often an issue empty of substance. An equally vain exercise is setting static limits and/or forgetting to fine-tune the system of internal controls necessary to ensure that established limits are observed. My rule is simple:

- *If* there is no real-time limits evaluation and immediate corrective action,
- *Then* the system of limits is cloud nine. It is worth nothing in practical terms.

Setting limits is a dynamic, ongoing process that relies on timely input from many areas of operations. Institution-wide credit risk (and market risk) limits is a starting point. Limits then must be established for every level of business across the enterprise.

Elaborating institution-wide limits at the top gives senior management a clear goal about the amount of credit exposure as a whole and by main axis of reference. Unbundling that risk into divisional and departmental lines down to desk and trader level gives each manager and each professional a measure of the risks that can be assumed at his or her level. Evaluating allowed counterparty exposure and expressing it through limits leads to a matrix of credit risk management. At this point comes something that looks as if it is a contradiction:

- Limits must be assigned all the way down the line, to desks and individual traders or loans officers.
- But micromanagement must be avoided because it deprives the enterprise of needed flexibility.

To solve this dilemma, rather than centralizing the unbundling of credit limits, it is better to have a board decision on levels, leave the finer distribution to business unit executives, and audit how well limits have been allocated down the line. Then use the internal control system to report on deviations, helped by real-time knowledge artifacts.

Whichever precise solution is followed in fine-tuning, limits are more effective when responsibilities are clearly defined and with them personal accountability. Institutions with rigid management structures find it difficult to manage limit allocation and even more so to do enforcement. One of the key queries is who should be accomplishing the analytical work that documents limit levels. At Prudential Securities the credit analysis department is responsible for client limits while market risk limits are established by the heads of trading desks. The board does not get involved. However, at Prudential Securities, the *Business Review Committee* addresses existing product lines and the *New Products Committee* concentrates on limits for new products only. Another committee scrutinizes new investments. Both the business review and the new products committees examine limits

Team-Fly®

product by product. The sponsor prices new products. Risk assessment and profitability are other processes with an impact on limits.

The departments responsible for credit risk and market risk (see Chapter 15) act as oversight to ensure that limits are respected. Salespeople have different limits for derivatives trades and for securities, and there is in place a system to warn the compliance department when limits are broken, since among marketing people there is always a tendency toward assuming greater risk.

Concomitant to the study of limits should be the classification into expected, unexpected, and catastrophic credit risks. Annual credit risk provisions should equal the sum of expected credit losses computed in an analytical way from historical information, differentiating among expected, unexpected losses, and extreme events. Expected losses, or predictable risk, is essentially a cost of doing credit-related transactions.

Actual losses that occur in any one day, week, month, or year may be higher or lower than the expected amount, depending on economic environment, interest rates, exchange rates, and other market factors influencing the investments inventoried in the portfolio. Unexpected losses can be estimated through worst-case scenarios over a one-year time horizon, focusing on historical events of low default probability but higher dollar amounts as well as historical recovery rates. Outliers and spikes are used as proxies of likely but improbable extreme events.

TAKING ACCOUNT OF MANAGEMENT QUALITY IN ESTABLISHING CREDIT LIMITS

Financial instruments that potentially subject a company to concentrations of credit risk consist principally of investments, debt instruments, loans, and trade receivables. While every management tries to place its investments with high-credit quality counterparties, a sound policy will put limits on the amount of credit exposure to any one party, at any time, for any transaction, based on the analysis of its credit standing and financial staying power.

The credit standing changes over time, and, historically, there are more downgrades than upgrades. Management negligence is the key reason. In the mid-1990s Sumitomo Corporation lost $2.6 billion. (Some sources say the red ink was $5.1 billion.) In 1996 stockholders sued, charging Sumitomo with gross negligence under the commercial code, asking for 200 billion yen ($1.7 billion) in damages. Five years later, in 2001, the case is still pending, a victim of Japan's slow-moving legal system and cover-ups protecting big business.

This is a pity because prolonged legal suits hurt the company's credit standing. Legal system dynamics may be, however, changing. In September 2000, the Osaka District Court heard the case of Daiwa Bank shareholders, ordering 11 current and former company directors, including bank president Takashi Kaiho, to pay a record $775 million for negligence after a bond trader in the bank's New York branch piled up $1.1 billion in losses.

Mitsubishi Motors is another case of the growing anger of shareholders. Mitsubishi Motors shareholders filed suit against former company officials implicated in a scandal that has dented vehicle sales and the firm's stock price. They are asking for $84.6 million to compensate for write-offs that followed management's admission that it had covered up reports of defects in its autos for 30 years.

All these references on lack of transparency are important because, when it comes to credit risk, investors and lenders often are acting in good faith, unaware of what goes on in mismanagement.

When the bad news breaks out, it is already too late. Banks have the lawyers to file lawsuits, but until recently individual Japanese investors would not take such initiative. With shareholder activism on the rise, there is a new factor weighing on counterparty risk.

These examples emphasize that transparency is the best policy. When it comes to taking risks, limits have to be set, keeping the business environment within which a company operates in perspective. Depending on the company's business, there may be a concentration of credit risk not only by industry or geographic region but also as a function of the quality of management of a counterparty. (See in Chapter 4 the top positions in the definition of operational risk.)

It is useful to avoid concentration of credit risk in a company's business partners; recall the disastrous aftermath of this concentration on Nortel, Lucent, Ericsson, Cisco, and Qualcomm. At Intel, too, the company's five largest customers account for about 39 percent of net revenues and approximately 34 percent of net accounts receivable. With such concentration of counterparty risk, Intel:

- Performs ongoing credit evaluations of its customers' financial condition, and
- Deems necessary sufficient collateral to act as a buffer if worse comes to worst.

As this example and many others document, it is wise to adopt credit policies and standards that can accommodate business expansion while keeping close watch on a number of key factors inherent to credit risk. Typically, credit risk is moderated by the diversity of end customers; also typically, the crucial credit risk variables evolve over time, a factor that managers do not always take into account.

As an example from banking, the former Manufacturers Hanover Trust of New York said in a late 1970s meeting that, day in and day out, it had a credit line exposure of between $2.0 and $2.5 billion with General Motors. At that time, GM was not particularly well managed. While no one was expecting it to go bankrupt, Lee Iacocca revealed that while he was Chrysler's CEO, his company had contemplated making a leveraged buyout for GM—which, if done, would have substantially reduced the credit rating of the rolling loan.

Few senior bankers appreciate that measuring and managing credit risk are two highly connected operational risk issues that greatly impact on the safety of the bank's capital and its ability to survive adverse conditions. Fundamentally, lending officers respond to two major influences:

1. Loan *policy*, including acceptable grade collateral and limits
2. The *leadership* shown by senior bank management in analytical approaches to relationship banking

This leadership concerns both the bank as a whole and specifics connected to credit and loan policies as well as business partner handling. In short, it concerns the way to manage the bank's assets at risk. Like the analysis of market risks, credit risk management is conditioned by what has been said about concentration of exposure. Banks fail because:

- They put all their eggs in a few baskets.
- They fail to reevaluate critically how counterparties are managed.
- They lack a rigorous internal control function.
- Their lending is too much influenced by sales drive and market share.

Marketing people and relationship managers push the lending officer to give the loans, even when there is an inordinate counterparty risk. By contrast, loan portfolio managers who like to ensure high-quality assets concentrate on returns commensurate to risks being taken. Typically, conflicting drives blur senior management's judgment. The idea that high-quality assets and high yield can work in synergy paralyzes credit risk decisions and sees to it that credit institutions fail to take appropriate steps. At the same time, relationship managers are not trained to find out what the clients do with the money lent by the bank, which might help in reducing credit risk.

USING SIX SIGMA TO STUDY DETERIORATING CREDIT RISK

Internal control should flesh out contradictions between policy and practice in credit risk management. Banks eager to improve their internal controls for lending are busy establishing a valid system for internal performance rating. They begin by identifying strategic influences, such as: admissible client rating targets as percentages of total business; the ability to dynamically update percent of delinquency by carefully studied category of client; and credit risk as percent of original business target, which integrates credit risk, market risk, and other risks. (See Chapter 15.)

Real-time information is important because pricing should be based on a spread over cost of funds plus reinsurance. Other strategic decision factors are collections; recovery as percent of changed items; and profitability derived by the bank for its loans—by class and as a total.

Classic statistical studies of the sort taught in business schools are not enough. Many statistical analyses are opaque, therefore useless. A dynamic stratification permits analysts to make a distribution of working assets, with risks attached to each class and with emphasis on concentrations and associated exposure. Experimental design is highly advisable, and it is practiced by tier-1 organizations. An example is the use of Six Sigma by GE Capital.[5]

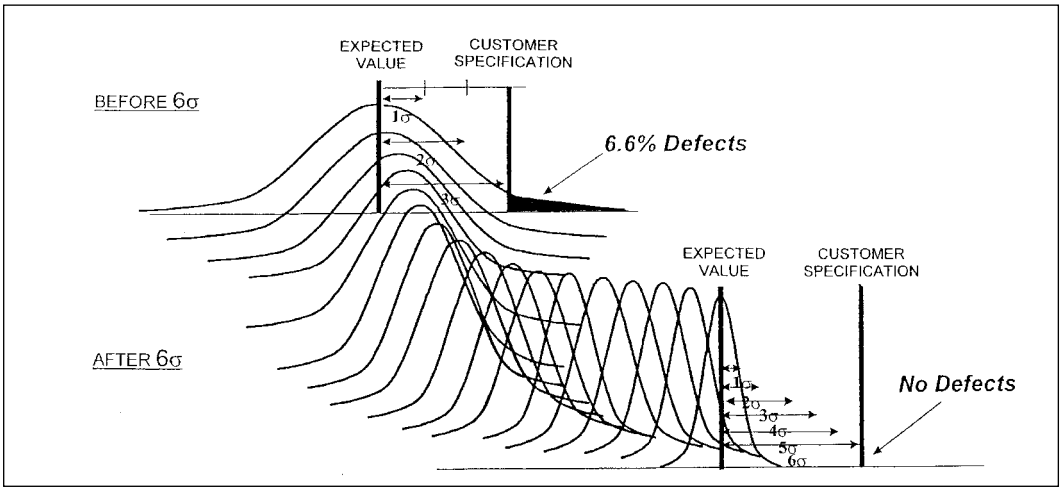
The torrent of normal distributions in Exhibit 13.5 explains in a nutshell the concept behind Six Sigma. A small standard deviation means high quality; a large standard deviation means poor quality. The nature of the distribution tells a lot about the underlying quality level. This concept can be applied very nicely with loans, investments, and trades.

For instance, a valuable pattern that should be carefully analyzed is loan structure as a measure of policy performance. A target figure is the distribution of risk weighting the bank's loan portfolio. What is more, performance evaluation and risk measurement can be automated to a substantial degree through the able use of technology.

Agents (knowledge artifacts) should be mining daily and intraday the database,[6] interactively reporting by exception when preestablished limits are reached and breached; tracking incidents of breaking them, even temporarily; and establishing the quality of management hidden beneath the statistics. Banks that fail to analyze their information and to experiment bias their financial results toward an out-of-control condition.

Similar concepts can be used for the analysis of leveraged conditions. In the second half of the 1990s and in 2000, the gearing was not only at the consumer level—even if private sector debt jumped from 168 percent of GDP in 1994 to about 200 percent in 1999. A bigger culprit was the financial sector, whose debt skyrocketed from 54 percent of gross domestic product (GDP) to 80 percent during the same period. Much of this credit may well have served as fuel for the bull market for equities. On the other hand, excess credit does not really stay in the stock market. For every buyer of shares, there is a seller who ends up with cash.

Exhibit 13.5 Three Standard Deviations Usually Fit Between Quality Control Target and Customer Specifications, But This Is Not Enough



Source: With the permission of General Electric.

Excess credit and liquidity correlate (see Part Two). Some analysts suggest that global competition, deregulation, and technological strides would have led to outright deflation in the Group of Ten countries were it not for such rapid credit growth. This growth has created *excess liquidity*—a situation where credit grows, as measured by the relationship between commercial bank credit and GDP.

Excess credit and credit rating also correlate with one another, but negatively. It is therefore not surprising that, compared to 1998, 1999 saw a very significant increase in downgrades of syndicated loan ratings, while the number of upgrades was mild. This pattern continued in 2000. Credit institutions responded to declining credit quality by increasing the gap between the price of lending to good borrowers and to not-so-good ones. Some of the poorer borrowers have not been getting loans at all, as screening standards rose.

- Still, bad loans increased by about 7 percent in the second quarter of 2000.
- Banks' reserves were at their lowest level in more than a dozen years.

Six Sigma methodology can nicely be used in the context of these points about the control of credit quality. Volatility of the reserves-to-loans ratio is an example. Adjusted for the riskiness of the banks' loans, the reserves-to-loans ratio is at its lowest since 1950. The pains experienced by the economy because of these downgrades are significant also for another reason. They are indicators of risks inside a bank's loan portfolio.

In principle, the syndicated loan market in the United States offers a quick method of evaluating industry exposure because industrial companies often use banks to arrange financing quickly, before issuing stock or bonds. As a result, properly analyzed, the market for syndicated loans reveals trends in credit. Such analysis suggests that during 1999, there was a steady slide in the quality of these loans. According to Moody's, 2000 showed no sign of a reversal. This is bad news

for Chase Manhattan and Bank of America, banks that together arrange more than half of all syndicated loans.

A rigorous statistical analysis also should include smaller banks that had bought syndicated loans previously. Such banks are becoming increasingly reluctant to continue buying these loans, because of concerns about poor and declining credit quality. Another source of money has been the loan participation, or prime rate funds. Tied to the quality of the underlying loans, their net assets slipped in 2000.

Industry sector evaluation also can be achieved through advanced statistical methods. In this case, the quality of loans to the technology, media, and telecommunications (TMT) companies have been particularly poor. The bank with the biggest involvement in TMT is ABN AMRO, which has been most active in the syndicated loan market. The Dutch bank's share of syndicated loans to the TMT sector was estimated at $13 billion in September 2000, ranking it fourth globally.

- On paper, that share is small compared with ABN-AMRO's total assets base of euro 458 billion ($415 billion).
- If the bank had kept all those debts on its own books, the loans would have been equivalent to 74 percent of its tier-1 capital.

Still another domain of financial leverage where Six Sigma methodology can be used effectively is junk bonds. In March 2001 the international junk bond market was in a state of serious decline. In Europe all the top high-yield front runners in 1999 and 2000 were U.S. institutions, but some European banks were not that far behind. UBS Warburg and ING Barings have been building up their businesses in these highly risky instruments.

On October 10, 2000, Morgan Stanley issued a statement saying that junk bond losses cut its earnings in the third quarter by about 3.5 percent, and markdowns in the fourth quarter would be of similar magnitude. Junk bond blues and TMT correlate. The uncertainty in the high-yield market is strongly related to uncertainty about the credit quality of some telecommunications and technology issues. (See also Chapter 1 and the second section in this chapter.) European and American banks find themselves doubly exposed through both their lending business and their investment operations. Therefore, they are well advised to use rigorous analytics to pinpoint their weakest spots.

IMPACT OF THE INTERNET ON CREDIT CONTROL

The Internet is enabling credit insurers to reach new markets and also provide new products, such as unbundling existing services by separately pricing and selling information on risk and risk coverage. Other services, such as invoicing and debt collection, are also brought on a global scale, thereby providing additional sources of earnings.

A significant contribution of networks at large and of the Internet in particular is facilitating less expensive distribution and data collection channels for many services including claims adjustment. Direct business-to-business (B2B) Internet transactions offer an opportunity for credit insurers.[7] By providing lines of credit to buyers on the Internet, they:

- Enhance their fee-based revenues through new channels
- Leverage their proprietary information on creditworthiness of buyers
- Enter the market for derivatives and asset-backed securities

These business lines present opportunities and challenges for credit insurers. One of the challenges is the development and use of model-based real-time systems permitting specific credit enhancements—for example, real-time evaluation of fair value of asset-backed commercial paper, trade receivables, and liabilities incurred by insured parties.

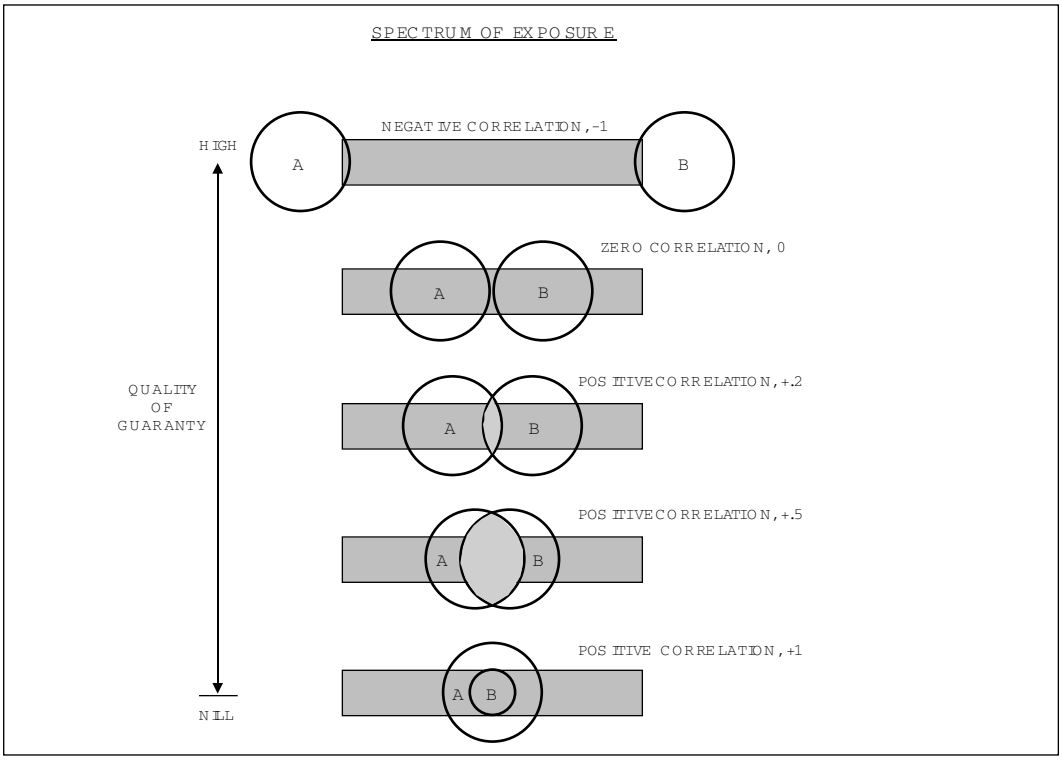
Because of its capillarity, the Internet helps credit insurance companies deliver more timely and better personalized information to clients as well as in reducing paperwork costs related to data processing, because a good deal of the work is done on-line. Insurers expect the Internet will help to improve efficiency in underwriting, distribution, administration, and claims settlement.

These activities just described lead toward lower costs for credit insurers and guarantors, who believe that Internet business could bring about 10 percent cost savings. Such estimates, however, tend to ignore the fact that significant expenditures on information technology have to be made to get the expected results, and these expenditures will consume part of the savings.

Investors and credit institutions can profit from on-line information. They can use experimental design to analyze risk factors and correlations involving counterparty risk. As Exhibit 13.6 shows, a whole spectrum of risk correlation may exist between debt issuer and guarantor, and this can be exploited through analytical studies.

Different credit insurance companies offer different strategies in exploiting the Internet's potential. The strategy of Euler, a credit insurance company, is helping clients to manage the insurance policies through its Online Information Service. Clients can:

Exhibit 13.6 Counterparty Risk Involving Debt Issuer "A" and Credit Issuer "B"



- Check outstanding limit on their customers.
- Track claims which were filed.
- Get responses to requests for extensions in credit limits.

Another credit insurer, Coface, uses the Internet to enhance relationship management. It also handles credit limit requests and policy amendments on-line, thereby improving service and reducing cost. Gerling Kredit provides insurance for the entire selling chain, from B2B transactions to business-to-consumer (B2C) deals. Gerling controls Trusted Trade, whose goal is insuring B2B, while Trusted Shops protects online consumers from a company's failure to deliver goods as well as from damaged goods delivery.

Still another credit insurer, NCM, provides online services through eCredible.com. Its offerings include credit management services and the eCredible Payment Guarantee. The former offers a credit certificate issued to the seller's customers helping to authenticate the buyer's creditworthiness. Buyers are assigned a spending limit, based on data provided by independent rating institutions, credit agencies, or NCM's own database. As these examples help demonstrate, credit risk–related products are on the upswing and networks are instrumental in promoting them.

NOTES

1. D. N. Chorafas, *Credit Derivatives and the Management of Risk* (New York: New York Institute of Finance, 2000).
2. For Babylonian cultural history, see B. Meissner, *Babylonian and Assyrian* (Heidelberg, 1921); and B. L. Van der Waerden, *Science Awakening* (Groningen: P. Noordhoff, 1954).
3. D. N. Chorafas, *Managing Credit Risk*, Vol. 1: *Analyzing, Rating and Pricing the Probability of Default* (London: Euromoney Books, 2000).
4. *Business Week*, February 19, 2001.
5. D. N. Chorafas, *Managing Operational Risk: Risk Reduction Strategies for Banks Post-Basle* (London: Lafferty, 2000).
6. D. N. Chorafas, *Agent Technology Handbook* (New York: McGraw-Hill, 1998).
7. D. N. Chorafas, *Internet Supply Chain. Its Impact on Accounting and Logistics* (London: Macmillan, 2001).

CHAPTER 14

Marking to Market and Marking to Model the Loans Book

One of the notions advanced by the Accounting Standards Board (ASB) in the United Kingdom that goes beyond the 1996 Market Risk Amendment by the Basle Committee on Banking Supervision is that of marking to market the banking book. The major challenge in this connection is valuing gains and losses in the loans portfolio and mapping them into a reliable financial statement.

How can the loans book be marked to market? A linear answer seems to be: "Like any other asset." But while some loans, such as mortgages, can be relatively easy to mark-to-market, others pose a number of problems and many institutions lack the experience to overcome them. In my view, the greatest current weakness in accounting for market risk associated with loans is the absence of the needed culture (and supporting technology) to steadily measure all assets and liabilities as close as possible to fair value.

- This measurement should be done in a way similar to the one we use with budgets: plan versus actual (see Chapter 9).
- With assets and liabilities, the *plan* may be the historical cost; the *actual*, the current market price.

How can a loans portfolio be marked to market for those items that do not have an active market? The answer is by approximation through modeling—provided that the model is valid, its hypotheses are sound, and this procedure is consistently used. *Yield curves* can help. (See Chapter 11.)

One of the ways to mark to model corporates is through bond equivalence using Macauley's algorithm for duration. This algorithm was developed in the 1930s for application with mortgages but became very popular with rocket scientists in the mid1980s because of securitization of debt. The concept of duration might be extended to corporate loans, sovereign debt, and other cases. Discounted cash flows (see Chapter 9) also assists in the evaluation of the intrinsic worth of an asset.

More sophisticated approaches combine market risk and credit risk, as will be seen in Chapter 15. Many experts consider the integration of market risk and credit risk to be at the top of the financial modeling food chain. Integrative solutions are particularly important because, between 1997 and 2000, a structural change took place within the financial industry that alters the ways of confronting risk. Every year this structural change becomes more visible and fast-paced, affecting practically every professional and every firm.

One of the major contributors to risk redimensioning is the merger activity that has reduced the number of players in the financial landscape while competitive conditions have been recast: New windows of opportunity open up for the giants but smaller, more agile companies focus their resources and take advantage of business conditions by using cutting-edge technology.

CAN THE LOANS PORTFOLIO BE MARKED TO MARKET?

In the past, the answer to the question in the heading would have been a categorical "No!" But we live in different times. Today, to a very significant extent, the assets and liabilities a bank possesses can be securitized and sold to the market. In addition, new regulations recognize the market risk embedded into the banking book and ask for its definition.

The Group of Ten regulators have revamped their capital adequacy standards through the issuance in 1999 of "A New Capital Adequacy Framework" as a consultative paper. The Basle Committee on Banking Supervision aims to make the rules of reporting credit risk in the twenty-first century more sophisticated than they ever were.

Some of the significant differences between the 1988 Capital Accord and the New Capital Adequacy Framework is that the former set a fixed rate for capital and addressed only credit risk, not operational risk. Market risk has been regulated through the 1996 Market Risk Amendment, but only in regard to trading book exposure. By contrast, the new framework addresses interest-rate risk in the banking book. The framework also pays a great deal of attention to *market discipline*. The principles established by the Committee of Sponsoring Organizations (COSO) of the Treadway Commission dominate,[1] particularly in connection to:

- Encouraging high standards of disclosure by financial institutions, and
- Enhancing the role of market participants in inciting banks to hold adequate capital.

This has had a definite effect on loans policies. The strategy banks have classically followed with their loans now needs to be updated to answer the new requirements posed by regulators and by the market. The change is an evolutionary one because many credit institutions have been using for years in connection with their loans:

- The rating of the borrower through independent agencies[2]
- A view of credit risk based on the exact type, amount, collateral, and covenants of the loan

The concept embedded in the second item is strengthened by the New Capital Adequacy Framework, which promotes both the employment of credit ratings by independent agencies and an *internal ratings-based* (IRB) approach. The Basle Committee suggests that sophisticated financial institutions might use IRB for setting capital charges—which is a form of precommitment. (See also Chapter 15.)

The IRB approach mainly addresses credit risk, but the new regulatory policy also aims to account for market risk in the banking book. One problem with loans encountered by most banks is that, depending on market conditions and prevailing psychology, their structure tends to magnify underlying market movements. Regulators seem to be well aware of this. For instance, in the

United Kingdom, the ASB specifies four measures that are broadly in line with current U.S. norms and practices:

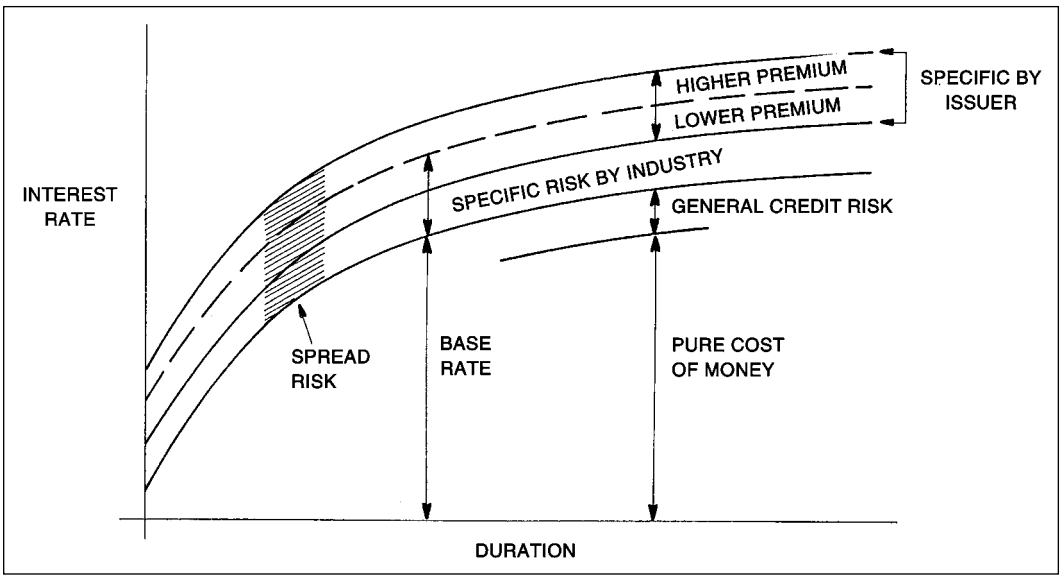
1. A standard disclosure matching the one already introduced in the United States, to ensure reliable financial reporting by all public entities
2. The use of an operating and financial review (OFR) to reveal a bank's or other company's policy on risk and the way it uses financial instruments
3. A series of quantitative disclosures, such as the interest-rate and currency profiles of its positions, to be displayed in the notes
4. A rigorous presentation of market risk reflecting the effect of movements in key rates on all positions and instruments a company holds

The implementation of points 2 to 4 calls for *sensitivity analysis* able to describe the effect of market changes on gains and losses. For instance, what will be the effect on the exposure taken by the institution of a small fraction of rise or fall in interest rates? (For a practical example on the control of interest-rate exposures, see Chapter 12.)

Few banks have the needed ability in quantitative analysis to recognize that market sensitivities are nonlinear. This is easily seen in Exhibit 14.1, which presents the pattern of interest rates as a function of duration in situations other than backwardation. Linearized sensitivity is an approximation that holds for minor changes in interest rate but tends to distort fair value calculations as interest-rate volatility. Exhibit 14.1 presents a yield curve analysis of the effects of credit risk and spread.

As Chapter 12 has explained, the Office of Thrifts Supervision in the United States has developed an excellent interest-rate reporting system for savings and loans. This has been an important cultural development for small, unsophisticated banks. Once the culture is there, and the tools, this experimental analysis can be applied effectively to all positions affected by interest-rate volatility:

Exhibit 14.1 Yield Curve Analysis on the Effects of Credit Risk and Spread Risk



Team-Fly®

- The loans portfolio,
- Investments being made, and
- Derivatives instruments.

Top-tier American banks are indeed applying *what-if* scenarios through simulation. They started doing so on their own initiative in the mid-to-late 1980s. In this way, they have obtained a very valuable decision support system that has been extended geographically, by product line, by client relationship, and in other implementation domains.

Regulators are increasingly watching out for changes in volatility and liquidity, and they target a proactive strategy in terms of supervision. The best-managed commercial banks and investment banks do the same. But a surprisingly large number of credit institutions are not aware how much their survival depends on the careful study of interest rates and currency rates—and on their prognostication. In many institutions, senior management does not pay enough attention to experimentation. Therefore, regulators are right in asking for disclosure of market value of the loans portfolio.

Modeling will be more intricate under the *dual risk* perspective of interest-rate risk and currency risk. Some of the bigger players, such as Citibank and Barclays, now claim to deal in more than 100 currencies, and certain banks say that they have tripled the number of their exotic-currency trades in the past five years. All this calls for paying more attention to analysis, not less.

Few investors appreciate that one of the interesting (and intricate) aspects of the loans portfolio is that, except for small local banks, it is seldom in one currency. A British bank may extend loans in dollars, euro, yen, or any one of 100 currencies in any country in which it operates. This risk usually is mitigated by the bank raising matching deposits, and in some cases loan capital, in the same currency as the loan—but in general this classic model of hedging is less than perfect. To tune it up, the institution has to take into account at the same time:

- Counterparty risk,
- Interest-rate risk,
- Country risk,
- Currency risk,
- Liquidity risk, and
- Operational risk.

Typically, disclosure on currency risk calls for the choice of a *base currency*. A common denominator will be difficult for money center banks unless a common base of reference is chosen, such as the U.S. dollar or a basket of currencies. In the latter case, results always will have to be expressed in a base currency, if for no other reason than financial reporting requirements.

Selecting appropriate criteria to be applied to permit nearly homogeneous interpretation of movements in interest rates, currency rates, and other criteria can be fairly complex because solutions must address at the same time volatility, liquidity, and current market price, along the frame of reference which was presented in Exhibit 13.2 in the last chapter.

USING THE YIELD CURVE AS A GATEWAY TO SOPHISTICATED SOLUTIONS

Yield curves were explained in Chapter 11 and virtual financial statements in Chapter 6. The present discussion brings the two issues together to underline, by way of practical example, the need for a first-class method for reporting the risk embedded in the banking book, not only the trading book.

An integrated approach to fair value estimates that targets both the banking book and the trading book brings into perspective the requirement that the bank's chief financial officer (CFO), chief information officer (CIO), chief auditor, and members of the board think in terms of a bifurcation in accounting practices. As I already mentioned:

- Virtual financial statements available in real-time serving management accounting and control purposes should be accurate but not necessarily precise.
- In contrast, regulatory financial reporting—including a growing array of financial disclosures—should be precise and abide by the laws of the land.

For instance, to weed out of the banking book interest-rate risk, an internal interest-rate swap can be a rewarding exercise particularly for intraday and daily management reports. For internal accounting reasons, this swap will bring interest-rate risk into the institution's trading book. An internal interest-rate swaps method typically works through *time buckets*:

- *If* the loans in the banking book have a life up to, say, 15 years, *then* it is advisable to build up to five buckets for 1, 2, 5, 10, and 15 years.
- Reporting should be handled through knowledge artifacts, based on a model with predefined time periods into which are placed the loans to be priced and hedged.

A similar method can be used effectively with other instruments, such as a maturity premium regarding country risk. Exhibit 14.2 presents an example with five buckets. Notice that the time ranges of these buckets do not necessarily need to be equal. A buckets approach can help in hedging, essentially amounting to an internal netting function by time slots, approximating what the 1996 Market Risk Amendment calls the standard method for marking to market the trading book.

In implementing this methodology in connection with interest rates, a *zero coupon yield curve* can be used. This method is known from a number of practical applications that fall under the cumulative title *sensitivity models*. The key to a valid solution lies in the ability of converting loans positions into bond positions. As an example, say that the institution has a swap book of 2000 interest-rate swaps:

1. The analyst develops the time buckets, along the lines discussed in text.
2. Then the analyst takes as a frame of reference bullet bond payments corresponding to the right time bucket.

The analyst can use sensitivities to convert these positions to zero bonds and to calculate cash flow. Based on maturities, he or she can reduce, for example, 2000 different payments to the positions of 10 buckets. With time slotting comes the challenge of evaluating exposure.

Exhibit 14.2 Five Time Buckets with Time to Maturity Premium Regarding Country Risk

Bonds can be geared. There is a long list of derivatives using bonds as underliers. Therefore, since the early 1990s, my favorite approach is to convert the notional principal amount associated with derivatives into real money at risk through a demodulator.[3] Many banks disagree because they think that the notional principal amount does not have a relation to risk exposure. This is a false assumption as well as an internal contradiction because these same banks use stress analysis.

- An institution is well advised to use the demodulator of notional principal for internal management accounting, as a way to subject positions to a stress test.
- This procedure provides the board and senior management with a compass on exposure at different values of the demodulator, chosen according to prevailing market conditions.

Financial analysis and its tool have to be very flexible and innovative. While different models are needed to deal with different financial instruments, experience teaches that these models evolve over time, as users' know-how increases and demands for experimental solutions become more sophisticated. Classification factors also play a role. In terms of exposure, for example, in handling options one distinguishes between:

- *Bought options*, where the worst case is a simple write-off of the premium that was paid, and
- *Written options*, where sophisticated models are necessary for pricing, because there is no bottom to possible losses

Regulators believe that the growing expertise of commercial banks and investments banks in modeling serves several purposes: It makes reporting a little more objective, it presents banks with

a fairly uniform approach to the measurement of risk, and it advances a methodology that enhances control of credit risk, market risk, and other types of risk.

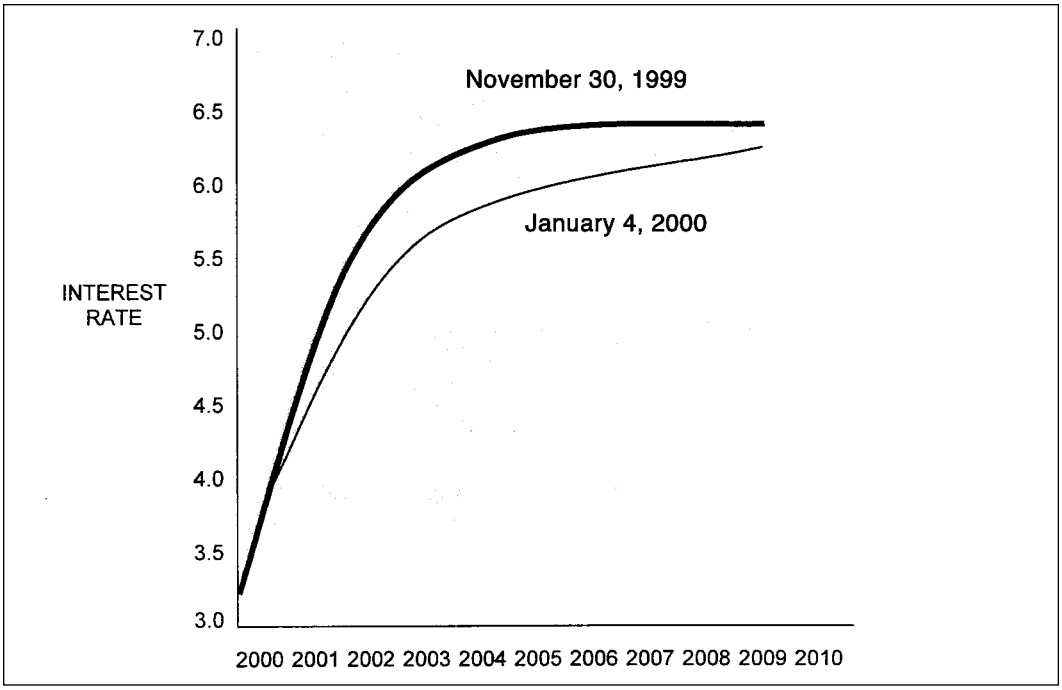
In the majority of cases, marking to market and marking to model are complementary processes. It may be possible to mark to market some of the loans in a portfolio, particularly the more conventional ones. Others would have to be marked to model. Even with conventional-type loans, models may have to be used to reflect specific valuations because of covenants.

In all cases, the models built work through approximations. This is true not only because of the assumptions made and the hypotheses used but also because data on which some of the extrapolations have been based changes over time, while the algorithm(s) also may contain an error. Few organizations appreciate the importance of data, yet data makes up 80 percent of the problems in modeling. All these factors lead to *model risk*.

Exhibit 14.3 provides an example of data change in a little over one month; it presents two yield curves of 10-year implied forward interest rates in Euroland. The implied forward yield curve, which is derived from the term structure of interest rates observed in the market, reflects the market expectation of future levels for short-term interest rates. The data used in the estimation has been based on swaps contracts.

The new global perspective for interest-rate risk management enlarges the concepts of modeling and of regulation and brings them to an international dimension. No doubt, as they are implemented, the new financial reporting requirements will have a major impact on:

Exhibit 14.3 Implied Forward Overnight Euro Interest Rates



- Marketplaces
- Equity and bond prices
- Loans being contracted
- Derivatives trades being made

The requirements also will lead to new definitions of prudential reporting rules. Some of the many basic questions regarding the variables to be taken into account include:

- the relative weight of each variable
- the method of integrating different risks
- how exposure should be reflected in the profit and loss statement

Simply stated, the question is: "What is earnings at risk?' Multivariable exposure and recognized but not realized gains and losses are examples of evolving definitions.

A rigorous comparative analysis poses different requirements from the better-known method of calculating the average all-in spread from a sample of recently issued loans or bonds. While with adjustments to provide plausible estimates of par market pricing for current deals banks may come nearer to present value, this and similar approaches do not necessarily satisfy the basics behind fair value estimates of loans positions.

The value at risk (VAR) model recommended by the Basle Committee and the G-10 central banks[4] should be seen as nothing more than a stepping-stone to more complex solutions for measuring exposure that will develop over the coming years. Still, because the able use of VAR requires a cultural change, it is wise not to skip this stepping-stone but to try to improve it. After all, central banks now welcome eigenmodels (the bank's own models) in the computation of risk.

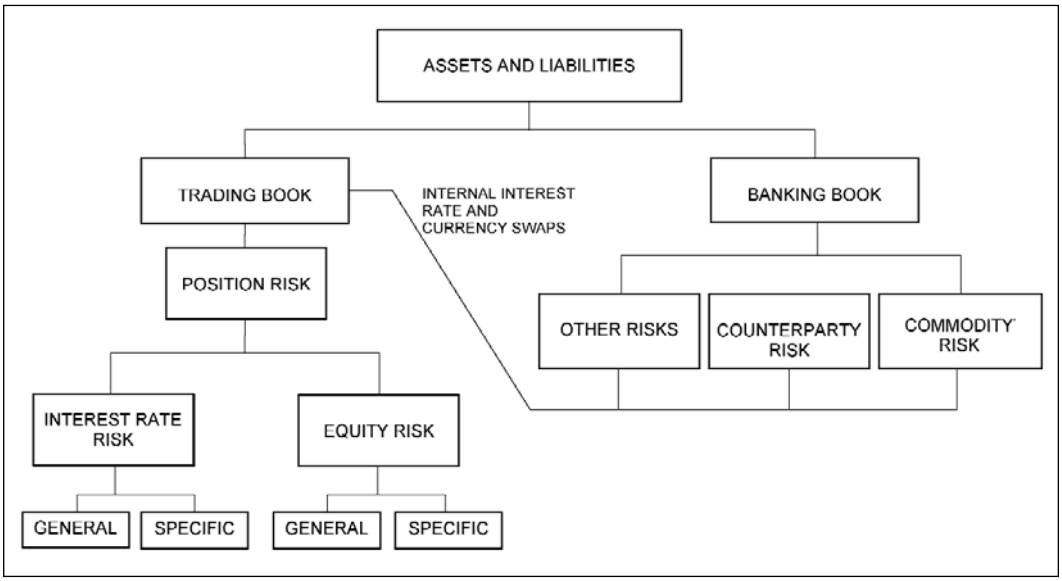
MISMATCH IN CAPITAL REQUIREMENTS BETWEEN COMMERCIAL BANKS AND INVESTMENT BANKS

At the end of the 1980s, Dr. Gerald Corrigan, then chairman of the New York Fed and the Basle Committee, and Sir David Walker, then chairman of the Securities and Investments Board in Britain, put forth a proposal that led to the distinction between banking book and trading book. The proposal became known as the "building block approach." This happened after the 1988 Capital Accord, as voices were raised for its revision.

The building block approach is relatively simple in design. It calls for dividing a credit institution's business into two parts: *trading* and *banking*. The idea was that the Basle Committee's capital standards of 1988 would apply to the banking book, while a new capital requirement should be worked out for the trading book. An April 1993 discussion paper by the Basle Committee ensued, which was redrafted and reissued in April 1995 incorporating the use of models. It became the Market Risk Amendment in January 1996.

The contents of trading book and banking book are shown in a snapshot in Exhibit 14.4. Both have assets and liabilities. Credit risk and market risk are present in both of them, although there tends to be more market risk in the trading book and a greater amount of credit risk in the banking book.

Exhibit 14.4 A Bird's-Eye View of Risks Embedded in Banking Book and Trading Book



Within the trading book separate charges are made for the market risk component and for the underwriter (issuer-specific) element of the portfolio, subject to certain changes in capital needs. The U.S. Securities and Exchange Commission (SEC) did not find this to be a satisfactory solution. The SEC feared that many of the reductions in capital requirements implied in the rules by the British Securities and Futures Authority (old SFA) that were to be adopted by the Basle Committee for the trading book would dilute the SEC's capital requirements for large investment banks.

The SEC's decision not to agree to the proposed common standard on trading book capital requirements for commercial banks and investment banks was taken at IOSCO's annual conference in London in 1992. Prior to this, regulatory thinking about a common ground for credit institutions and broker-dealers had reached, so to speak, a high-water mark.

After the 1992 conference, another bifurcation was created with the publication by the European Union of the Capital Adequacy Directive (CAD), which resulted in further divisions in regulations between the Basle Committee and, this time, the European Union Executive. Some of the gap was filled in the mid-1980s, after the Amsterdam accord that led to CAD II. Gaps also exist in the way the 1996 Market Risk Amendment is implemented from one G-10 country to the next. Because not all markets are the same, and because past policies die slowly, individual central banks of the G-10 have established their own requirements beyond those elaborated by the Basle Committee.

The Bank of England has a rule that no bank can lend to any individual nonbank 25 percent or more of its capital. This and similar rules assist in controlling the exposure of commercial banks to industrial companies and to nonbanks. Twenty-five percent of a bank's capital is, however, a huge amount. When Long Term Capital Management crashed in late September 1998, the United Bank of Switzerland lost the $1.16 billion it had invested in a transaction with this hedge fund. This was about 3 percent of its capital—and it still represented large losses that took the bank some time to recover from.

Another interesting issue to regulators and to the bank's own management is how institutions with global operations address some other risks, such as country risk, associated with their loans. Pure credit risk is not the only exposure with loans. Sticking to the fundamentals, one can say that the loans book basically incorporates three risks:

1. The classic *credit* risk
2. *Liquidity risk* (with country risk associated to it)
3. *Interest-rate risk*, which can be absolute or structural

Structural interest-rate risk is essentially mismatch risk. (See Chapter 12.) Top-tier commercial banks tackle the challenge of top management's awareness of credit risk, liquidity risk, and interest-rate risk through *virtual financial* statements that are available intraday and address assets and liabilities both in the banking book and in the trading book. As with the virtual balance sheets, discussed in Chapter 6, they are available intraday and serve a worthwhile purpose in terms of management decisions because they permit users to answer ad hoc queries regarding present value as well as exposure.

Chapter 6 also mentioned Cisco's use of virtual balance sheets. The State Street Bank has virtual statements available on 30 minutes notice. Among industrial companies, Intel, Microsoft, Motorola, and Sun Microsystems also produce virtual financial statements updated intraday. A virtual statement is confidential, but its interactive approach is most valuable to senior executives. Organizations that master high technology think highly of intraday:

- Balance sheets,
- Income statements, and
- Other financial documentation.

Moving from interday into *intraday* presents significant competitive advantages. In this connection, accuracy is more important than precision. Even if it involves, for example, a 3 percent error, management loves to have a balance sheet available ad hoc in real time. This error rate is not acceptable for regulatory reporting and for legal purposes, where precision is foremost.

In all likelihood virtual financial statements are a longer-term issue confronting FASB, ASB, and every other accounting standards board. Regulatory requirements do not appear out of the blue sky. Their purpose is not only to control but also to promote the well-being of the banking industry. It is all a give and take.

These examples are only a few of the major changes taking place in accounting and in finance. It is certain that the new regulations, marking to model, internal swaps, and virtual balance sheets will radically change the way we value equity. They also will greatly impact on the way we look at cash flow, earnings, and risks.

CREATIVE ACCOUNTING DAMAGES THE PROCESS OF SECURITIZATION

At any point in time, all loans have a value that, theoretically, can be defined with a certain accuracy. Alternatively, the value might be computed through algorithms. Both the theoretical and the computational approaches are, for practical purposes, approximations. In the large majority of cases, estimating the value of loans in the banking book is not an easy business because no two loans are the same. Their market value differs in a number of ways principally:

- Amount,
- Counterparty risk,
- Covenants,
- Special conditions,
- Maturity, and
- Interest rates.

Volatility and *liquidity* are other key factors that are never the same in different markets or at different times in the same market. These are the crucial variables the market uses to look at the value of loans. Volatility and liquidity help in framing prevailing psychology in investments—and therefore, in lending and in trading.

The correlation among volatility, liquidity, and market price is a domain where too little research has been done. Yet the results of such studies are vital, particularly in connection with the securitization of loans by means of credit derivatives. Not all loans attract the same market interest in securitization terms:

- Some loans are liquid; others are not.
- Some loans have low credit risk; with others the risk of default is high.
- Some pools of loans have been studied analytically through option adjusted spread (OAS); with others, the analytics are lousy.

Other things being equal, those financial instruments the market considers to be more transparent and well structured become more liquid and can be securitized more easily. Mortgages are a good example. In the United States, some 80 percent of mortgages have been pooled and sold as securities to institutional investors, particularly insurance companies and pension funds that are interested in annuities.

Corporate loans are a different class. Until credit derivatives started rolling in 1996, only 3 percent to 5 percent of corporate loans were securitized. One of the main reasons for investors' apathy to corporates has been that they are not uniformly structured or as transparent as the market would like. Hence they have the potential of negative surprises.

The implementation of COSO by commercial banks might help credit derivatives because it significantly increases transparency and reliability in financial reporting. Increased transparency and reliability helps to make securitized corporates more appealing to investors. The underlying concept is what General Electric calls the *wing-to-wing* approach, meaning that senior management examines the entire process from both the customer's perspective and its own. Transparency and reliability in financial reporting can be instrumental in counterbalancing other shortcomings—for instance, the fact that most corporates are inherently illiquid and they also carry a greater event risk.

- A large number of business loans lack covenants, which specify cash flow, event risk guarantees, and other crucial variables the borrower should observe.
- Hence, the credit institution (and the investor who buys them) has less control over them, although it continues carrying these loans on its books.

These considerations are at the top of investors' minds when they plan to diversify out of market risk by assuming credit risk. Investors do appreciate that, in a pool of loans, some debtors may be rated AA and hence have a relatively good credit standing while other companies have an A or a BBB rating.[5] Some of the latter companies may even be known to use *creative accounting* practices. This puts market players on guard, because typically investors have an aversion to tricks that may take place behind their backs.

Creative accounting gimmicks damage the process of securitization because investors know these tricks are used most often to conceal what under a rigorous analysis would be imperfect business.[6] Not all creative accounting is plain cheating. Some is cosmetic, with future benefits in mind. An example is when a new CEO arrives in a company that contains both successful and troubled divisions. The CEO then:

- Writes off the troubled divisions' business
- Sells uninteresting assets for whatever can be gotten

Following this fire sale, the new CEO negotiates with the company's compensation committee for a generous bonus, based on rising earnings, a higher stock price, or both. Therefore, in studying a company's financial statements it is wise to separate true earnings from those that are one-time events or generated by creative accounting practices that are hiding peculiar deals.

Another example of creative accounting is a case of stock price manipulation. In Wall Street, maintaining a high stock price is key to corporate success. Aggressive accounting practices reduce the impact of the buying binge on earnings. For instance, Softbank (a heavily indebted Japanese company that specializes in investing in the United States) decided to write off $2.7 billion in goodwill from the Ziff-Davis and Comdex buyouts over 30 years rather than the more conventional 10 to 15 years.

"If they wrote off the goodwill over 10 years, they would barely be profitable," figured Jonathan Dobson, a fund manager with Jardine Fleming Investment Management's OTC Fund. As a result, in July 1996 he dumped his $30 million stake, about 5 percent of his total Japan holdings. A case about creative accounting also can be made with regard to loans and to options.

The classic case with options concerns their pricing, which time and again has been based on a volatility smile—the assumption that future volatility would be low. Options prices and volatilities correlate. Because high-priced options do not sell well, many traders convinced management that future volatility would be benign—but low-priced options brought major risks to the company.

Estimating future volatility is not an exact science. Some brokers' opinions about what to expect in future volatility might be biased, often because of conflict of interest; these brokers also might be the parties who will sell the options. This happened in early 1997 with NatWest Markets, and the bank lost a rumored £300 million ($420 million). Such losses led to the demise of NatWest Markets. Its parent company, National Westminster Bank, dismantled it and sold its pieces to other investment banks. Eventually, NatWest also fell, to the Royal Bank of Scotland.

Volatility smiles concern future interest rates, and they affect pricing not only of options but also of other instruments. This is one of the examples of erroneous hypotheses (which I also referred to in connection with models). The algorithms addressing credit risk may be reasonably good, but *if* the hypotheses that we create are unsound or the data that we feed into our model are unreliable, then the results we get will not be dependable. Model risk is not limited to the algorithms and heuristics of the model, although these also are basic elements. Assumptions, hypotheses, and data

play a crucial role in terms of the reliability of what the model delivers.

There are available today some good models for credit risk. Examples of algorithms for marking-to-model counterparty risk are provided by CreditMetrics, by J. P. Morgan; the Actuarial Credit Risk Accounting (ACRA), by the Swiss Bank Corporation (now United Bank of Switzerland); CreditRisk+, by Credit Swiss; and Loan Accounting System (LAS), by KPMG.[8] Developed in the late 1980s by Bankers Trust, Risk Adjusted Return on Capital (RAROC) has been the first to apply marking-to-model procedures to credit risk. It is, by all evidence, the most successful modeling approach for credit risk. Exhibit 14.5 explains the sequential sampling on which RAROC is based.

I recently studied RiskCalc by Moody's Investors Service, including choices that led to its design and the hypotheses embedded into its structure. This model supports a rating methodology for private companies based on power curves as predictors of default. It is primarily addressing middle-market lending, which is still a largely subjective process in search of analytics.

The concept of *power curves* rests on Pareto's law, statistical inference, and database mining. Rich databases enhance the predictive potential of models. RiskCalc incorporates critical factors that help in the survivability of a company or, alternatively, can tell how well (or how badly) a given organization manages its business. Examples are:

- Level of leverage,
- Profitability,
- Liquidity,
- Inventories, and
- Sales growth.

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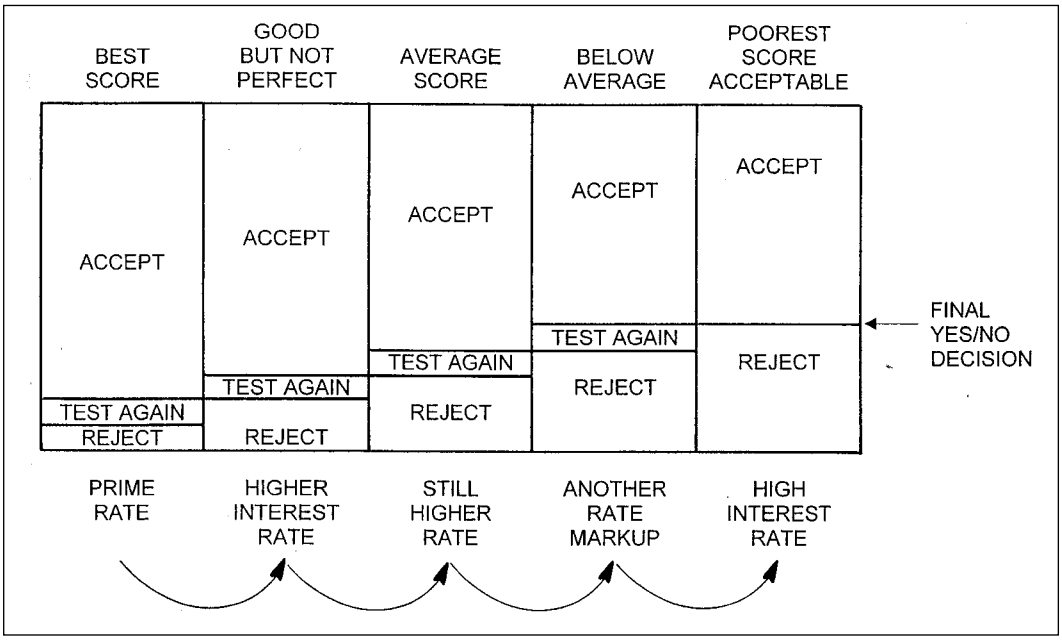
Exhibit 14.5 Sequential Sampling Plan to Avoid Inflexible Yes/No Decisions Taking a Higher Risk for Reinsurance



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The relation between *estimated default frequency* (EDF), in the ordinate, and the absolute value of a given ratio, in the abscissa, regarding the default likelihood in connection to each of these factors is not linear. The power curve maps the fraction of all companies with the value or score relating to factors just listed to survivability. By so doing, it permits users to analyze the most likely pattern of defaults.

Other quantitative approaches, and their models, fulfill different objectives, such as marking to model a portfolio of derivatives; still others address exposure embedded into the loans book. In their fundamentals, these are as different from one another as the instruments they help to manage. Typically, a bank's commitment with a loan is *paid* upfront. By contrast, one of the major problems with accounting for derivative financial instruments is that they are easy to *buy* upfront, and, at least initially, they may cost nothing.

Derivatives involve no historical cost, as do other classic instruments. In fact, the lack of historical cost connected to many derivative financial products contradicts some of the principles of accounting, which are based on historical cost. Of course, not all derivatives value is zero. A number of options, for instance, have some value at inception, as do off-exchange contracts and most derivatives at any time after inception.

As this brief discussion demonstrates, the design of models and their use must be focused. Few banks appreciate this simple but basic fact. Some use a model designed to prognosticate the behavior of a certain instrument or control its exposure for other totally unrelated financial products. When this happens, the results are highly misleading or, under the best conditions, they are zero.

SECURITIZATION OF CORPORATE LOANS THROUGH CREDIT DERIVATIVES

The concept of credit derivatives is based on two pillars:

1. The bank's desire to liquefy its corporate loans and other assets related to its lending business, and
2. The belief that the credit universe is evolving into a liquid, transparent market of the type characterizing other global markets, such as foreign exchange.
3. Historically, however, this second hypothesis is not fool-proof.

While over the years mortgage-backed financing prospered, corporate loans have not been easily liquefied. Creative accounting is one of the reasons investors do not particularly like securitized corporates. Creative accounting increases credit risk, which is anyway not so transparent. Many of the loans in the securitization pool were given to companies with no public rating by independent companies. Investors therefore must rely on the word of the bank that gave these loans and also may be the underwriter. The market for credit derivatives is globalized. Some people think this market is a brilliant approach to credit risk management. Others do not buy this notion because of unknowns attached to the securitization of credit risk. There exist several types of credit derivatives instruments. The more popular are:

- Asset swaps,
- Total return swaps,
- Default swaps, and
- Credit-linked notes.

The good news for institutions is that credit derivatives permit them to pass off to other parties the risk of default on some of the loans in their portfolio. Investors, however, demand a higher premium for this combination of market risk and credit risk, and the securitization of corporates requires fairly accurate pricing methods.

A different way of saying this is that the complexity of pricing financial instruments increases. Other things being equal, it is relatively easy to establish the price of a futures contract in commodities. When the cost of soybeans rises, the price of the futures contract on the commodity increases by a corresponding amount.

- In the case of commodities futures, the relationship between the price of the underlier and that of the derivatives tends to be linear.
- This is not true with other instruments, such as credit derivatives, because compound risk leads to nonlinear pricing algorithms.

It is no less true that commercial loans have become complex, linked to other credit and non-credit products and services, while derivatives are becoming customized. Therefore, correct pricing requirements multiply. The classic pattern characterizing commercial loans is being restructured even in domains in which a historical trend has existed for as long as anyone can remember. Other sectors of the economy have had a similar experience.

"We are starting to see evidence that the capital markets are working to moderate the real estate cycle," says Greg A. Smith of Prudential Securities.[9] "This is particularly true for office building construction. The problems in the non-Treasury debt markets are siphoning some capital away from real estate. The dependence of real estate activity on the capital markets, rather than on private lenders (which is the historical pattern), has reduced the overall amount of money available to real estate at the top of the cycle."

Comparative analysis is one way to look into pricing products for the financial markets in an environment of galloping change in instruments, including changes in the way they are priced and being channeled to the capital market. Comparative analysis might provide a simpler pricing process, without too many simplifications, by looking directly to the market for pricing information. This works best for standardized products traded in liquid markets; that is, in an environment of known risks. The secret is keeping a close watch on the market's view of risk, both current and forthcoming.

Investors are always concerned about the unknown. When transparency does not hold the upper ground and there is no guarantor for securitized corporates, the market will not go for these products. Investors also know that many banks do not keep the risks embedded in their loans under lock and key.

Credit derivatives are an interesting idea if for no other reasons than only rarely have there been attempts to rid the balance sheet of unwanted risks. As mentioned earlier, one of the basic factors for this is that corporate loans have not been transparent. The bank holding the loans keeps many secrets close to its chest. The equity markets would never have reached their current levels of liquidity and efficiency if it had not been for well-regulated financial disclosure.

The above statements talk volumes about the contribution of transparent financial reporting to the securitization of corporates.[10] Short of the aforementioned preconditions, credit derivatives will go up to a point but not further. Serious investors require a framework to account for loan market dependability. Specifically, they are looking for documentation regarding the difference between the values with which they are confronted:

- The value the open market would assign to a pool of loans, and
- The one the lender would assign internally to the same loans.

By comparing loan values derived from internally calibrated risk premiums with those obtained from market risk premiums, it might be possible to quantify pricing disparities. With this, informed judgments can be made about how to reconcile pricing dictated by the marketplace with the bank's internal pricing of credit risk, including its loan servicing costs.

Risk management models are needed to help identify, qualify, and quantify credit risk. Another fundamental requirement is a solid methodology, as all commercial banks have problems in managing their loan portfolios—because, quite often, these portfolios tend to be very illiquid and undiversified.

When bankers work on the securitization of loans, they must appreciate that they are working from a different perspective from fund managers who design and build their portfolios practically from scratch. While the precondition is understanding the risk/reward profile of the loans portfolio the bank owns, this is not enough all by itself. Some experts believe that while players in credit derivatives may be a little ahead of themselves in terms of when this market is likely to flourish, the market is definitely one that is worth watching.

NOTES

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2. D. N. Chorafas, *Credit Risk Management*, Vol. 1: *Analyzing, Rating and Pricing the Probability of Default* (London: Euromoney Books, 2000).
3. D. N. Chorafas, *Managing Credit Risk*, Vol. 2: *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
4. See D. N. Chorafas, *The 1996 Market Risk Amendment. Understanding the Marking-to-Model and Value-at-Risk* (Burr Ridge, IL: McGraw-Hill, 1998).
5. Chorafas, *Credit Risk Management*.
6. Terry Smith, *Accounting for Growth* (London: Century Business Books, 1992).
7. *Business Week*, August 12, 1996.
8. D. N. Chorafas, *Credit Derivatives and the Management of Risk* (New York: New York Institute of Finance, 2000).
9. Global Equity Research, *Investor Weekly*, Prudential Securities, New York, September 23, 1998.
10. Chorafas, *Reliable Financial Reporting and Internal Control*.

CHAPTER 15

Changes in Credit Risk and Market Risk Policies

Credit risk is present in all transactions into which a bank enters, whether the other party is another institution; a manufacturing, merchandising, or any other type of company; or a physical person. One or more of a bank's counterparties may go bankrupt prior to fulfilling its contractual obligations. Or some of the counterparties may be unwilling to perform, as happened several times in the 1990s with derivatives contracts.

Quite similarly, any transaction made by a financial institution involves market risks. Their origin may be commitments concerning interest rates, from loans to derivative financial instruments; currency exchange rates; equities and equity indices; as well as other commodities: Many of the credit risks and market risks taken by an institution correlate. But so far few banks have the know-how and technology to integrate them into the coherent estimate of exposure.

The rigorous quantitative measurement of exposure is a relatively new notion in finance, but there is enough know-how from engineering and the physical sciences to make feasible this solution in connection with products and processes in banking, brokerage, and other financial industries. The application of engineering measurement principles to banking and finance should not be an exception, especially when it is commonly perceived that credit risk and market risk are on the rise.

Measurement represents an appropriate means of increasing control and of improving the quality of management. However, the need for measurements regarding financial products and processes contrasts in many cases with deficiencies some of the current metrics reveal when analyzed from a rigorous implementation viewpoint. To a substantial extent, these problems are a consequence of the use of inadequate methods of definition and validation.

Because the profession of banking is becoming more sophisticated year after year, the measurement of credit risk and market risk is now seen as a key issue for financial and nonfinancial institutions. Even if in the 1990s losses from corporate defaults were rather low, default rates rose. They are expected to rise significantly more in the near future. And because volatility is high, market risk is also increasing.

To cope with this dual amplification of risk, top-tier banks use innovative models, methods, and techniques to measure and manage their exposure internally. One approach is fair value assessment of nonliquid assets and liabilities—for instance, bank loans and deposits. The Financial Accounting Standards Board (FASB) defines fair value as market value other than a fire sale, at which a willing seller and a willing buyer agree to exchange assets.

Chapter 14 discussed marking to model. Reference was made to several credit risk models currently available, such as RAROC, LAS, and ACRA, which can be used effectively (but carefully) to estimate credit risk. The use of models itself involves risks: Assumptions may be faulty; hypotheses may be undocumented; and data obsolete, biased, or outright inaccurate.

The exploration of these issues and avoidance of their pitfalls stimulates the effective sharing of ideas on how to identify risks and bring them under control. There are indeed many challenges. Increasingly, bankers find that the ability to integrate counterparty exposure with the different types of market risk is the cornerstone to the able handling of their institution's business. Such integration helps in better appreciating the risks the bank is taking in its daily practice and in managing those that are already in its portfolio. This is one of the major changes in credit risk and market risk policies.

ART OF CREDIT RISK AND MARKET RISK INTEGRATION

Bankers should not only appreciate the similarities and differences between exposures in credit risk and market risk but also understand the information needs and computational requirements necessary to estimate each one of them accurately and bring the two together. The aggregation of market and credit risk is critical in determining the true risk of loss faced by a credit institution, investment bank, or any other entity.

This integration is important inasmuch as a rational way to allocate economic capital[1] is on the basis of combining risk of loss prevailing in different channels. Without appropriate measurements and steady follow-up on these measurements, any business is subject to the law of *unintended consequences*. Integrated credit risk and market risk figures, by major client, correspondent bank, or other counterparty, is a basic ingredient of both:

- Active portfolio management, and
- A proactive risk control system.

Take as an example Long Term Capital Management (LTCM), the nearly bankrupt Rolls-Royce of the hedge funds. Money center banks, brokerage firms, and other counterparties that dealt with LTCM faced both credit risk and market risk, and they did so in a triple capacity:

1. They were shareholders in LTCM.
2. They loaned money to LTCM.
3. They did derivatives trades with LTCM.

Cases along this triple line of exposure happen practically every day. Therefore, a prudent risk evaluation by senior management obliges the integration of market risk and credit risk along a framework that makes feasible a rigorous analytical approach and provides results pointing to corrective action. This framework should, for instance, permit managers to:

- Assess the credit risk embedded into a derivatives portfolio.
- Evaluate the implications of netting agreements on credit risk.
- Test correlation assumptions between market risk and obligor default.

A huge penalty must be paid when the board and senior management fail in their duty to account for credit risk and market risk simultaneously, because this is tantamount to abdicating risk control responsibilities. The aftermath might be seen in the short term in the income statement, but the drift also can go on for years. This happened in the 1990s with practically all of the major Japanese banks whose nonperforming loans reached a multiple of their equity, as Exhibit 15.1 demonstrates. (Statistics are from early 1999, prior to liquidations and mergers.)

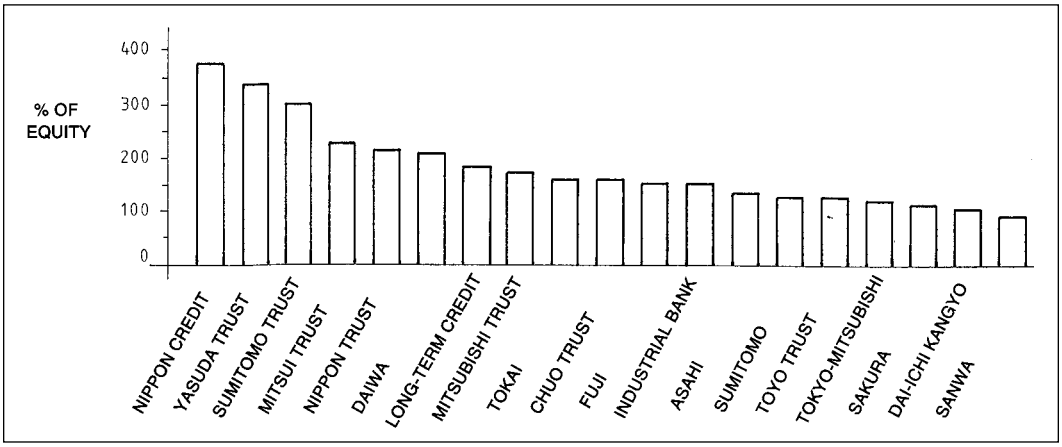
Some of these banks, such as Nippon Credit and Long-Term Credit Bank of Japan, are bankrupt; the government took them over to avoid a financial meltdown. Others have merged, but mergers do not change the fact that staying power is weak. An example is the merger of Industrial Bank of Japan, Fuji Bank, and Dai-Ichi Kangyo Bank by means of a common holding controlling all three equities.

David Ben Gurion once said that two things that are wrong do not make one that is right. A similar dictum is applicable in the financial sector. As shown in Exhibit 15.1, Dai-Ichi Kangyo is far better off in terms of nonperforming loans versus its equity. Fuji is the worst off of the three, but Industrial Bank of Japan is not much better. In a way, Dai-Ichi money can be seen as pulling the other two institutions out of trouble, creating a megabank of $1.23 trillion in assets, which may be a colossus with feet of clay.

Measuring the counterparty's net worth for credit risk reasons requires addressing the fine print of business exposure: the firm's country (and prevailing economic, political, and financial conditions); industry and specific risk; and other factors contributing to the likelihood of default and, in general, of nonperformance. A sound approach would implement a market-based measure of default risk integrating company and instrument rating by independent agencies, as suggested by the New Capital Adequacy Framework by the Basle Committee. Calculating a client firm's default probability involves:

- Estimating business value and assumed exposure because of credit risk and market risk factors,
- Determining the counterparty's distance to default, as the joint effect of the above variables, and
- Identifying positions for risk reduction, either through disinvolvement or by means of hedging.

Exhibit 15.1 Nonperforming Loans by Japanese Banks in Mid-1998



The hedging approach would require structuring the transaction(s) in a way able to maximize the factors that provide the best protection; for instance, analyzing what is required by a "perfect hedge" (if there is one) compared to the practical hedge. We will return to this issue when we discuss the assessment of hedge effectiveness.

We must feed our strengths and strangle our weaknesses, says Peter Drucker. This is easier said than done. Hedges often fail because our assumptions do not materialize. Those forecasters and investors who were expecting a booming world economy in 2001 found out the hard way that they had to adjust for the fact that it was not booming because the world recovery was not happening in fits and starts. Those financial analysts who said that NASDAQ's first meltdown in late March/early April 2000 was a short-lived event, or that at the end of September 2000 the NASDAQ had reached bottom, learned to their sorrow that stock market blues continued well into 2001.

Recovery from a big shock is a much more gradual affair than what the fast-track analysts and investors imagine. The adjustment period often proves to be longer than expected. Real life rarely validates end-of-the-crisis optimism. Crosscurrents also were occurring, which mean that the global market is changing. Investors gradually have to substitute individualized risks unique to specific investments, instruments, and industries for the world economic and financial system risk to which they have become accustomed.

In 1998, for instance, investors weathered a very difficult global economic climate by concentrating their ownership in the very best investments within each asset class, thereby minimizing credit risk. Examples are Treasuries in the fixed income area and the most solid companies in equities. In 1999, with the world financial crisis gradually dissipating, it was no longer important to own the very best in each asset class. In 2000 and early 2001, even the best names were severely punished by the market. Finance is not as simple as labels.

One common assumption was that after January 1, 1999, the common currency would induce European consumers to spend more and, with their spending, revive Euroland's economy. Nothing like that has taken place, and the euro has sunk by more than 30 percent against the U.S. dollar. This was another of the undocumented assumptions by analysts, investors, and, most particularly, Euroland's governments that went wrong.

To get an idea of how lightweight these hypotheses on the euro's forthcoming supremacy have been, one must appreciate that diversity rather than uniformity characterizes the 12 countries of Euroland. This is true of laws, regulations, cultures—all the way to debt. Based on statistics of June 30, 1999, Exhibit 15.2 suggests that current practices in regard to household debt varies widely between European countries, with evident effects on each country's economy.

Another assumption that has been way off the mark in terms of being fulfilled is that borrowing at variable interest rates in Euroland would increase across the board and percentages in different countries would tend to converge. So far this has not happened, and it does not look like it is going to take place. Exhibit 15.3 demonstrates that, if anything, both among households and among industries, these percentages tend to diverge.

Part and parcel of an able solution to the management of exposure is overcoming assumptions that intrude at the most inopportune moment, thereby inhibiting effective risk control. The strategy the better-managed banks follow is that of pricing of credit risks and market risk through realistic assumptions that they regularly test. They also use instruments that permit a better balance among assumed exposures. Experimental design should be used to permit study and analysis of risk/return ratios along with the study of default probabilities.

Exhibit 15.2 Household Debt as a Percentage of Disposable Income in Five European Countries

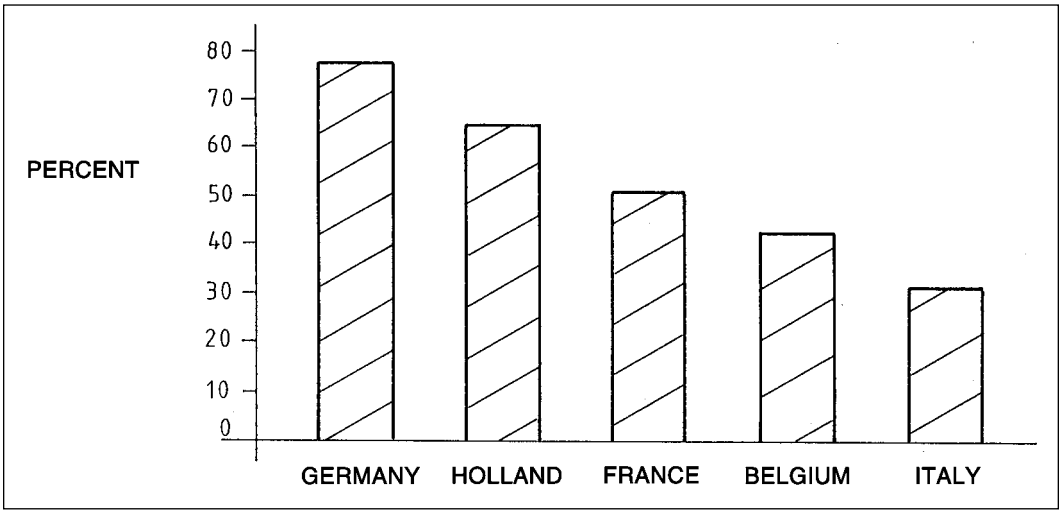
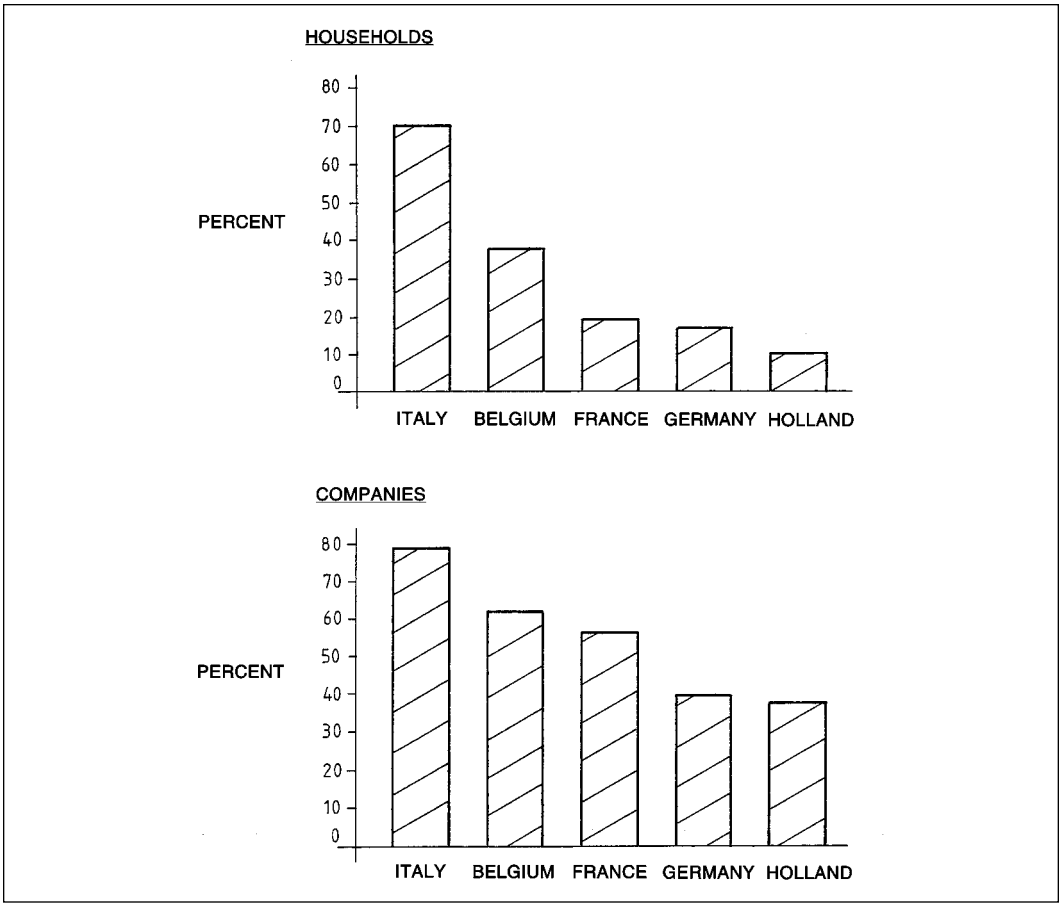


Exhibit 15.3 Percentage of Borrowing at Variable Interest Rates in Euroland (BIS Statistics)



- An integral part of a sound methodology is the ability to integrate risk management metrics with performance measurements.
- Bringing performance measurements into the picture makes it possible to link risk management processes with compensation and reward systems.

One reason that banks go overboard with credit risks and market risks is that reward systems are skewed toward greater risk taking—eventually biasing the assumptions, the models, and the whole decision-making process. Steady watch over rewards and commissions is an integral part of internal controls that must be worked out, bringing into perspective *demerits* and redefining each professional's and each manager's role in an enterprise-wide risk management framework.

The implementation of well-balanced reward systems is an integral part of credit risk and market risk integration. However, it requires changing the corporate philosophy and adopting a dynamic perspective on risk, return, and commissions. Monetary rewards are not just costs; they can also be incentives in moving the bank in the right or the wrong direction.

Senior management also is well advised to adopt actuarial techniques and develop analytic models able to map credit risk and market risk in the portfolio—both forward-looking credit risk and market risk provisioning policies. Tier-1 banks have in operation active portfolio management systems using risk contributions, according to the type of exposure and its likelihood. Their management not only understands the linkage between market correlations and default correlations but also uses benchmarks to better appreciate risk diversification by

- Measuring the incremental influence on the portfolio of each new exposure, and
- Calculating the rational price for each exposure, given the state of portfolio diversification.

While these approaches are still evolving, currently there exists enough know-how to permit assessment of the impact of these measurements not only on cash flow and general exposure but also on specific risk factors. In turn, such factors help in analyzing the development of deeper market trends, projecting the way they affect the institution, and making feasible the integration of market risk and credit risk by major counterparty, area of operations, and domain of management responsibility in the bank's organization.

IS IT WISE TO HAVE DISTINCT CREDIT RISK AND MARKET RISK ORGANIZATIONS?

An astute management is always eager to learn the way principal players in the financial market act and react, including their habits and patterns of behavior. It is important to distinguish between the style of hedge funds, investment management firms, institutional investors, manufacturing and merchandizing companies, and other counterparties—but this is not enough. Each company has, so to speak, its own management style.

The bottom line is that counterparties with different personalities deal with a bank in various amounts of credit risk and market risk, the two often meshing with one another in the same transaction. For many institutions, the analysis of this coexistence and synergy of variable credit risk and market risk at the very source of a transaction poses two sorts of problems:

1. *Cultural*, because the concepts coming into credit risk evaluation are quite distinct from those characterizing market risk
2. *Organizational*, because in the large majority of cases, credit risk and market risk are managed, within the institution, by two independent organizations

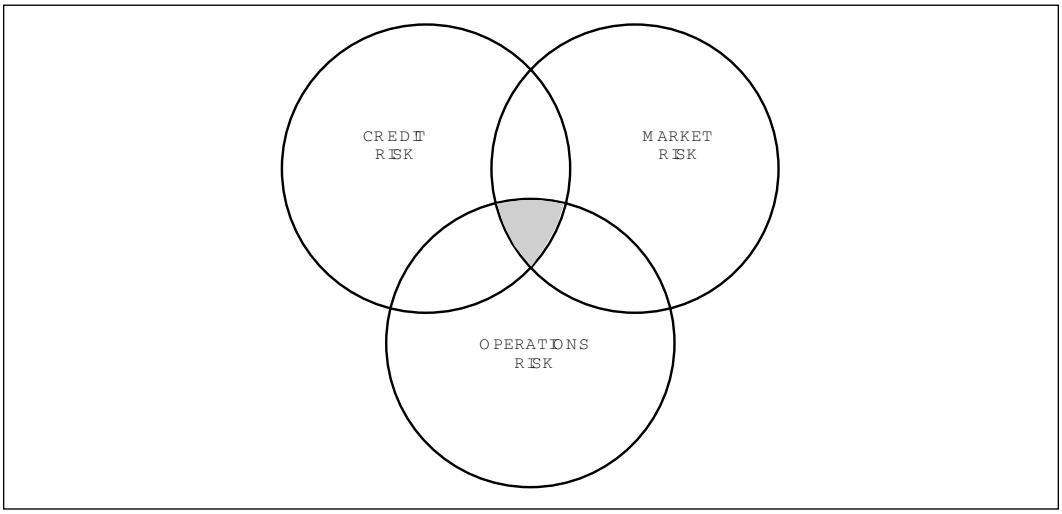
In those banks where two different organizational units are responsible for credit risk and market risk control, coordination is said to be provided at the trader level. But is this the best way to manage what should always be an integrated exposure profile able to guide the hand of traders, loans officers, and investment advisors? Three different money center banks say that that process works, but in each case the executive who told me this did not seem convinced.

A sound organizational approach will pay due attention to the fact that credit risk and market risk requirements greatly overlap in terms of management policies, internal controls, and mathematical models to support such policies and controls. Furthermore, as shown in Exhibit 15.4, market risk and credit risk systems overlap with operations risk.

- There are only historical reasons for splitting credit risk/market risk responsibilities.
- This separation of missions works against effective coordination, and the institution as a whole pays the bill.

COSO takes no position on this issue of organizational responsibilities, nor does the New Capital Adequacy Framework. But practical examples demonstrate the wisdom of an integrative organizational solution. Risk management duties should be (in principle) characterized by *unity of command*. To the contrary, front desk and back office executives should definitely be separated by a thick organizational wall. Even then, there may be conflicts of interest.

Exhibit 15.4 Internal Controls, Risk Management Policies, and Mathematical Models Overlap In Three Domains That Should Work In Synergy



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Organizations are made up of people. Mixing trading and control duties leads to disaster: In the case of UBS, during the LTCM meltdown of September 1998, two of the four members in the top-level risk management committee were the chief credit officer and the chief risk management officer (CRMO). Both of them had a conflict of interest. The chief credit officer was the person who made the commitments in connection with the LTCM accords; the CRMO was for a long period associated with the trading division in a similar function, and the links were not cut.

There was also organizational conflict. The associate CRMO explained how this approach works by taking interest-rate swaps (IRS) as an example. He then stated that the (market) risk management operations, which control all market parameters, see to it that every trader who buys or sells is aware of market risks. This is done through market risk limits, and there is a check on limits to make sure they are not surpassed.

Centrally the CRMO computes the replacement values at the level of a certain detail. Eventually the gross replacement cost will be published in the Annual Statement, also at the level of a certain detail. For instance, interest-rate transaction will be shown as:

- Over-the-counter divided into forward rate agreements, IRS, interest-rate options written, and interest-rate options bought
- Exchange traded products classified as interest-rate futures and interest-rate options

The explanation raised two questions.

1. What type of gross replacement cost will be used? The answer was that a gross replacement value will be derived from a model, including certain add-ons, such as the 10-day horizon and time buckets. The result of this computation goes against a credit limit.
2. What coordination is necessary between the market risk side and the credit risk side?

    - Is the coordination done in a way that permits the capture of the synergy of market risk and credit risk?
    - Who would be the senior executive "of last resort" to solve a conflict between market risk and credit risk taking, when it arises?

When I asked these questions, the CRMO of a financial institution provided the example of a trader who buys fixed interest rate and pays with floating rate. On one side the model calculates the market risk but on the other there is a credit line issue. This transaction might create, for example, a 5 percent credit exposure on the notional amount. Therefore, the notional principal is demodulated by 20 and the result is applied to the credit limit.

On paper, this makes sense. I am all for the use of a demodulator of the notional principal.[2] Yet the response does not do away with the need for an integrative approach to credit risk and market risk. In connection to its leveraged LTCM deals, UBS had hedged itself for market risk but not for credit risk. Just three days after my meeting with the assistant CRMO, LTCM lost $1.16 billion.

Another problem with assigning credit risk and market risk management to two separate organizational units is that they tend to work in two different frames of reference. Market risk management favors quantitative approaches; credit risk evaluation historically prefers qualitative solutions. This dichotomy makes coordination difficult and handicaps the necessary follow-up of total exposure.

Also, since the market risk management unit has the responsibility for modeling and generally for quantitative approaches, in the majority of cases rocket scientists are on the side of market risk control. True enough, even when credit risk responsibility depends on a different division, the same rocket scientists may be given the job of developing models that address credit risk and portfolio-level quantification. This brings up two other problems. In the general case, market risk models are more advanced than credit risk models. This is reasonable because the modeling of credit is still in its infancy; however, other reasons also are holding back this effort.

Credit Risk Models Heavily Depend on Default Rates

While independent rating agencies do a good job on grading counterparties, they usually concentrate on major companies, and only recently have they started to grade loans. This, plus the fact that many credit risks involve special conditions, means that many of the ratings necessary for an effective use of credit risk models do not exist. Supplementing them through internal rating is a solution; however, often banks have weak databases that cannot provide the necessary information.

Bank's Weak Database Cannot Provide the Required Information

While some of the credit risk models that are currently available make sense, at least on a theoretical basis, in the majority of cases the data is missing. Therefore, the estimates made through credit risk models are not as dependable as they should be.

While an integrated risk management organization is not going to solve all of the problems discussed through magic, it will be able to provide for cross-fertilization of expertise, thereby assisting both the market risk and the credit risk side. It also will be better positioned to integrate credit risk and market risk into one coherent figure of exposure. As the following section explains, this is key to effective calculation of capital requirements through interactive computational finance.

CALCULATING CAPITAL REQUIREMENTS FOR CREDIT RISK AND MARKET RISK

The new derivatives regulation that came into effect in Germany at the end of the 1990s made it mandatory to inform the supervisory authorities on counterparty large exposures, not only on loans but on all risk assets. Underpinning this requirement is the concept that credit risk and market risk must be integrated by major counterparty.

The new regulation is an extension of paragraph 13 of the German Banking Act, which obliges a commercial bank to report on counterparty exposure when the business relation involves an amount equal to 10 percent or more of its own capital. The financial industry expects this floor to be lowered because of the synergy of market risk and credit risk. Germany, like all other G-10 countries, will be bound by the New Capital Adequacy Framework.

Will the new framework be implemented in precisely the same way all over the G-10 countries? A great deal will depend on how the regulators of the world's most industrialized countries respond to the precommitment approach. In G-10 countries there already exist some provisions allowing credit institutions to calculate their own funds requirements for general and specific risk associated with debt instruments: for instance, the general and specific risk in equities, positions taken in commodities, interest rate instruments, foreign exchange positions, and so on.

This calculation is typically done by means of models that supervisors accept, provided that institutions do so regularly and act within the confines of the 1996 Market Risk Amendment by the Basle Committee on Banking Supervision.[3] But only the most technologically advanced banks are able to do so in an efficient manner. Also, both within and outside the G-10, central banks and supervisory authorities have added their own regulatory requirements.

For instance, in February 1996 the Austrian Federal Minster of Finance issued the decree "Recommendations to the World of Banking on Risk Management." Besides following the Market Risk Amendment, this document adds clauses from the directives jointly developed by the Bank for International Settlements and the Technical Committee of the International Organization of Securities Commissions (IOSCO).[4]

One of the leading thoughts among the G-10 regulators, which will most likely find its way into new algorithms for the calculation of capital requirements, is that institutions should be rewarded for diversifying risks. For this reason, a consistent model of the diversification of exposure must not only integrate credit risk and market risk but also account for operational risks that have not yet been well defined by regulatory authorities.

In order to position themselves for the foreseeable steady evolution in the calculation of capital charges, banks are well advised to start determining their own proper capital reserves because of lending, trading, and speculative investments. Indeed, top-tier banks have already started this process based on eigenmodels. They now do client-by-client evaluations for major counterparties and sampling-based capital estimates for their other clients.

Some institutions do so at the 95 percent level of confidence, which is inadequate. Others have adopted the 99 percent level stipulated by the 1996 Market Risk Amendment. Notice, however, that this 99 percent confidence interval still leaves a 1 percent probability that losses will exceed the worst-case scenario calculated at the 99 percent level. Hence the wisdom of accounting for catastrophic risk by addressing the capital market, as has been discussed already.

Regulatory solutions that can respond to these types of challenges are still under discussion. One concept being evaluated would require all institutions to hold uninsured bonds at the level of roughly 10 percent of capital reserves. This mandate would minimize possible taxpayer risk by creating a new group of watchdogs: the bondholders, who could provide early warning signals of problems accumulating at a given financial institution.

Another proposal is to make the banks themselves look over the shoulder of other banks with which they deal by means of uninsured cross-investments. This notion rests on the idea that banks would be more watchful as investors than they are as lenders and traders, leading to a sort of self-regulation within the banking industry.

Because some economists doubt that these approaches will be as effective in practice as it is hoped, they prefer a more radical approach. They would replace the current government-run system for insuring bank deposits with private insurers who would serve as intermediaries between:

- Banks seeking private deposit insurance—a sort of privatized Federal Deposit Insurance Corporation (FDIC)
- A syndicate of guarantors, most likely other banks, insurers, and (why not) the capital market

The concept behind this proposal is that, with the globalization of capital markets, it is becoming increasingly difficult for any one country's regulators to keep pace. Central banks have a license to print money. But they do not have carte blanche to put it on the block for salvage operations. The

implementation of reinsurance by the capital market would require an independent body of on-site inspectors able to probe the banks' financial health, while underwriting agents would set the premiums paid by banks.[5]

The idea that it is easier to bridge borders through the use of private contractors and underwriters than with a well-structured system of regulators has many flaws. The East Asian "tigers," for example, took private bankers and investors for a ride—and the bigger the Goliaths of finance get, the greater are the consequences if they stumble. The following problems might occur:

- A privatized system of bank supervision could have an unlimited leverage, ending up worse than the South Seas bubble.
- If the state regulators and supervisors are taken out of the picture, there will no more be a lender of last resort. Market liquidity would disappear globally during a panic.

While these different approaches to a more universal solution are still under discussion, the fact remains that reliable financial reporting is cornerstone to all of them. While COSO does not enter into global regulatory issues, weeding out fraudulent financial reporting is vital to any effective regulatory solution and associated financial reporting practices, whether old or new.

Precisely the same statement is valid in terms of calculating capital requirements for the joint credit risk and market risk exposure by major counterparty. Few banks are organized to do this work effectively. The job is difficult, but it can be done if one applies to it all one's skill and ingenuity without violating prudential requirements and regulatory guidelines. The next section explains why this is true.

CONCENTRATION OF CREDIT RISK, PRECOMMITMENT, AND EIGENMODELS

During research I did in July 1998 in New York, Boston, and Washington, commercial and investment bankers observed that the Federal Reserve is moving toward a greater reliance on eigenmodels for capital adequacy purposes. A year later, in June 1999, the publication of the discussion paper in the New Capital Adequacy Framework by the Basle Committee documented this fact. While for the time being, in-house models are focusing predominantly on securitization and off–balance sheet trades, credit risk–oriented algorithms are becoming popular. For example, the Bank of England now utilizes rating by independent agencies and asks for ratings histories available from Standard & Poor's and other independent rating agencies.

Standard & Poor's itself is using models in its rating. "We rely on models to do our work, but we approach a bank's in-house models with some skepticism," said Clifford Griep of S&P, "because financial institutions are overleveraged entities. They don't have much capital, by definition." Many regulators with whom I talked made similar statements, which are, indeed, most reasonable.

Should this overleveraging worry the financial institution's senior management? The answer is "yes," and the reasons for this answer have to do with both regulation and shareholder value. While during the 1990s many efforts focused on shareholder value, scant attention was paid to the synergy of risks involved in the bank's inventoried positions and the fact that leveraged transactions take place with a steadily shrinking number of counterparties—which amounts to a greater concentration of credit risk exposure.

The American landscape of credit institutions provides an example. The top 10 banks in the mid-1980s were (classified by assets): Citicorp, BankAmerica, Chase Manhattan, Manufacturers Hanover, J. P. Morgan, Chemical, Security Pacific, Bankers Trust, First Interstate, and First Chicago. Of these, only three remain in 2001: J. P. Morgan/Chase, Citigroup, and Bank of America.

Citicorp was bought by Travelers, which changed its name to Citigroup. BankAmerica took over Security Pacific and was subsequently swallowed by NationsBank, which changed its name to BankAmerica. Manufacturers Hanover fell to Chemical Bank, which, after buying Chase, renamed itself Chase Manhattan; then it merged with J. P. Morgan. First Interstate was taken over by Wells Fargo, which was then bought by Norwest; Norwest chose the name Wells Fargo. First Chicago was bought by NBD of Detroit, and this was taken over by Bank One. Deutsche Bank took over Bankers Trust.

This concentration of credit risk, and most particularly of derivatives exposure, worries many regulators. It also affects technology leadership. Among the top 10 U.S. commercial banks in the mid-1980s (most of them money center institutions), Bankers Trust and Citicorp were world leaders in technology and in proprietary models (eigenmodels). Those that bought them do not have that distinction.

At the same time, while the development and use of eigenmodels is welcome, the bottom line remains financial staying power. Some commercial and investment bankers are more confident than others that their institutions have the necessary financial staying power, but practically no one is really satisfied with the method currently used internally to weight capital adequacy against the synergy of market risks and credit risks.

"We are heading towards a situation where each institution will have its own way of measuring it capital requirements," said a cognizant executive. "This will impose quite a bit on regulators because they will have to test these in-house models." "Precommitment is one of the subjects where opinions are divided," said Susan Hinko of ISDA. "It is a very intriguing idea, but many regulators don't like it."

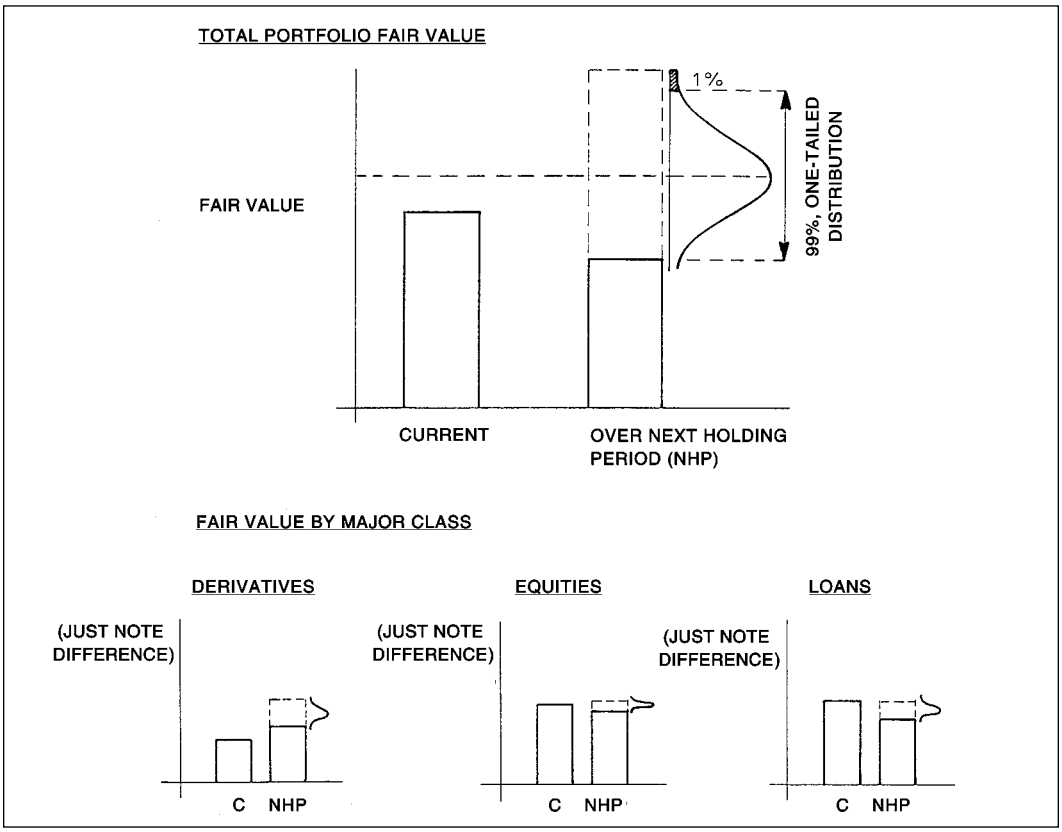
Some of the regulators with whom I spoke think that precommitment has merits, but it will take a lot more development to make it a reality. One regulator said that the idea of imposing a heavy penalty on the bank that fails in its precommitment is odd: "If an institution is in difficulties, are we going to penalize it to make matters worse?" Others believe that precommitment's time is past, before it even arrived. Yet the New Capital Adequacy Framework conveys the opposite message.

Theoretically, precommitment is doable, partly by generally available models such as value at risk (VAR), LAS, and others—and partly by eigenmodels. The idea of computing fair value and exposure by major classes, then integrating them on a total portfolio basis, is shown in Exhibit 15.5. Mathematically there should be no problem, but practically it is because of:

- Wishful thinking
- Personal bias
- Undocumented assumptions
- Lack of adequate skill
- Algorithmic fitness, and
- Data unreliability

"We commercial bankers will love precommitment, but my guess is the regulators will be uncomfortable with it," said a senior commercial banker in New York. Other executives of credit

Exhibit 15.5 Simulation of Portfolio Holdings for Predictive Reasons



institutions were concerned about the contemplated penalty to the bank that will be applied in the case of precommitment underestimated capital needs.

Those regulators who look favorably at precommitment see severe penalties looming if a bank reports to them a computed level of capital adequacy but in real life exceeds that level by a margin. This particular risk is the basis of the fact that there is no unanimity on what approach should be used for planning and control reasons. The Federal Reserve is fairly vocal about the need to look into more sophisticated solutions that permit an institution to compute its own capital adequacy in a reliable way. But the Fed also is aware of the limitations of modeling.

At the same time, because the contemplated penalties will be heavy if the precommitment an institution makes to the regulators is broken, commercial banks look for alternatives. During meetings in New York, for instance, I heard on several occasions that the commercial banks' interest in credit derivatives is driven by capital requirements .

Regulators are concerned both about the lack of experience in the optimization of a bank's capital requirements and about the difficulties posed by an effective integration of market risk and credit risk for capital adequacy reasons. Hence, even those who look rather positively on precommitment believe that many years will pass before it becomes a reliable way of establishing capital need on a bank-by-bank basis at a preestablished level of confidence.

Regulators are also concerned about the fact that a significant market volatility, like that which characterized 1998 and 2000, poses its own risks, risks that are not yet fully understood by market players. For instance, high volatility does not suggest that there should be a decrease in capital requirements, even if some better model than the linear approach of the 1988 Capital Accord establishes itself as the preferred solution.

In essence, there are two schools of thought regarding eigenmodels and what they offer. The pros believe that models can help in doing a better allocation of capital because today the tools available to bankers are more plentiful and much sharper than in the mid- to late 1980s. But the die is not cast; much depends on how:

- Management of commercial banks and investment banks uses eigenmodels
- Well the examiners of central banks, as well as external auditors, can control their accuracy

Practical examples, most from the United States, the United Kingdom, and Germany, suggest that many commercial banks and investment banks are today at a crossroads regarding strategies for risk management. During our meeting in Frankfurt, Peter Bürger of Commerzbank suggested that the many issues today connected to the control of risk were not seen as major until fairly recently. At Commerzbank:

- The cultural change came when it created its own subsidiary for derivatives trading in 1994.
- The risk management drive got a boost following the Barings bankruptcy in early 1995.

In practically all major institutions, the bankruptcies of other banks led to growing pressure for risk management tools and with them the drive to establish internal metrics of prudential capital. Subsequently, the 1996 Market Risk Amendment and the new regulation it brought along, like the calculation of value at risk, helped boards to focus their attention on certain issues seen as salient problems.

IMPROVING CAPITAL ADEQUACY AND ASSESSING HEDGE EFFECTIVENESS

With or without the help of eigenmodels, senior management of credit institutions that takes the proverbial long, hard look at assets and liabilities often finds the assets side damaged because of bad loans and sour derivatives deals. What management sees through this research is not necessarily what it wants to see to ensure longer-term survival. Therefore, both pruning the loans book through securitization and critically evaluating hedge effectiveness have become focal points of senior management attention.

Capitalizing on the then recent regulation that took a favorable stance in connection to credit derivatives, in June 1999 Banca di Roma became the first Italian financial institution to securitize its loans. It took all the nonperforming loans of the old Banco di Roma and Rome's Saving Bank, which had merged; wrote them down at 50 percent of face value; added some sugar coating; had Standard & Poor's, Moody's, and Fitch IBCA rate them (respectively, AA–, Aa3, and AA); and offered the securitized product to the capital market. Within a short period:

- Commitments by interested parties reached about 50 percent of the offering,
- Banca di Roma kept for itself the more risky 25 percent, and
- The other 25 percent was still for sale some months after the offering.

This minor miracle cleaned up the loans book in an unprecedented way for Italian banking. It permitted the credit institution to recover 37.5 cents to the dollar of its nonperforming loans portfolio, while another 12.5 percent moved from liabilities to assets after the securitized nonperforming loans changed side in Banca di Roma balance sheet.

The cultural change in Italian banking has not been limited to the securitization of corporates. It also includes the method of collection. Typically "dear customers" and those with political connections were not pressed to face up to their liabilities. That is how the merged entities Banca di Roma and the savings banks had raked up $3.2 billion in bad loans. (The securitization that was established pooled half that amount.)

- Using the securitization as a fait accompli, Banca di Roma got tough with those clients who refused to pay.
- Acting as the factoring agent of the new owners of the securities, it hired and trained inspectors whose mission was to collect what was due.

Assets securitization is a process that the New Capital Adequacy Framework by the Basle Committee tends to promote. But experts also feel that some rules likely will come along to ensure that it is done in a dependable way. I think that not only the regulators but also most people who run a credit institution today understand that the risks being taken will have to be accounted for properly, even if this ends up by producing thinner margins.

Let us now look into the assessment of hedge effectiveness. Derivative financial instruments theoretically are used for hedging market risk and credit risk. But true hedging happens with much less frequency than suggested by most institutions and treasuries of manufacturing or merchandising companies, although it is not totally unheard of. In these cases, it is only normal to care about hedge effectiveness:

- From the measurement of the results of a hedge, and
- To the evaluation of hedge performance.

In its way, the example on securitization of bad loans by Banca di Roma is a manner of hedging credit risk. In fact, all credit derivatives issued by a commercial bank, savings bank, or any other institution that grants loans have in the background:

- Credit risk hedging
- Interest rate hedging
- Improving the issuer's liquidity

It is rare to be able to hit three birds with one well-placed stone, but if the securitized instrument is designed and marketed in an ingenious way, it might be doable. Institutions must be very

sensitive not only to credit risk but also to interest-rate risk embedded into their loans book. Exhibit 15.6 dramatizes the sharp rise in interest-rate spread between corporate bonds and 30-year Treasury bonds that took place in late August to late September 1998 as Russia defaulted and LTCM skirted with bankruptcy.

A good way to assess hedge effectiveness is by examining the data required in terms of regulatory reporting. As part of the designation of a hedging relationship, the FASB wants a financial institution or other organization to define a hedge's effectiveness in achieving:

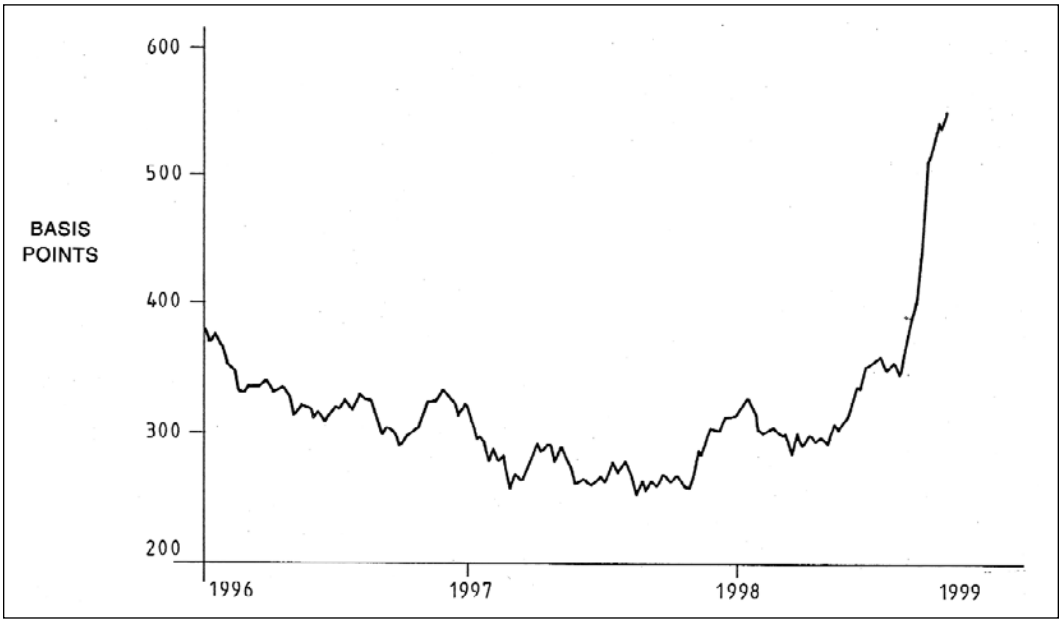
- Offsetting changes in fair value
- Offsetting cash flows attributable to the risk being hedged

The FASB financial reporting standards also demand that an organization use the hedging methods defined in its report consistently throughout the hedge period. For instance, the organization must assess, at inception of the hedge and on an ongoing basis, whether it expects the hedging relationship to be highly effective in achieving offset, and to determine the ineffective aspect of the hedge. There should be no cherry-picking, as COSO aptly suggests.

The FASB does not attempt to specify a single best way to assess whether a hedge is expected to be effective, to measure the changes in fair value or cash flows used in that assessment, or to determine hedge ineffectiveness. Instead, it allows financial institutions to choose the method to be used—provided that the method is in accord with the way an entity specifies its risk management strategy.

In defining how hedge effectiveness will be assessed, an entity must identify whether the assessment will include all of the gain or loss, or cash flows, on a hedging instrument. Assessments of effectiveness done in different ways for similar types of hedges should be justified in the financial report even if, as is to be expected:

Exhibit 15.6 Basis Points of Spread Between Corporate Bonds and 30-Year Treasuries



- In some cases, hedge effectiveness is easy to assess and ineffectiveness easy to determine, and
- In other cases, it is difficult to demonstrate let alone justify the hedge's effectiveness or ineffectiveness.

The first step of a policy in assessing the effectiveness or ineffectiveness of hedges is a clear definition of *management intent*. If the critical terms of a hedging instrument and of the entire hedged assets or liabilities are well stated, the organization can evaluate in a factual manner whether changes in fair value or cash flows attributable to the risk being hedged can completely offset the risk they are intended to cover. A good hedge will deliver both:

- At inception
- On an ongoing basis

Accounting standards by the FASB state that the resulting profit and loss should be reported unless the hedge is inventoried for the long term to its maturity. For this reason, the board and senior management should at all times be aware that as market conditions change, a transaction intended as a hedge can turn belly up—whether the hedge was made for credit risk or market risk.

TEAM-FLY

NOTES

1. D. N. Chorafas, *Credit Risk Management*, Vol. 1: *Analyzing, Rating and Pricing the Probability of Default* (London: Euromoney Books, 2000).
2. For details on how to use demodulators for credit risk and market risk, see D. N. Chorafas, *Credit Risk Management*, vol. 2, *The Lessons of VAR Failures and Imprudent Exposure* (London: Euromoney Books, 2000).
3. D. N. Chorafas, *Setting Limits for Market Risk* (London: Euromoney Books, 1999).
4. "Public Disclosure of the Trading and Derivatives Activities of Banks and Security Firms," Montreal, November 1995, IOSCO.
5. D. N. Chorafas, *Credit Derivatives and the Management of Risk* (New York: New York Institute of Finance, 2000).

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CHAPTER 16

Summary: Management Blunders, Runaway Liabilities, and Technical Miscalculations Leading to Panics

In all classic tragedy from Aeschylus to Shakespeare and from Sophocles to Schiller, the tragic failure of the leading figure has been his inability to change. This is seen in the destiny of Oedipus as well as in that of Hamlet. But change for the sake of change is no solution either. We must always define where we wish to go, how we go from "here" to "there," and what risks and rewards are associated with our decision.

> "Would you tell me please," asked Alice, "which way I ought to go from here?"
> "That depends a great deal on where you want to get to," said the Cat.
> "I don't much care where . . .," said Alice.
> "Then it doesn't matter which way you go," said the Cat.[1]

Whether for social, financial, or technological reasons, change is often inescapable. But do we know *why* we wish the change? Every great classic tragedy moves an audience not because it has been deceived as by tempting illusion but because it is led to recognize the perils of immobility. Through clever stratagems advanced by the author, hence by means of intellectual activity, the audience appreciates the illusion in the notion that "nothing changes, and we can keep going on as in the past."

By extension, a great sin of a company's top managers (and of a country's political leaders) is not their violation of custom, the restructuring of existing product lines (or institutions), and the reinventing of their organization, but their failure to change custom. Change is often necessary to prevent the disconnecting of a company (or country) from the evolution of the environment in which it lives. Reinventing oneself helps to avoid decay and oblivion.

Time and again, continuing to bow to the authority of failing customs and crumbling institutions or pushing decaying product lines into the market carries with it huge penalties. Organizations and individuals are destroyed from *within* much more often, and in a more radical way, than because of blows from outsiders. Since change is a long, often painful, and usually never-ending process, it cannot be managed in old, accustomed ways. At the same time, however:

- Adaptation is never free of miscalculation.
- Change is open to excesses.
- Anything may go way beyond what was expected some time earlier.

By early April 2001, as the shares of optical networking companies were struggling to see the light, investors found out that their wealth was reduced by 75 percent or more in some cases. Exhibit 16.1 dramatizes the pain these investors felt. When an inverse wealth effect is repeated in tandem—for instance, from the dot.com meltdown to the unmanageable debt assumed by telephone companies and destabilization of their suppliers—the aftermath can well be a market panic. Or, more precisely, a panic due to *market psychology*.

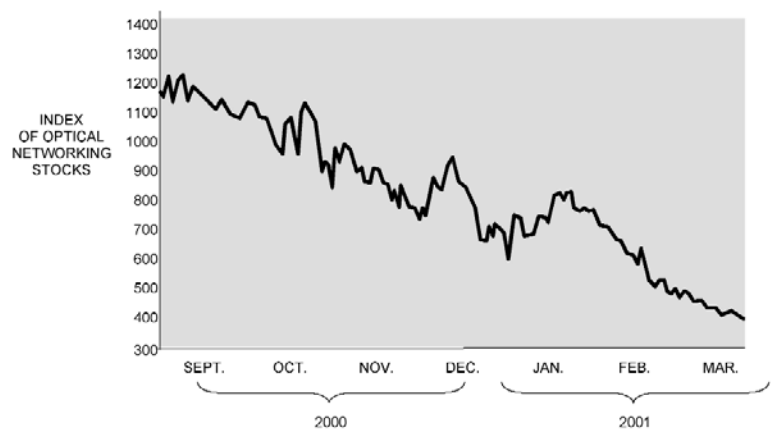
Stock prices hit the skids because everyone comes to believe the market cannot go anywhere but down. This is a concept recently studied through *behavioral finance*, which attempts to find psychological explanations for financial movements that defy quantitative approaches and valuation methods. In many cases, market psychology is used as a way to justify bad management: the inability or unwillingness of people in executive positions to ask themselves if they *really* know their company, its strengths and its weaknesses; if they have a sense of direction; and if they have the courage to be in charge of its liabilities.

MOUNTING RISK OF TURNING ASSETS INTO RUNAWAY LIABILITIES

One of the goals behavioral finance has put on itself is to demolish the widely accepted theory of how markets act and react, a theory largely based on the belief that the market is *efficient*. The main thing "market efficiency" is supposed to mean is that prices incorporate all available information. Many economists abide by this notion, even if it is proven time and again to be wrong.[2]

There is no instantaneous dissemination of meaningful information in a mass market, and neither traders nor investors are able to receive, digest, and incorporate market information into their

Exhibit 16.1 Since the Dot-Com Meltdown Caught Up with Telecoms, Optical Networks Have Been in Free Fall



pricing decisions. Therefore, financial markets are very *inefficient*. This fact makes future changes in prices unpredictable. Therefore, investors and traders outperforming a market average are either momentarily "lucky" or (most usually) are taking bigger risks.

Another fallacy is that diversification in investment strategy protects one's capital and gains. In a globalized market, diversification in investments is easy to preach but very tough to do. What is doable is the *management of liabilities* in a way that is analytical, rational, and constantly prudential. This is first and foremost a matter of top management resolve, expressed through iron-clad policies and supervised by means of rigorous internal control. Then, and only then, is it an issue that should be studied in terms of longer-term risk and reward, with timely and accurate results brought back to top management for factual and documented decisions regarding:

- Loans, investments, trades, and financial staying power, and
- Credit risk,[3] market risk[4], and operational risk[5] embedded in inventoried positions.

Because theoretically, but only theoretically, prudential policies and properly established limits tend to diminish paper profits, few bankers and investors pay attention to them for anything beyond lip service. Had they paid full attention, they would not be faced with the mountains of liabilities described in this book. Leveraging liabilities is a game of risk. No policy and no model can eliminate that element. It is the one who limits the risks best who wins.

Financial institutions try to dispose of some of their assets that can turn into liabilities through *securitization*. Exhibit 16.2 shows in a nutshell the rapid growth of the volume of secondary loan trading in the United States, including securitization of corporates. Classically, the securitization market addressed, rather successfully, house mortgages, credit card receivables, and other consumer loans. The securitization of corporate loans had a slow takeoff, but credit derivatives are changing the landscape.[6]

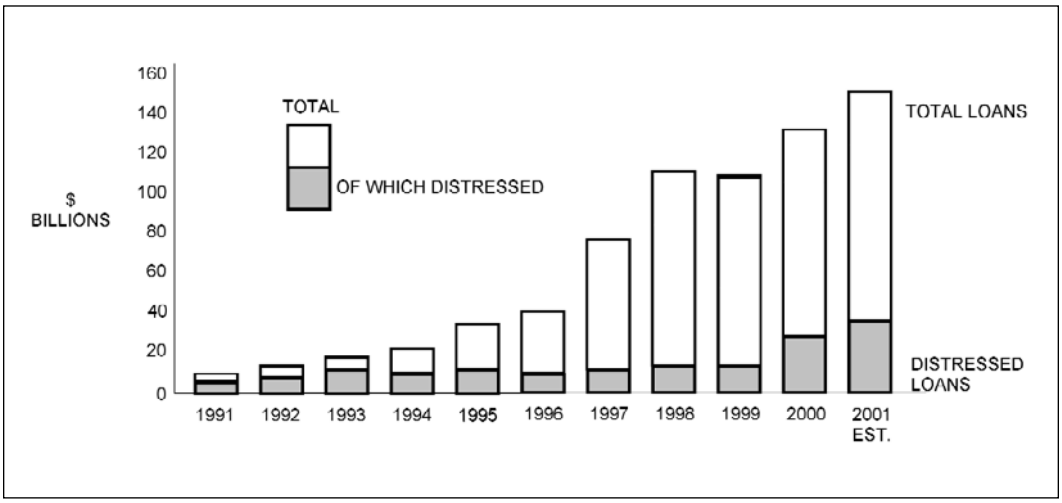
Another strategy followed in the United States and Europe is that banks with problem loans have securitized them by putting them in their trading books. This poses a new challenge to regulators, because they feel that at a time of worsening credit quality, credit institutions may be disguising their mounting debt instrument problems by cherry-picking where to report outstanding loans, in the banking book or in the trading book. The loophole is that current norms in financial reporting leave it up to commercial banks to decide where to keep their bad loans:

- They must make provisions if the loans are clearly impaired while in their banking book, and
- They must mark these loans to market, if they have carried them in their trading book.

It comes as no surprise that in March 2001, U.S. bank regulators gave new guidance on how credit institutions should account for loans in their books and how they should be reported if they decide to trade them. The supervisory authorities are worried that, as credit quality falls, banks will be tempted to put more and more bad loans into their trading book without showing a provision for them. That makes it more difficult for stakeholders to value the bank, its liabilities, its assets, and its risks.

This move by U.S. regulators is timely for another reason. As shown in Exhibit 16.2, the secondary market for bank debt has significantly increased, as credit derivatives and other instruments make it possible to sell straight loans or package them into pools and securitize them. This makes it feasible for banks to be more secretive about how they value assets and liabilities, as they reclassify them from "loan held to maturity" to loans held for sale.

Exhibit 16.2 Fast-Growing Volume of Secondary Loan Trading in the United States



But growing credit risk reduces the freedom of choice, and new regulatory rules oblige credit institutions to rethink such strategy. Statistics indicate that mutual funds which invest in bank loans have shown a 10 percent drop in value in the short period from the autumn of 2000 to the end of the first quarter of 2001. At the same time, the big commercial banks have written off less than 1 percent of their portfolios of problem loans while adding no more than 2 percent in reserves.

According to many experts, this 1 percent and 2 percent may be the tip of an iceberg of hiding damaged assets, which in turn permits the masking of the effect of runaway liabilities. The cover-up strategy has been made possible by transferring billions of dollars of loans from the loan book to the trading book, at their then-market value, sticking a for-sale sign on them, and making no provision for these loans on the balance sheet.

Financial analysts and, up to a point, supervisors, have no difficulty admitting that there are major risks embedded in this policy. Therefore, what seems to have become "accepted practice" has to be revisited in terms of financial reporting. Critics of this method suggest that the practice is a twist of guidelines on how to deal with loan transfers established in the late 1980s by the Securities and Exchange Commission. These guidelines were studied for the prevailing conditions at that time, after the collapse of Continental Illinois.

- In the restructuring, Continental moved its bad loans into a trading portfolio.
- At nearly the same time, Mellon Bank spun off its bad loans into a *junk bank*.

In both cases, the "solution" allowed the credit institutions to make no provisions, which suits them well since they were short of capital. But as these events multiply, financial reporting becomes unreliable. Regulators suspect that some banks use the loans trading strategy to mislead stakeholders about the extent of their problem loans. Because they do not charge the entire write-down to the loan-loss reserve, by putting something "here" and something else "there," senior management hopes people will not be smart enough to see the gaping holes.

THERE IS NO WAY TO PROGNOSTICATE THE AFTERMATH OF LEVERAGING THE LIABILITIES SIDE OF THE BALANCE SHEET

No one can precisely predict the course financial events may take because of runaway liabilities. A great deal will depend on market psychology and on how fast the Federal Reserve will bring the situation under control. Who would have thought in 1999 that a year later some 210 Internet companies would shut down—more than 120 of them in the fourth quarter of 2000—as venture capitalists cut off funding to unprofitable Web outfits.

Indeed, we must admit that prediction is not characteristic of the experts. In 1986 Roger Smith, then chairman of General Motors, said: "By the turn of this century we will live in a paperless society." The century turned, and our society today uses more paper than ever. In 1960, in a study by the RAND Corporation, the interviewed experts expressed the belief that man will first land on the moon *after* 1990. There were two nines all right in the year of moon landing, but it was 1969.

Thomas Watson, IBM's founder and chairman, predicted in 1943 that . . . there is a world market for maybe *five* computers." Watson missed the mark by more than eight orders of magnitude (10^8). The most beautiful is Albert Einstein's projection, made in 1932: "There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will."[7] The Greens wish Albert was right.

Since so many well-known experts screwed it up, it is clear how difficult it is to foretell the exact aftermath of huge liabilities and damaged assets. No one, however, doubts that the financial reporting standards of today must be revamped. There is an ongoing debate among regulators, auditors, and banks, in this and in many other critical issues, concerning the recognition of:

- Damaged assets,
- Booming liabilities,
- How loans should be valued in a uniform way globally, and
- How they should be reported.

In December 2000 the Financial Accounting Standards Board (FASB) put out a discussion paper suggesting that all financial instruments should be booked at fair value, including bank loans held to maturity. That would reduce the scope of loan transfers, but critics say that it also risks making the banks' share price and deposit base more volatile.

There are really no ideal solutions, and no financial reporting standards will be good forever.[8] Some experts call for a thorough review of accounting practices at large—not only of regulatory financial reporting, which really shows only the end result. Credit institutions should be very careful to whom they give loans and how much money they put at stake. If real-time limits to business partner transactions were the policy, then money would not have been thrown down the drain by granting the telecoms a virtually unlimited credit line.

Conventional economic thinking that focuses on stand-alone financial concepts and one-to-one trade links underestimates by a margin the impact of a recession in the United States, Euroland, and Japan. It accounts neither for the aftermath of globalization of financial markets nor for the broadening of business channels that escape regulatory action, such as foreign direct investments. Yet these channels have the power to spread financial contagion through securities and other markets.

One of the facts that should attract the attention of every policymaker is that the first two years of the twenty-first century feature a perilous synchronization between credit risk and market risk. In 2000, as a result of falling share prices, the net worth of American households fell for the first time since records began a little over 50 years ago. Lower share prices dent confidence and make even more formidable the challenge for the Federal Reserve to stabilize the U.S. economy without:

- Cutting interest rates to bail out investors,
- Igniting inflation and its perils, or
- Raising suspicion that its target is to bend the curve of personal bankruptcies shown in Exhibit 16.3

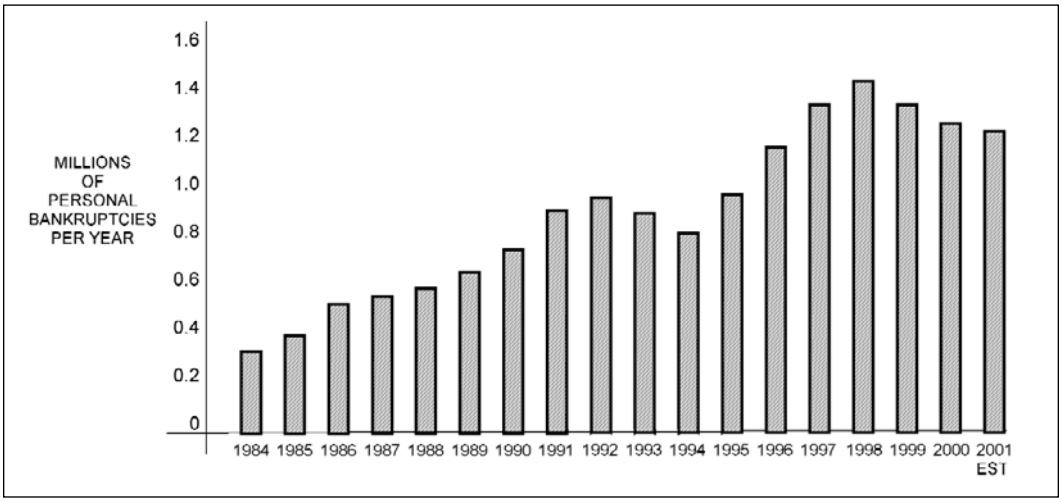
Some of the laws enacted to position the economy against the forces of the late twentieth century have been overexploited and therefore counterproductive. As a result, in early 2001 the U.S. Senate passed legislation to limit the ability of individuals to hide behind bankruptcy protection. This new bill revises the Bankruptcy Reform Act of 1978, whose clauses have led to a windfall of personal bankruptcies as the easy way to shed one's liabilities.

If, as expected, the new bill becomes law, then the claims of those filing for personal bankruptcy who have incomes above their state's median will be presumed frivolous, unless proven otherwise. Also, people who already have filed at least once for bankruptcy will be presumed to be in bad faith if they do so again, and creditors will have an easier time seizing homes, cars, and other personal assets. But companies will still be able to grow their liabilities by leaps and bounds, making one mistake after the other in the direction of their investments.

THROWING MONEY AT THE PROBLEM MAKES A BAD SITUATION WORSE

By throwing money at problems, we compound them. Take British Telecom (BT) and its four main errors as a case study. (See also Chapter 1 on telecoms.) Theoretically, there is nothing wrong in the

Exhibit 16.3 Rising Number of Personal Bankruptcy Filings in the United States



fact BT followed a bifurcated strategy between land-based and wireless lines. Practically, this strategy has been unattractive to investors, who saw it as an error in judgment compounded by BT's ill-studied drive to become a global telecom entity in which:

- BT took small but costly stakes in operators in Japan, India, Malaysia, and eight other disconnected countries.
- By doing so, it spread its management too thin and it assumed too many liabilities.

As if a business strategy unattractive to investors and the policy of buying left and right minor stakes in telecoms were not enough, BT's top management pushed the company further toward the precipice. The third big error made in 2001 is that it learned nothing from share offerings by Orange (of France Telecom), which raised less than half as much as the company expected.

In a market suspicious of telecoms and their follies, BT geared up to float off a chunk of its wireless operations. Finally, and this is the fourth big mistake, BT overleveraged itself with debt it knew it could not serve, let alone repay. How fast liabilities can pile up is demonstrated through the statistics in Exhibit 16.4.

The management of any company that, over the short span of one and a half years, increases its liabilities by a factor of 8 simply is not worth its salt. Investors in a declining London stock market punished BT with a loss of more than 65 percent of its capitalization. Quite similarly, at the New York Stock Exchange and the NASDAQ, American investors punished AT&T, Sprint, and their suppliers of telecoms gear, as Chapter 1 indicated.

The main sin of AT&T, under its current management, has been that it tried to be everything to everybody. The company had no clearly focused customer strategy. Instead, it spent big money left and right with no evidence that returns would exceed the risks being assumed. Both European and American telecom operators excelled in this game. The Europeans did worse because of their huge expenditures for licenses that were supposed to give them leadership in the third generation of Universal Mobile Telecommunications System, or UMTS.

Of all places, the financial precipice of UMTS started at the European Union (EU) Executive in Brussels. The bureaucrats of the EU had the brilliant idea that since some of the countries in the old continent were ahead in wireless communications, the new-generation gadgets and their airwaves were the ideal field to beat the Americans in new technology. The still-hazy notion of *Internet mobile* was their baby, and it had to be put in place very fast.

Exhibit 16.4 High Leverage of British Telecom during the Last Few Years

Date	Amount of Debt
September 1999	£ 4 billion ($5.6 billion)
December 1999	£ 7 billion
March 2000	£ 9 billion
June 2000	£15 billion
September 2000	£18 billion
December 2000	£19 billion
March 2001	£30 billion ($42 billion)

In 1998 the European Commission decided that all the UMTS licenses had to be given by 2001 and the first third-generation mobile communications had to take place in 2002. This decision was taken without examining if such a time plan was technically and financially sound and whether it was altogether advantageous or a disastrous enterprise. "Brussels," says Elie Cohen, "incited the [European] governments to launch themselves in a process without visibility.[9]"

Neither did the different European governments bother to examine the current technical feasibility of third-generation (3G) mobile infrastructure and the economic soundness of this costly enterprise. Instead, they were happy to keep within Brussels' strict deadlines once they discovered that they could make big money by selling UMTS licenses. The British were the first to benefit from the cash flow, pocketing £25 billion ($35 billion). The Germans exceeded the British intake with DM 100 billion ($48 billion). The French missed the boat, because by the time they sold the UMTS licenses, the telecoms' treasuries were dry. They collected "only" FF 65 billion ($9 billion).

In all, the Ministries of Finance of different European countries brought home nearly $130 billion paid by thoughtless telecoms, who failed to examine if this UMTS operation had even a remote likelihood to break even. They did not study how much more money they had to put on the table to exploit the expensive licenses they bought, nor did they determine what services they would offer and the cash flow to be expected from these services. The soul-searching questions should have been:

- Which new services can we support with UMTS?
- Are we ready for them? Will the market bite?
- What is the discounted cash flow of these services to the company?

A vague idea has been around that 3G consumer services will consist of meteorological bulletins, traffic congestion information, stock market prices, and music. None of the items is sexy, which suggests that no one had a clear notion if UMTS is really worth the trouble. Post-mortem it was discovered that the hopes about the bottom line were fake. No telecom operator bothered to investigate risk and return with the UMTS licenses. They all failed to check:

- How many new clients were to be acquired?
- How much more would existing clients spend with 3G?
- Why will people pay for services when much of what entered into UMTS product plans was already available gratis?

Again post-mortem, independent research outfits tested the market's response and the likely price structure. Having done so, they came up with the finding that by 2005, on average, the money paid by wireless consumers would *drop* by 15 percent (compared to present spending) rather than increasing by 200 percent as the telecom operators had thought. The whole UMTS enterprise was like throwing $130 billion at the problem:

- To build a factory that would manufacture an unspecified product,
- Whose clients were not yet known, and
- Whose market price might vary from single to double.

IS FINANCIAL CONTAGION SPREADING ON A GLOBAL SCALE?

Leave aside for a moment poor decisions regarding investments and the overgearing of liabilities. The salient problem becomes one of corporate earnings. At the root of this problem is the fact that weak demand for products, especially in the technology sector, hit the bottom line of companies and increased their inventories. As a result, they had to take immediate action to slash production and ensure that inventories do not grow much further.

Macroeconomic factors also played a major role. The United States has exhibited the problem of low savings rate, since during much of the 1990s American households spent more than they earned. This was made possible by the wealth effect, a behavioral finance aftermath created by higher and higher share prices. But with lower corporate profits on the business side and the inverse wealth effect hitting consumers, the drive for consumption diminished.

Lower U.S. demand for technology and luxury goods had an adverse effect on the level of exports of European suppliers. Also, while theoretically European investors have been less exposed than their American counterparts, local consumption was affected as companies cut organizational fat, people became afraid of being unemployed, and they looked more carefully at their spending habits. European stock markets also could not avoid the repercussions of the slowdown in the United States.

Thus it is not surprising that in 2000 and 2001, after the U. S economy showed signs of bending, European economies were not able to assume the role of a locomotive of the global economy. Instead, European stock exchanges emulated the sentiment, volatility, and downhill movement of the NYSE and NASDAQ. Investment diversification is a chimera as American, British, and continental European stock exchanges now move in unison:

- The correlation between changes in American and European share prices was 0.4 in the mid-1990s.
- In 2000, this correlation became 0.8, and it rose still further in 2001.

Stock market psychology has been globalized.This globalization has been advanced by international capital flows, which are looking for a quick buck while they rush out of the same door at the first sign of trouble. A higher correlation among capital markets also reflects direct foreign investment and the growing crossborder trading in shares. Some financial analysts add that high-tech stocks have become a channel for *financial contagion* between capital markets.

Any serious study of crossborder financial contagion has to consider leverage ratios. Quantitatively, one of the leverage ratios is that of debt service coverage. It is computed as earnings before interest and taxes over interest due (EBIT/interest), and is considered to be predictive. Therefore, it is an important tool in discriminating between lower and higher credit risk entities and their fair value.

Qualitatively, *leverage ratios*, particularly those characterizing the outliers, are a major determinant of market psychology. When investors see the direct effects of mismanagement through overleveraging, as the statistics of British Telecom demonstrate (see Exhibit 16.3), they do not need to compute EBIT/interest to find out if a company is sick. When the whole telecom industry is characterized by the same foolishness, the market psychology is bleak.

Even in the same market there can be a significant difference between one group of equities and another. This is clearly seen in Exhibit 16.5, which reflects seven months of volatility—

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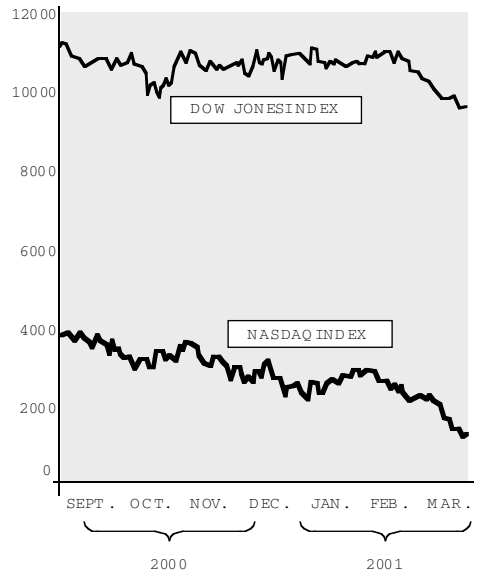
Exhibit 16.5 Greater Volatility of Technology Stocks as Compared to More Traditional Companies



September 1, 2000 to March 31, 2001—in the Dow Jones and the NASDAQ. Both were in decline, but the overleveraged technology stocks fell much more than those of older established companies.

Is there a way to reverse the tide in the valuation of technology stocks and bend the curve upward, from going south to going north? This question is practical as this text is written, in April 2001, although it might be theoretical by the time the book is on the market. Because the events of September 1, 2000 to March 31, 2001, will surely repeat themselves at some point, it is important to look at this issue, even enlarge it to respond to this query: *What does it mean for the New Economy overall that many of its companies are in financial trouble?*

LEARNING FROM PAST EXPERIENCE IN TURNING THE TIDE

Good news first. The New Economy is here to stay. Technology, globalization, innovation, and productivity are the four wheels of the vehicle that in all likelihood will bring society to new levels of prosperity. By contrast, many Internet outfits and other New Economy entities may fail because they have overleveraged themselves and have mismanaged their (often limited) resources. Survival of the fittest is good for the economy.

Another piece of good news is that, over time, deregulated financial markets provide great efficiencies—even if they are subject to crises now and then. The challenge is that of providing the conditions for crisis resolution, particularly debt reduction, whether the problem comes from:

- Restructuring the domestic banking system, as in Japan
- Consumer overleveraging, as in the United States

- Archaic regulations regarding economic behavior, as in continental Europe
- The increasing vulnerability of national economies, as in many developing countries

The bad news is the current degree of uncertainty about how financial markets, which have been evolving rapidly, might react to major credit risk shocks. The salient factor behind this bad news is the difficulty of improving the governance of the global financial system in terms of financial stability. The attention to be paid to markets, institutions, and infrastructure includes, at the same time:

- Internal governance
- Prudential supervision
- Market discipline

These factors always existed to a certain degree in an economy's governing system. But with the New Economy they have changed in substance, level, and global coverage. Because of overleveraging and mismanagement, *credit quality is deteriorating*. This might lead to systemic risk if several major firms fail and the Fed does not have the time to save the day, as it did with LTCM. Even among the experts, few individuals appreciate the fact that LTCM was a microcosm of the New Economy and its challenges[10].

Because organizations are made of people, able management matters a great deal. Another one of the major business risks is that too many dot.coms—including big names—find themselves today without management skills. Yet they are global enterprises, and their lack of world-class management may well aggravate their financial condition. I would not worry much about the shrinking capitalization of companies listed on the NASDAQ as long as the companies' credit risk and management risk are under control.

Another critical query on the liabilities management front that is proper to address is: Why are many of the New Economy companies that were once highly valued now failing? Were these companies highly overvalued? The answer is that in a free market, the valuation of companies is done by investors. The Internet companies became "our Indonesia" because the majority of investors did not do their homework when it was time to do so.

Lower investment activity reveals weaknesses hidden by a glut of money. The best example is the American railroads boom and bust. The functions of a transcontinental railway are polyvalent, but foremost, in the American case, was the issue of integrating the United States from the Atlantic to the Pacific. Doing so did not come without financial surprises, which included major ups and downs.

In 1873, shortly after the Civil War, was the scandal of the Union Pacific Railroad and Crédit Mobilier—followed by a depression that depressed industrial growth for several years. Confidence eventually returned and in the 1880s railroads comprised 60 percent of all issues in the U.S. capital market—a market that was, in fact, created to finance the rapid railroad buildup.

A new bust came a few years down the line. In 1890, Barings failed because of overexposure to financing U.S. municipalities and was rescued by the Bank of England. Then there was the 1893/94 panic of bimetalism (dual silver and gold standard for the dollar promoted by special interests). A conflict between holding parties brought the United States to the brink of financial chaos and led to another depression.

Ten years later, on May 9, 1901, came the biggest market crash known until that time in the United States, with Northern Pacific and the railroads' takeover fight at its epicenter. A whole

century has elapsed since then. The core issue today is technology, and the epicenter is telecommunications carriers and their suppliers. There is a striking similarity between 1901 and now:

- In 1901 the rails were the high tech of their time—as the telecoms are in 2001.
- The rails gave rise to the steel industry, because of the huge amount of materials they consumed.
- Similarly, the boom of the telecoms promoted Ciena, Cisco, Lucent, Nokia, and Nortel.

Another similarity between then and now is that liabilities management has been wanting. But there are also significant differences. The most important is that of financial leadership in the investment side, which was present a century ago but is not visible currently—at least not until now.

In 1901 the day was saved because J. P. Morgan put together an unprecedented rescue operation, and through that operation brought confidence back to the markets. In the twenty-first century, such a financial savior has yet to show up. The nearest thing to it was the 1998 salvage of LTCM from the abyss, wisely engineered by the New York Fed. In the early twentieth century, it took two years for the U.S. economy to get back on track. Most likely, that is how long the current twenty-first-century crisis will need; however, in 1907 came another panic that exposed many systemic defects.

There are many lessons to be learned through analogical thinking. Unorthodox at their time, the trusts put together by J. P. Morgan were a for-profit rescue operation mounted with private money. By pulling the American economy out of the 1907 panic, J. P. Morgan reached the zenith of his influence. From the ashes of 1907 was also born the Federal Reserve System as a regulator and lender of last resort.

My choice of a new J. P. Morgan, a person who could pull together the financial industry in a salvage operation of unprecedented magnitude, would be the highly respected Dr. Henry Kaufman or, alternatively, George Soros, who has hands-on experience with the risks hedge funds take and their large exposure overhang.

There are more than 3,000 hedge funds worldwide. Of these, 400 are the most important, and they are largely based in the United States. Banks, institutional investors, and high-net-worth individuals have made an estimated investment of more than $400 billion in hedge funds. Assuming a leverage factor of 50, which is rather conservative these days, the cumulative exposure stands at $20 trillion, or twice the GNP of the United States.

At the end of March 2001, market capitalization at the New York Stock Exchange and the NASDAQ was about $11 trillion, down from $20 trillion a year earlier. Experts estimated market capitalization at the $14 trillion level worldwide. This means that exposure by hedge funds has been over 140 percent of the capitalization of the world's stock markets. There is no liquidity to match this tsunami if it starts rolling, even if all reserve banks of the Group of Ten try to act in a concerted manner.

HOW HAS THE NEW ECONOMY REDEFINED THE NATURE AND FRAMEWORK OF RISK?

The New Economy did not redefine the nature and framework of risk. Business failures and the regulators (in that order) did the job of such redefinition. This redefinition included the Capital Adequacy Accord in 1988; the Market Risk Amendment in 1996; and the New Capital Adequacy

Framework in 1999 by the Basle Committee on Banking Supervision. The G-10 regulators also promoted credit risk rating by independent agencies and market discipline in 1999. The origin, nature, and pattern of New Economy risks have been, in order of importance:

- *Overleveraging*, to the tune of $1.4 trillion with $4 billion capital —or *35,000 percent*, in the case of LTCM
- *Globalization*, with unregulated international money flows and many unknowns embedded in risk and return
- *Rapid innovation* of financial products and services, with scant attention paid to different risks, including operational risk[11]

The dangers of overlapping and assuming extreme exposure through derivative financial instruments were seen again in March 2001, when OCC released new figures showing derivative concentrations at unprecedented levels due to recent mergers. The figures showed that three commercial bank holding companies accounted for 91 percent of the admitted derivative bets held by all U.S. financial institutions and other parties:

- J.P. Morgan Chase: $24.5 trillion
- Citigroup: $7.9 trillion
- Bank of America: $7.7 trillion

These figures are expressed in notional principal amounts.

The risk seen by financial analysts is that at any moment, any one of these institutions could find itself in the same position as LTCM in September 1998. Because of convergent credit and market risk, the global economy is entering a crucial phase. Authorities must be on the alert to take firm action in implementing emergency measures in view of the correlation of debt policies, the management of liabilities, and equity prices.

The outstanding financial debt of the world can never be paid by the global economy, which is trying meet quickly multiplying demands for payments past due. The current situation demonstrates the very essence of *an economy based on liabilities*:

- U.S. financial aggregates have grown in value from about $7 trillion in 1980 to approximately $150 trillion today
- The major share of this value is held in derivative financial instruments, which today total an estimated $110 in notional principal.

Because the United States accounts for roughly 35 percent of the global leverage of G-7 countries, the real money at stake in derivatives alone is approximately $300 trillion. Even demodulated, this is enough to wreck the financial sector if derivatives turn sour.

One reason for the gap between theory and practice in the control of risk is that growth in management skill did not follow the growth of exposure, in spite of modeling, simulation, expert systems, real-time solutions, database mining, and other technological advances. Yet someone must be in charge of geared risk taking. Risk taking is healthy as long as the appropriate internal controls are in place. But in many institutions:

- The internal control system is wanting,[12]
- Personal accountability has taken a leave, and
- The situation conjures up memories of 1901—but without the iron hand of J. P. Morgan.

How will this market downturn affect the American economy? Today the American economy is vastly stronger than 1907: It is also stronger than in 1987, when volatility at the New York Stock Exchange hit 14 standard deviations. But the events in October 1987 and from March 2000 to April 2001 are very different from one another.

The October 1987 stock market crash was a one-tantrum affair, and NYSE took about six months to recover its former level. The technology earthquake of 2000 to 2001 is a prolonged case of high volatility, with a major loss of confidence. The lessons that can be learned from it are the need for action on two fronts:

1. Rigorous risk management
2. Avoidance of overleveraging

Rigorous risk management executed in real time with immediate corrective action is necessary because it is not prudence but lust and greed that drive investors. When people and companies overleverage themselves, they can no more help themselves recover. They need someone else to act as deus ex machina.

THE DESTRUCTION OF THE NEW ECONOMY BY GOING SHORT IN A MASSIVE WAY

Like everything else, the New Economy has its friends and its foes. Some of the foes may be masquerading as friends but they are not, because by overleveraging and by going short in a massive way, they destabilize the New Economy at a time it is in distress and therefore cannot afford to get hammered on its head. Here are some of the strategies which are making a bad situation worse:

- Long/short, with massive resources amounting to up to 50 percent of the capital of some of the better financed hedge funds.
- Macromarkets and their macro investments, absorbing up to 26 percent of some hedge funds superleveraged capital.
- Other geared channels, such as market-neutral (a misnomer), emerging growth, emerging markets, fixed income hedge, and unquoted equities.

I see as very positive the innovation in financial instruments. This is one of the aspects that helps make the market tick. The problem is very high leveraging in new instruments whose aftermath on the economy is unknown, because there is no precedence. Therefore, the Fed and other supervisory bodies have little advance information about where to send the fire brigade. At the same time, as the recent tragic events in New York and Washington have shown, terrorists may have exploited these instruments to gamble against the American economy, or even hidden behind respectable institutions like charities.

People who disagree with what I am saying would point out that some of these lines of investing are not totally new, and this is true enough. There are, however, two differences between yesterday and today. First, trading in derivative financial instruments and in other leveraged products has become massive, greatly increasing the amount of exposure being assumed. Going short in a highly geared way destabilizes a market which already suffers from negative psychology (more about this later). Second, the high-stakes gambles by hedge funds are now pinching consumers' pocketbooks.

What most investors fail to appreciate is that the risks connected to the trades just outlined are very different from those of the more classical stock market volatility. Not only do they increase the prevailing volatility in the financial market but they also deprive investors, whether companies or individuals, of liquidity. For instance, the money they put into *alternative investments* is at the mercy of hedge funds for two or three years—whatever the contract they have signed stipulates.

The term *alternative investments* finds its roots in the manner in which capital is employed, which is different from traditional investment methods. Classically, a fund manager tries to obtain maximum performance by buying a stock when it is cheap and selling it when the price has gone up. The goal is to beat the index, although it can also be satisfactory to lose less value than the index, when the latter has gone negative.

Alternative investment strategies use different means to profit from the market. The fund manager goes short when the price is high and covers his or her position when the price is lower. With this strategy, the fund manager profits when the market is negative, but *shorting* has major risks because the market can turn around unexpectedly and covering short positions becomes very expensive, if not outright ruinous. Even more destructive is the fact that:

- Market optimism builds up slowly
- But market pessimism spreads like brush fire under high wind.

This is where the terrorists come in. Right after the terrorist attacks on the World Trade Towers and the Pentagon, which killed over 5,000 people, the media reported that Bin Laden had been shorting his vast wealth in Tokyo, London, Paris, and New York. Both the American and many European stock exchanges are now investigating who was behind massive short selling just prior to September 11. It appears that Bin Laden may have discovered a new way of *insider trading* by means of terror attacks which kill not only innocent people but also the market.

A few days before this book went to press, President Bush announced the freezing of accounts by terrorist organizations in the United States. This is welcome news and I hope it will be done on a global scale. Today's most destructive terrorists are not the underdogs of yesterday. They are people with university degrees, upper middle class, with considerable personal wealth which they hide through numbered accounts and the complexity of contracts traded for them by different financial firms.

The authorities should look in the most detailed manner into this new type of insider trading which combines terrorism with massive financial gains, permitting terrorists to kill two birds with one well-placed stone:

- Intimidating the public, and
- Reaping benefits through shorting in the stock market.

Apart from singling out suspicious accounts and the accomplices the different international terrorists have in the investment community, the authorities will be well-advised to ascertain how

inherently risky the alternative investments are and whether those peddling them alert the buyer to the risks. Contrary to what their designers, managers, and sellers are saying, the opportunities for profits with alternative investments do not necessarily justify the risks embedded in the different leveraged deals.

On the one hand, there is a whole new series of Ponzi games masquerading as the new wonder: alternative investments for the consumer. On the other hand, the underlying long/short transactions have just demonstrated their ability not only to disappoint but also to promote a new type of insider trading which both benefits from international terrorism and finances its next strike.

The New Economy companies need the ability to turn on a dime but they should not deceive themselves. As entrepreneur Sam Walton once said,[13] the strength to manage change and the patience to go through the turbulence that accompanies a change in epochs. Not all change, however, is for the better. An ancient Greek sage once asked the gods to give him three gifts:

1. The strength to change the things he could,
2. The patience to endure the things he could not change, and
3. The wisdom to know the difference.

These gifts are at a premium today, as we transit in a cyclical path from chaos to stability and from stability to chaos—a process that repeats itself often. Note that this transition is characterized by both turbulence and business opportunities. Financial stability has no turbulence, but neither does it present opportunities for profits worth talking about. The doors of risk and return are adjacent and indistinguishable.

In conclusion, lessons can be learned from events in the U.S. capital market of a century ago, when scores of railroads went bankrupt during what were then technology panics. J.P. Morgan used new and controversial techniques, the trusts, to bring about a state of financial order. He bought failing companies, reorganized them, and brought back confidence to the market. This is precisely the strategy that can save the day in the early years of the twenty-first century. A Chinese saying goes like this: "May you live in interesting times." We actually do live in interesting times.

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