

**Rewards and Risks:
Communications and Information
in the Global Financial Services Industries**

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The growth and development of a whole range of financial services during the past few decades depended in large part on the adoption of continuously evolving electronic means of doing business. New technologies have permitted such service organizations as banks, security houses, insurance companies, stock exchanges, and credit card companies to expand internationally, to differentiate themselves from other companies, and to provide more competitive products to a wider range of customers than previously. This *PIRP Perspective* briefly describes what is happening to the financial services industries, the opportunities presented, and some of the new and inherent risks in the system, such as: the potential for breakdown in the telephone and computer component, problems in the financial industry infrastructure, the emergence of processes that reduce the intermediary role of traditional financial institutions, pressures on the "clearing and settlement" process, and the reduced capability of banks to fulfill their traditional "social contract" obligations as stabilizer while the financial sector fragments. These considerations are important to top executives not only in the financial services industries but also in other businesses that are either dependent on these financial services or themselves increasingly becoming major players. Certainly, they are of interest to the telecommunications and computer industries, which provide the "nervous system" for the modern financial services industries.

The New Climate

Alexandre Lamfalussy, General Manager of the Bank for International Settlements, has said of recent developments:

While deregulation has created an environment of greater freedom, the spectacular technological advances in communications and information systems have provided the means to enable market participants to make liberal use of the innovative opportunities offered by this greater freedom.¹

Two vital contributions by new technologies to new financial processes, as Lamfalussy pointed out, have been that:

The speed and growing sophistication of communications have accelerated international financial integration. Advances in information systems have allowed the creation of highly complex new financial products and operating techniques.

Financial service organizations control and transfer vast sums of money electronically and provide related services, both domestically and internationally. Most such organizations are related to each other and together handle much of the money that is the basis of the world's economies. Evolving information tools, including very rapid computer processes and the ability to conduct near real-time communications, have made it possible for these institutions to carry out many new types of operations with new associated risks.² For instance:

as a company moves to the more complex EDI [electronic data interchange] environment, business risk increases. EDI — using computers to transmit business documents electronically — alters the effectiveness of internal controls designed for processing transactions in the conventional way.... That implies a need to be able to recognize the risks associated with the new technology.³

Growth and Change

- ▶ **The fragmentation of financial institutions has placed major capital reserves with insurance companies, pension funds, mutual funds, and other nonbank groups, calling into question the capability of banks to perform their traditional stabilizing role.**

According to a 1992 study by the staff of the Federal Reserve Bank of New York, "the number of nonbank financial firms comparable in asset size to the five largest U.S. banks rose from two in 1983 to seven in 1990."⁴ In return for a partial monopoly and special privileges, banks have traditionally provided an extra cushion of stability on which the financial system relies, both domestically and internationally. The question now is whether this "social contract" and its expectations are still valid for an increasingly diverse and fragmented industry which has been created in part in response to technological change. The question may even be raised of whether the "bank" of today has the resources at its disposal to serve this traditional role. Evidence points to the contrary, now that insurance companies, pension funds, mutual funds, and others provide the largest capital reserves. Unlike banks, these essentially unregulated entities have made no such contract with society, and thus have no obligation to come to the rescue of the nation state's liquidity.

Growth and changes in financial services operations are reflected in many ways, most importantly in the following areas:

- ▶ **The enormous amounts of money, involving relatively few transactions, that flow from place to place every day, nationally or globally**

It has been variously estimated that from one trillion to three-and-one-half trillion dollars pass through New York banks daily.⁵ That may be more money in one day than the \$2.3 trillion total US trade with the world in the whole year of 1990.⁶ It is said that "millions of dollars are routinely put at risk ... in telephone or computer trading around the world — trades that only later are confirmed by legal documents."⁷ Along with many legitimate new activities has come the illicit practice of massive money laundering, especially drug and crime money laundering. According to New York prosecutors familiar with the scene, it would not be difficult to hide a few hundred million dollars in New York's huge daily "money stream."⁸

- ▶ **The creation and growth of major profit centers, such as credit card and foreign exchange operations, involving enormous numbers of transactions**

These operations have demanded and received facilities to provide ever-increasing speed and efficiency. Thanks to increasingly powerful and flexible electronics, Visa's capability for peak hour transactions increased from 30,000 in 1978 to about 440,000 by 1986 and to 1,404,579 by 1991, while its response time dropped from five minutes in 1973 to five seconds in 1976 and to 1.1 seconds in 1991.⁹

- ▶ **Major shifts in the way stock exchanges handle their business and the growing trade of securities outside established stock exchanges**

The increased volume, quantity, speed, and complexity of interactions have been accompanied by an increasing number of market participants, nationally and globally. What was physically impossible a few years ago has become an instantaneous possibility. Previously, with the limited number of players involved, traders tended to be familiar with each other, but with the democratization of the market, the habits and reliability of dealers have become less known qualities. The computer age has made it easy to do direct trading outside the established trading system.

The Problem of Breakdowns

Changed technologies and methods of doing business have created major opportunities, but they have also made financial services institutions vulnerable to breakdowns. Such collapses may occur in the financial systems themselves or in the communications and information systems that support them.

Questions arise about two separate areas: (i) **The computers and communications component**: What strengths and weaknesses exist in the tools themselves that create potentially serious vulnerabilities along with the opportunities? and (ii) **The changed environment for doing business**: What vulnerabilities, although not tool-related per se, have been brought about by new communications and information (C&I)-produced capabilities for doing business? Combined, these areas of concern raise further questions about whether current methods of accountability or control by top management (command

and control) or national or international regulatory oversight are adequate to present needs. The danger is that new circumstances have been created that could lead to catastrophic situations that top decision-makers or the industries' regulators might be unable to rectify on a timely basis.

As Alan Greenspan, chairman of the Board of Governors of the Federal Reserve System, has put it:

We must all guard against a situation in which the designers of financial strategies lack the experience to evaluate the attendant risks and their experienced senior managers are too embarrassed to admit they do not understand the new strategies.¹⁰

Such questions arise from the following four circumstances:

- ▶ Prior failures of financial infrastructures
- ▶ Prior failures of communications infrastructures
- ▶ The emergence of processes that reduce the intermediary role of traditional financial institutions (disintermediation) and permit the entry of many and varied new players
- ▶ Pressure on the "clearing and settlement" process

Prior failures of financial infrastructures

These include past bank failures (Franklin and Herstatt); ongoing bank failures (for example, the Bank of Credit and Commerce International [BCCI]); brokerage company scandals (such as the irregularities in the Salomon Brothers firm's treasury bond trading); commodities trading crises (such as the March 1980 silver market debacle involving holdings of brothers William H. and Nelson Bunker Hunt); and stock market crises (as in October 1987, some aspects of which involved computer trading from outside the established structure).

Walter Wriston, former Chairman of Citicorp, described the effect of the 1974 failure of the small local German bank Herstatt as it was reflected in the activities conducted by the

Clearing House Interbank Payments System (CHIPS), the electronic system of the New York Clearing House, which must clear all foreign dollar payments. Begun in 1970 among nine New York banks,

the [CHIPS] system worked well and was expanded as additional banks joined. As volume built and more and more international payments flowed through the system, the question which was always in the back of people's minds was what would happen if one link in the payment chain failed to perform.... Since this CHIPS system in New York is the mirror image of Eurodollar trading in London, a breakdown would impact every participant in the Eurodollar market.... because every Eurodollar traded in London ... must eventually be reflected on the books of a bank in New York because only a New York bank can finalize a dollar payment.¹¹

"This nightmare came true," said Wriston, on Friday, June 28, 1974, when Herstatt failed, and "the Chase Manhattan Bank, which was acting for Herstatt ... stopped all payments [from the Herstatt account] into the CHIPS system"; through frantic rearrangements at the highest levels, "By Sunday afternoon the system had cleared and each bank was able to compute its loss, if any, from the failure of Herstatt."¹²

Since then, many changes have been instituted to improve safeguards. But a time lag still remains between the point when international debts are incurred and the point of their settlement. Said Wriston,

As long as the sun rises in the East and sets in the West, there will be a five- or six-hour time difference between London and New York, and that time span between London payments and final payment in New York constitutes the credit risk.¹³

In the case of BCCI, "the world's first global banking scandal,"¹⁴ there have been several interesting C&I angles. BCCI is said to have "sought computer software as far back as 10 years ago that would allow its London headquarters to create a secret set of accounts."¹⁵ Examples of defects in BCCI's computerization are that few records were kept and that BCCI did not maintain the kinds of backup files one expects, making it difficult for inspectors to discover fraud. In one instance of global fraud involving their computers, a manager of a BCCI branch bank in Sri Lanka lifted \$10 million from three international

banks — two in Japan, one in New York — by stealing “the coded computer chip that was the signature of a telex machine at BCCI’s banking operation in ... Oman” and using it to transfer the money into his personal Swiss bank account.¹⁶

In the case of the six-day crisis in the silver market in March 1980, during which in one day prices fell 50 percent, the telecommunications equipment then available may ultimately have prevented disaster.* For six long days, however,

it appeared to government officials, Wall Street and the public at large that a default by a single family on its obligations in the plummeting silver market might seriously disrupt the U.S. financial system.¹⁷

The Hunts owned or held futures positions for 195 million ounces of silver worth \$6.6 billion — roughly four-sevenths of the entire US holdings (government and private) of 339.6 million ounces. During the days of crisis, the broker-dealers handling the brothers’ accounts, including six of the biggest securities firms — Bache Halsey, Merrill Lynch, Dean Witter, A.G. Edwards, E.F. Hutton, and Paine Webber — could have had disastrous losses had the Hunts not been able to meet their obligations. And, according to an SEC staff report:

The potential failure of even one of these firms threatened a financial chain reaction that would have jeopardized commodity clearinghouses and their members, other broker-dealers and their customers and banks, public companies and their stockholders.¹⁸

This crisis was said to have provided “a valuable lesson in the fragility and interdependence of the financial structure.”¹⁹ The rapid developments in both financial services and the telecommunications field in the twelve years since have witnessed a situation of ever increasing fragility and interdependence.

*According to an editorial of *Advertising Age* (“Saved by [Ma] Bell?” April 7, 1980), “A domino effect did not ripple through the economy. Why? It had to be more than plain luck. Along with regulatory safeguards that were built in after the Great Crash of 1929, this time we had modern communications going for us. As telephones, satellite communications, computers and video display facilities fed information from and to the trading areas, those empowered to make decisions could act swiftly. And the brakes held.”

Lack of conversion to electronics can be unhelpful. When giving Congressional testimony regarding the Salomon Brothers scandal, the Chairman of the US Securities and Exchange Commission, Richard Breeden, suggested that the auction system for treasury bonds might be made less subject to manipulation if electronics were used to open it up to direct bidding throughout the market place, rather than "rely[ing] heavily on the Federal Reserve's 39 primary dealers."²⁰

Changes in the way the financial system operates have led to its increasing opaqueness, so that

off-balance-sheet activities create a two-fold problem ... [making] it more difficult to evaluate the direct risks run by a financial intermediary; and ... creat[ing] hitherto unknown linkages between different parts of the financial industry.²¹

Aside from exacerbation of general risks, the accelerated speed and volume, along with opacity, offer more opportunity for international fraud. That is, "the BCCI and Maxwell scandals have demonstrated the extensive opportunities provided by financial globalisation to anyone wanting to erect financial structures which, to put it mildly, lack transparency."²²

Trouble can also be caused by failure to keep up with market conditions and can be aggravated by reliance on computerized information that may be outdated. For example, in the spring of 1992, Japanese banks in California were having their books examined and being required "to get the collateral for their loans revalued" in the wake of the collapse of the real estate market. According to *The Economist*,

The consequences have appalled conservative bankers in parent offices in Tokyo, who had little idea that the lending in California had often been based on computer programs that ignored supply and demand. In one recent case, the appraised value of a hotel and office complex dropped from \$120m to \$60m, and the Japanese owner was told that the project would not break even until 2017.²³

The above is illustrative of a problem found across the financial services industry, where many institutions use the same computer programs containing the same assumptions and flaws.

Prior failures of communications infrastructures

These include the Chicago (Ameritech) failures of May 1988, the Bell Atlantic and PacTel phone failures of June 1991, and AT&T failure of the telephone system in New York City's financial district in September 1991.

In the case of the September 1991 phone failure, the financial services system came out relatively unhurt. Although the breakdown disrupted the transfer links of the New York Federal Reserve Bank's Fedwire Funds, backup systems permitted the bank to settle only one hour late. Other industries were not so lucky: air traffic, for instance, was disrupted for hours.²⁴ On another occasion, financial institutions might find themselves in chaos. A report called the "\$1 Trillion Gamble: Telecommunications and New York's Economic Future," issued in 1990, warned that "A loss of telecommunications service for just one day in the Manhattan central business district could disrupt \$1 trillion in financial transactions — an economic impact that would ripple through the U.S."²⁵

Ironically, financial squeezes, as well as lower telecommunications costs, which had caused parts of operations to be dispersed, made it possible for many financial services companies to survive the April 10, 1992 bombing by the Irish Republican Army of London's financial district, when 200 buildings were damaged, 100 badly. Other companies were saved because "duplicate computer records were stored away from main offices."²⁶

Closely related to such dangers as the physical breakdown of telecommunications systems or damage from terrorist attacks is the danger of deliberate computer sabotage. According to a 1990 General Accounting Office report, although

No outside computer hacker has cracked the codes for the banking system or for securities markets.... weak internal controls for computers linking the stock exchanges and over-the-counter securities trading systems means a computer virus could sabotage these systems.²⁷

In 1988 alone, these computers took care of the trading of 53 billion shares.²⁸ Of the Federal Reserve System's three electronic transfer methods, in 1988 "Fedwire moved \$253 trillion among its 12 Federal Reserve banks," "CHIPS ... transferred \$165 trillion between U.S. and international banks," and the Belgian based SWIFT (Society for Worldwide Interbank Financial Telecommunication) "linked 2,537 financial partners."²⁹

The emergence of processes that reduce the intermediary role of traditional financial institutions (disintermediation) and permit the entry of many and varied new players

These may include such diverse activities as direct trading by individuals via computer communications as well as the massive money laundering mentioned above. Some of the questions that have arisen have been put this way:

Will the "switch in front of the dealer" ... change the structure of trading markets in such a way that a hierarchical system will emerge in which computer/ communications companies will participate more directly in the clearing and settlement of electronic trades? Will such a structure increase "systemic risk?" Who will monitor this risk? How will payment systems be linked to trading systems? If "delivery vs. payment" is used as the method for settling transactions, how will it work in an electronic data interchange (EDI) environment, which has as its most important feature the fact that electronic documents (invoices, payment instructions, etc.) can be transmitted from one computer application to another without human intervention? Will traders use communications networks to trade directly with each other and bypass conventional exchanges and clearing houses altogether?³⁰

Because direct stock trading takes place without benefit of stock markets or brokers, the physical location of financial institutions and markets is changing. According to the Chief Economist of American Express Bank Ltd.:

the advent of screen based trading ... has changed the whole concept of location. The market has always been where the price is struck: that locus is now on a computer chip whose geographical coordinates are hard to pin down.³¹

Pressure on the "clearing and settlement" process"

A 1989 Office of Technology Assessment (OTA) report pointed out that the technology used in the clearing and settlement process "is only as sophisticated as its least sophisticated link," and that "in times of high volume this could become a problem." Many users, it says, "are operating at a level of technology that is insufficient to meet the increasing demands of the marketplace."³²

Cultural and economic differences, it goes on, make correction of this problem especially difficult in an increasingly sophisticated international environment.

Lamfalussy of the Bank for International Settlements says:

the sheer size and opaqueness of the intra-day or very short-term liquidity and credit exposures incurred by market participants as a result of the spectacular surge in financial transactions calls for a close scrutiny of clearing and settlement arrangements.³³

According to him, such arrangements "are a key channel for the propagation of a crisis across the financial system, both nationally and internationally."³⁴

With international financial markets thoroughly intertwined, any changes in the clearing and settlements process must necessarily be of an international order.

"Clearing and settlement," according to the OTA report (see note 30), refers "to the processing aspect of trading on the world's stock, futures, and options exchanges, as well as the processing of trades which are done outside of any organized exchange. Generally speaking 'clearing and settlement' is what happens after the trade — everything from double-checking and confirming the terms of the transaction to paying for and delivering the traded financial instrument."

Further Considerations

Given the enormous economic importance of financial services institutions, and their rapidly increasing complexity, some subjects that would appear to need addressing are:

- ▶ The trends and consequences of disintermediation and the changed role and power of current intermediaries, as the critical information necessary for decision making becomes available to all
- ▶ The growing needs for security of information systems, including new needs for encryption and authentication
- ▶ The risks of global spillover from local incidents such as the Herstatt failure
- ▶ Globalization and the emergence of many new players nationally and internationally, including those from Third World countries, and the consequences of this for the competitiveness of other players
- ▶ The opportunities and risks presented for financial services and C&I-related operations by the opening to the West of Eastern Europe and the countries of the former Soviet Union and by the closer association of some of these countries with the European Community

Finally, some broad questions need to be asked: Are safeguards now in place to compensate for the volume, speed, quantity, complexity of interactions, increased number of market participants, and diverse locales, as well as for the more impersonal nature of trades resulting from democratization of a formerly elitist system? Is it still possible to prevent the worst excesses? What are the necessities for changed regulations at national and global levels? Is the last war still being fought — that is, are safeguards previously considered adequate still relevant in this changed environment? How should regulation affecting global markets be managed when national legal and social environments differ so drastically? Where, for example, Europeans might tend to come up ahead of time with some omnibus plan, Americans might feel that would stifle new growth and instead advocate the approach of "If it ain't broke, don't fix it."

Notes

1. Alexandre Lamfalussy, *The Restructuring of the Financial Industry: A Central Banking Perspective*, SUERF Lecture at the City University, London, March 5, 1992, p. 3.
2. In 1990, "the worldwide market for on-line transaction processing (OLTP) embraced \$33.8 billion in hardware and systems software," a situation of major importance not only for users and their customers but also for suppliers of this equipment. "The Key to Profitability: On-line Transaction Processing," *Wall Street Computer Review*, vol. 8, no. 9, June 1991, S1.
3. "EDI Security and Controls," *The Magazine of Bank Management*, Bank Administration Institute, February 1991, p. 92.
4. *International Competitiveness of U.S. Financial Firms. The Dynamics of Financial Industry Change*, Staff Study, Federal Reserve Bank of New York, May 1992. p. 4.
5. The lower figure is frequently used. The higher figure is attributed to Robert Morgenthau, Manhattan District Attorney; see Marie Brenner, "How They Broke The Bank," *Vanity Fair*, April 1992, p. 261; p. 169 ff.
6. *Direction of Trade Statistics*, December 1991, p. 141.
7. Federal Reserve Chairman Alan Greenspan, quoted in Stan Hinden, "Global Pacts Designed to Fight Stock Fraud," *The Washington Post*, September 25, 1991, C6.
8. Ibid.
9. Oswald H. Ganley and Gladys D. Ganley, *To Inform Or To Control? The New Communications Networks*, Second edition (Norwood, N.J.: Ablex Publishing Corp., 1989), p. 223. Personal communication with Visa, 1992.
10. Alan Greenspan, "International Financial Integration," Speech presented to the Federation of Bankers Associations of Japan, Tokyo, October 14, 1992, p. 16.
11. Walter Wriston, "The Day the (Electronic) World Stopped. June 28, 1974," unpublished paper (1991), pp. 1-2.
12. Ibid., p. 4.
13. Ibid., p. 6.
14. Jonathan Beaty of *Time* magazine called it this on "BCCI Scandal in U.S. Only Beginning to Unfold," ABC News, *Nightline*, July 30, 1991.
15. Michael West, "BCCI Sought Software To Set Up Secret Accounts," *The Associated Press*, August 2, 1991.

16. Sonia Purnell, "Workers Were Too Scared to Tell About Mafia Links," *The Daily Telegraph*, August 3, 1991, p. 2.
17. "Summary and Recommendations of SEC Staff Report on 1980 Silver Crisis," *Securities Regulation and Law Report*, The Bureau of National Affairs, Inc., vol. 14, no. 42, October 29, 1982, p. 1872.
18. Ibid.
19. Ibid.
20. "Statement of Richard C. Breeden, Chairman of the Securities and Exchange Commission, Washington, D.C.," *Hearings Before The Subcommittee on Securities of the Committee On Banking, Housing, and Urban Affairs*, United States Senate, regarding "The Activities of Salomon Brothers, Inc., in Treasury Bond Auctions," September 11 and 12, 1991, pp. 13-14.
21. Lamfalussy, p. 9.
22. Ibid.
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24. Jeanne Iida, "Banks Confront Telecom Failures," *The American Banker*, October 9, 1991, p. 3.
25. Alan Radding, "How Disaster-Proof is Wall Street," *Wall Street Computer Review*, Information Access Company, vol. 8, no. 11, August 1991, p. 41.
26. Simon London and Danny Green, "Fears Over Foreign Opinion," *Financial Times*, April 14, 1992, p. 8; also, "UK Insurers Face £1 bn Claims After IRA Bomb in London," *Financial Times*, April 14, 1992, p. 1.
27. Stella Dawson, "Computer Sabotage Could Wreck Global Financial System," *The Reuter Business Report*, February 21, 1990, BC cycle.
28. Ibid.
29. Ibid.
30. Marjorie Greene, "Electronic Trading Networks: Are There Regulatory Overlaps?" Speech presented to the Science Policy Research Unit (SPRU), University of Sussex, March 17, 1992, pp. 5-6.
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34. Ibid.

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