



Annex V

Globalization of Finance and Financial Risks

The structural changes that have occurred in national and international finance during the past two decades can be seen as part of a complex process best described as the globalization of finance and financial risk. The key elements of this ongoing transformation have been (1) an increase in the technical capabilities for engaging in precision finance, that is, for unbundling, repackaging, pricing, and redistributing financial risks; (2) the integration of national financial markets, investor bases, and borrowers into a global financial market place; (3) the blurring of distinctions between financial institutions and the activities and markets they engage in; and (4) the emergence of the global bank and the international financial conglomerate, each providing a mix of financial products and services in a broad range of markets and countries. These changes have altered investor and borrower perceptions of financial risks and rewards around the world, and their behavior across national and international financial markets.

This annex documents the broad areas of structural change that have occurred in the past decade or more. The first subsection examines the consolidation and restructuring that has occurred in the international financial services industry comprised of banks, investment banks, institutional investors, and insurance companies. The second subsection describes the increased integration of capital markets, including the greater linkages between trading exchanges and national markets. The final subsection describes the impact of information technology and mathematical models on finance, and their ability to unbundle, repack, price, and trade precisely defined elements of financial risk, and some of its implications for risk management.

Consolidation and Restructuring of the Global Financial Services Industry

The global financial services industry has been transformed during the past two decades, and aspects of this transformation appear to have accelerated in the 1990s. Two basic characteristics have defined this transformation. First, traditional banking institutions have been transformed into new financial services firms taking on new business lines and new risks—in-

cluding those of institutional securities firms, insurance companies, and asset managers. Second, nonbank financial institutions—such as mutual funds, investment banks, pension funds, and insurance companies—now actively compete with banks both on the asset and liability sides of banks' balance sheets. In effect, the financial services industry has become desegmented, which is increasingly blurring the distinction between banks and nonbanks.

The Changing Business of Banking

The motives for expanding beyond traditional banking have been twofold and have operated both domestically and internationally. First, the lowering and removal of regulatory barriers has meant that banks could enter businesses that had been off limits, and this has allowed them to diversify their revenue sources by taking on related activities in different markets. Second, bank disintermediation and the further development and deepening of capital markets worldwide has allowed corporations to raise funds directly through bond and equity issues. As a result, the traditional source of bank profits—lending to small and large firms financed by low-cost deposits—has suffered due to competition from securities markets and institutional asset managers. These competitive pressures on traditional bank franchise values have forced banks to seek more profitable sources of revenues, including new ways of intermediating funds. The U.S. bank data provide a good illustration of the impact of these pressures: between 1980 and 1995, U.S. banks' share of personal financial assets fell by 50 percent to 18 percent, and nonbank financial institutions' (pension funds, insurance companies, and mutual funds) share rose by almost the equivalent amount to 42 percent. Of course, these trends are less evident in some countries where capital market deepening has not yet occurred to the degree that it has in the United States, but even in these countries banks are aware that their traditional franchises are becoming more difficult to maintain.

The degree of disintermediation has not been shared equally by all banks and in all countries; banks that are active in smaller markets have experienced less competitive pressure, and these pressures have been slower to take hold in countries that have historically

Table A5.1. Major Industrial Countries: Bank Deposits*(In percent of total bank liabilities)*

	1980	1990	1995
United States ¹	75.5	69.6	58.8
Japan	71.8	71.3	71.3
Germany	73.9	71.2	65.7
France	...	34.1	27.5
Italy ²	46.3	44.2	36.9
United Kingdom	86.5	84.6	86.0
Canada ³	79.7	74.3	72.4

Sources: Organization for Economic Cooperation and Development, *Bank Profitability: Financial Statements of Banks* (Paris), various issues; and France, Secretary of the Banking Commission.

¹Data refer to commercial banks; private checkable, time, and savings deposits divided by total liabilities.

²Deposits from the domestic sector as a percentage of total liabilities.

³Total Canadian dollar deposits as a percentage of total Canadian dollar liabilities.

relied more heavily on banks than on securities markets. Nonetheless, aggregate national data show four main trends. First, deposits as a share of total bank liabilities have declined since 1980 in all of the Group of Seven countries except Japan and the United Kingdom, and there is an indication that this trend has accelerated in the 1990s (Table A5.1). This trend is particularly pronounced in the United States, where deposits as a share of total bank liabilities declined by 10 percentage points during the first half of the 1990s. Second, tradable liabilities of banks as a percentage of total liabilities have increased (Table A5.2). In other words, banks are increasingly funding their activities by issuing securities. Third, loans as a percentage of bank assets have generally declined since 1980 (Table A5.3). Fourth, bank assets have shifted toward investments in securities (Table A5.4).

The changing business of banking is most evident in banks with an international focus. As a proxy, con-

Table A5.2. Selected Industrial Countries: Negotiable Liabilities*(In percent of total bank liabilities)*

	1980	1990	1995
United States ¹	0.4	0.8	1.1
Japan	2.0	3.9	4.8
Germany	19.2	19.0	23.5
France ²	...	21.7	19.4
Italy ³	12.2	18.7	22.0
United Kingdom	3.9	6.1	7.3

Source: Organization for Economic Cooperation and Development, *Bank Profitability: Financial Statements of Banks* (Paris), various issues.

¹All insured commercial banks; subordinated debt divided by total liabilities.

²Issued bonds and negotiable debt securities.

³Negotiable liabilities are defined as certificates of deposit and bonds outstanding.

Table A5.3. Major Industrial Countries: Bank Loans*(In percent of total bank assets)*

	1980	1990	1995
United States ¹	63.3	62.9	58.9
Japan	55.3	56.2	65.4
Germany	83.6	81.2	77.7
France	...	40.4	36.4
Italy ²	35.7	45.6	42.4
United Kingdom	43.6	57.9	52.4
Canada ³	70.4	70.8	67.6

Sources: Organization for Economic Cooperation and Development, *Bank Profitability: Financial Statements of Banks* (Paris), various issues; and France, Secretary of the Banking Commission.

¹U.S. commercial banks' total loans divided by total financial assets.

²Banks' loans to the domestic sector as a proportion of total assets, exclusive of bad loans.

³Nonmortgage and mortgage loans as a percentage of Canadian dollar liabilities.

sider the largest 50 banks in the world (see Table A5.5).¹ During the 1990s, three changes in the composition of these banks' balance sheets are noteworthy. First, there has been a clear displacement of lending by other activities: the proportion of "other earning assets" relative to total assets has increased noticeably in recent years from 33 percent to 37 percent. Moreover, excluding Japanese banks, where the trend is reversed, this ratio has risen even further (to 39 percent).

Second, off-balance-sheet items have grown relative to total assets: between 1991 and 1996, the aver-

¹The top 50 banks by total assets were identified by *The Banker* (July 1997), using end-1996 data. Data regarding these banks was obtained from Fitch IBCA Ltd. Using the assets from the largest 1,000 banks as reported by *The Banker* (July 1997), the top 50 banks account for almost 50 percent of the assets showing that the top 5 percent of banks hold 50 percent of the assets.

Table A5.4. Selected Industrial Countries: Tradable Securities Holdings*(In percent of total bank assets)*

	1980	1990	1995
United States ¹	18.0	18.9	20.1
Japan	14.7	14.3	15.4
Germany	10.2	12.1	15.7
France ²	...	7.3	13.7
Italy	20.4	13.0	13.9
United Kingdom	9.2	9.2	17.9

Source: Organization for Economic Cooperation and Development, *Bank Profitability: Financial Statements of Banks* (Paris), various issues.

¹All insured commercial banks; total securities, trading securities, and repurchase agreements divided by total assets.

²For 1990, securities operations, treasury bonds, and negotiable debt securities; for 1995, trading securities, securities held for sale, and investment securities.

Table A5.5. Top 50 Banks: Balance Sheet Information¹*(In percent except as noted)*

	1991	1992	1993	1994	1995	1996
Other earning assets/total assets	33.35	31.85	33.78	36.40	37.24	37.14
Off-balance-sheet items/total assets	14.58	17.02	20.81	19.50	19.67	20.33
Other operating income/net interest revenue	49.18	54.10	62.00	61.77	56.16	67.06
Commission and fees/other operating income	86.56	80.37	61.09	61.28	60.87	57.54
Number of reporting banks	25	33	34	30	30	36
Trading income/other operating income	24.80	18.50	22.06	12.92	14.69	18.15
Number of reporting banks	5	10	10	11	11	11

Source: Fitch IBCA Ltd.

Note: The top 50 banks were identified by *The Banker* (July 1997) using end-1996 data.¹Average across all banks.

age ratio of off-balance-sheet items to total assets has increased by almost 6 percentage points, and in 1996 stood at more than 20 percent. These data mask variation in the importance of off-balance-sheet activities across banks: one bank registered as much as 112 percent of off-balance-sheet items relative to total assets and another as little as 0.03 percent. Often little indication of the types of instruments comprising off-balance-sheet items is provided in financial reports, but an important component of off-balance-sheet activities among the major international banks has been derivatives instruments.

Third, as banks have shifted from lending to other activities, the income of banks has tilted away from traditional deposit-loan spread income and toward other types of income. For example, the proportion of “other” operating income to net interest revenue grew from 49 percent to 67 percent during 1991–96. In some of these banks, other operating revenue is two to three times net interest revenue. An increasingly more important source of revenue for internationally active banks has been their activities in derivatives and fee-based income from investment services: derivatives-based earnings for the larger banks is estimated as roughly 15–20 percent of their noninterest income.

The restructuring that is under way in banking systems is also reflected by banks expanding into other segments of the financial industry and by consolidation within banking industries. First, banks in many countries have stepped-up their securities market activities. This is evident by the well-publicized acquisitions of securities firms by some of the major global banks, by the relaxation of restrictions separating commercial and investment banking in several countries (for example, Canada, the United States, and Japan), and by domestic and foreign banks establishing securities market subsidiaries.²

²For example, during 1996–97, 394 banks filed applications to establish an office in the United States, compared with just 29 in 1995 (*International Banking Regulator*, various issues). A number

Second, banks have entered the insurance business. Most of the insurance business now conducted by banks has been domestic, and much of it aims to distribute insurance products—annuities and variable life policies that mirror other long-term investment products—to retail customers. In Europe, by using their low-cost distribution channels, banks have gained market share versus insurance companies in virtually every major European market for relatively simple, standardized savings-type policies, referred to as “bancassurance.” Although some European banks have attempted to enter the insurance business by growing it internally, most have acquired insurance companies. In the United States, rigid regulatory constraints have historically meant the banks have had little latitude to penetrate the insurance industry, but the recent relaxation of some of these restrictions has made banks one of the fastest growing distributors of annuities and basic life insurance policies. For instance, 84 percent of banks with assets over \$10 billion and over 60 percent of banks with assets between \$100 million and \$10 billion were selling insurance in 1995.³ Further, it is expected that the life insurance industry will lose its exclusive underwriting right to annuities in the near future, leaving greater latitude for U.S. banks to enter this part of the insurance business. The recent announcement of a proposed merger between a large U.S. global bank and a large U.S. insurance company might be interpreted as indicating that banks’ involvement in the insurance business is set to expand significantly into all areas of the insurance industry.

of institutions applied to U.S. bank regulators for permission to engage in a variety of nonbanking activities, with brokerage and investing receiving the highest number of applications, followed by other nonbanking, which was then followed by requests to use forward contracts, futures, options, and swaps. A bank can submit an application for multiple requests so it is difficult to judge the number of banks entering these various nonbanking activities.

³From Glossman and Plodwick (1998), p. 17.

Third, banks have entered the asset management business, both by establishing their own asset management units and by acquiring independent asset management firms. Banks seemingly see two potential benefits from expanding their asset management business: (1) fee income from providing investment management services; and (2) providing a wider range of financial services to their traditional customers in order to counter the disintermediation of their deposits. Even in Europe, where universal banks in some countries have long been in the asset management business, it is likely that competition from independent asset managers may cause these banks to become more aggressive in increasing their asset management operations.

Finally, the competitive challenges faced by banks have fostered consolidation in banking industries in North America, Japan, and Europe. This consolidation has typically occurred among domestic banks, but the objectives of the larger bank mergers have often been rooted in the view that by becoming larger they stand a better chance of competing both domestically and internationally. International competition is expected to continue to be a motivating factor underlying mergers, because in many countries restrictions on the entrance of foreign financial institutions are being removed. A recent merger proposal between two Swiss banks, for example, would create a financial institution with close to \$1 trillion in assets—a magnitude that is considerably larger than the GDP of the smallest Group of Seven country (Canada). In the rest of Europe, many factors have motivated merger activity and such activity is likely to continue and perhaps accelerate with the introduction of the euro in 1999.⁴ Overcapacity, deregulation, loss of national protection, disintermediation in wholesale banking, weak earnings growth in many banking business sectors, the need for scale to spread growing information technology and processing costs, and the rising demands of shareholders for a competitive return on their investment are some reasons that have been cited.⁵

The ability of banks to increase scale and broaden their scope has resulted in two trends developing simultaneously. The first is consolidation among already large banks driven by the goal to be global players in a financial market characterized by financial institutions providing a large number of services worldwide. For instance, an annual report for one of the top 50 banks states that the institution enjoys worldwide relationships with 500 multinational industrial and service corporations, with 4,000 institutional investors and with 1,300 financial institutions. These firms will maintain extensive distribution channels, be at the forefront of product development, and transfer

risks around the globe. The second trend is disaggregation at the national and regional levels where banks and other financial institutions will become more specialized, niche players. These institutions will take advantage of the increasing “commoditization” of some types of products and will specialize in only a few areas that meet particular customer demands.

Desegmentation of Financial Services and the Institutionalization of Asset Management

Traditionally, intermediation between borrowers and savers occurred through banks and securities firms, with banks lending depositors’ funds directly to firms, and securities firms providing the distribution of new issues of debt and equity to individual investors, pension funds, and insurance companies. Two notable trends have eroded this traditional view of financial intermediation. First, from the supply side, nonbank financial institutions have been slowly competing away banks’ traditional assets, by facilitating the securitization of finance and also by offering financial services that have historically been provided almost exclusively by banks. Investment banks, securities firms, asset managers, mutual funds, insurance companies, specialty and trade finance companies, hedge funds, and even telecommunications, software, and food companies are starting to provide services not unlike those traditionally provided by banks. Second, on the demand side, households have bypassed bank deposits and securities firms in order to hold their funds with institutions better able to diversify risks, reduce tax burdens, and take advantage of economies of scale. The result has been dramatic growth in the size and sophistication of institutions that specialize in investing money, increasingly on a global basis, on behalf of households.

Nonbank financial sectors in the major advanced economies are very large. In the Group of Seven countries, insurance companies, pension funds, investment companies, and other institutional investors managed assets totaling more than \$20 trillion in 1995 (Table A5.6). To put this in perspective, this amounts to about 110 percent of GDP of the Group of Seven countries, it is more than half the value of all bonds and equities outstanding in these countries, and it represents 90 percent of all assets in the banking systems in these countries. In comparison, total assets of institutional investors in 1980 in the major advanced economies was only about one-tenth of what it was in 1995, and as a share of GDP in no country did institutional assets exceed GDP in 1980.⁶ The United States has progressed the furthest in the process of the institutionalization of savings: U.S. institutional assets

⁴See Chapter V for a more detailed discussion of financial sector consolidation in Europe.

⁵See Lee (1998).

⁶See “The Increasing Importance of Institutional Investors” in International Monetary Fund (1995) for a discussion of the trends in institutional asset management between 1980 and 1992.

Table A5.6. Major Industrial Countries: Assets of Institutional Investors*(In billions of U.S. dollars except as noted)*

	1990	1991	1992	1993	1994	1995	Average Annual Growth Rate, 1990–95 (In percent)
Insurance companies							
United States	1,966.4	2,142.8	2,280.5	2,493.5	2,634.8	2,908.3	10.0
Japan	1,137.1	1,329.1	1,433.3	1,715.7	2,036.4	2,072.2	16.0
Germany	427.0	455.6	463.6	481.3	586.9	713.1	13.0
France	238.9	273.1	299.3	362.3	415.9	582.1	29.0
Italy	116.7	143.2	131.9	129.9	153.0	181.5	11.0
United Kingdom	529.7	601.5	567.6	724.3	721.1	853.6	12.0
Canada	133.0	143.8	138.2	140.3	140.0	154.0	3.0
Total	4,548.9	5,089.0	5,314.3	6,047.2	6,688.0	7,484.8	13.0
Pension funds							
United States	2,460.7	2,723.6	3,006.5	3,286.7	3,435.1	4,037.4	13.0
Japan ¹	...	...	...	...	...	...	...
Germany	54.9	60.0	60.6	51.2	59.7	69.8	5.0
France	...	...	...	...	...	...	...
Italy	56.6	70.2	55.0	50.2	59.3	64.1	3.0
United Kingdom	591.0	648.9	584.8	717.8	700.5	813.6	8.0
Canada	184.9	203.5	201.5	213.9	223.8	248.6	7.0
Total	3,348.0	3,706.2	3,908.4	4,319.8	4,478.5	5,233.5	11.0
Investment companies							
United States	1,154.6	1,375.7	1,623.5	2,041.4	2,186.6	2,730.0	27.0
Japan ²	390.0	373.8	407.4	503.6	481.2	500.0	6.0
Germany	159.9	187.6	191.2	243.7	316.4	396.8	30.0
France ²	393.1	449.4	471.8	508.3	549.2	576.9	9.0
Italy	41.9	48.8	41.3	64.6	79.9	80.0	18.0
United Kingdom	127.8	146.0	141.5	194.9	206.2	241.8	18.0
Canada	30.4	44.5	54.3	83.1	94.1	107.1	50.0
Total	2,297.7	2,625.8	2,931.0	3,639.6	3,913.6	4,632.6	20.0
Other forms of institutional saving							
United States ³	1,238.9	1,349.7	1,381.7	1,440.6	1,563.1	1,814.5	9.0
Japan ^{2,4}	963.6	1,069.7	1,151.3	1,357.4	1,573.9	1,496.0	11.0
Germany	...	...	...	...	...	...	...
France	...	...	...	...	...	...	...
Italy	...	...	...	...	...	...	...
United Kingdom	...	...	...	...	...	...	...
Canada	...	...	...	...	...	...	...
Total	2,202.5	2,419.4	2,533.0	2,798.0	3,137.0	3,310.5	10.0
All investors							
United States	6,820.6	7,591.8	8,292.2	9,262.2	9,819.6	11,490.2	14.0
Japan	2,490.6	2,772.6	2,992.0	3,576.7	4,091.5	4,068.2	13.0
Germany	641.8	703.2	715.3	776.2	963.0	1,179.8	17.0
France	632.0	722.5	771.0	870.5	965.0	1,159.0	17.0
Italy	215.3	262.2	228.2	244.7	292.3	325.6	10.0
United Kingdom	1,248.5	1,396.4	1,293.9	1,637.0	1,627.7	1,908.9	11.0
Canada	348.2	391.7	393.9	437.2	457.9	509.7	9.0
Total	12,397.0	13,840.4	14,686.6	16,804.6	18,217.0	20,641.4	13.0
Total assets of all investors (in percent of GDP)							
United States	118.7	128.3	132.8	141.4	141.7	158.6	6.0
Japan	77.9	75.6	79.1	84.1	85.2	87.0	2.2
Germany	39.5	37.4	37.5	42.5	44.9	48.9	4.4
France	49.8	55.2	60.7	72.5	69.8	74.0	8.2
Italy	18.5	21.1	22.3	26.9	29.0	29.1	9.5
United Kingdom	117.5	129.7	143.3	175.2	156.1	176.0	8.4
Canada	60.3	66.9	72.6	81.2	85.6	89.2	8.1
Total	84.7	88.3	93.7	103.7	102.1	110.5	5.5

Sources: Bank of France; Bank of Italy; Bank of Japan; Board of Governors of the Federal Reserve System; Deutsche Bundesbank; Office for National Statistics (United Kingdom); Organization for Economic Cooperation and Development; Statistics Canada; and IMF staff estimates.

¹Pension fund assets of Japan are combined with those of insurance companies and trust accounts of trust banks.

²Financial assets.

³Other nondepository financial companies (bank personal trusts, finance companies, and real estate investment trusts).

⁴Trust accounts of trust banks excluding investment trusts.

Table A5.7. Selected Industrial Countries: Institutional Investors' Holdings of Securities Issued by Nonresidents*(In percent of total assets)*

	1980	1988	1990	1991	1992	1993	1994	1995
Pension funds								
United States	0.7	2.7	4.2	4.1	4.6	5.7	...	...
Japan	0.5	6.3	7.2	8.4	8.4	9.0	...	...
Germany	...	3.8	4.5	4.5	4.3	4.5	5.0	...
United Kingdom	7.9	16.3	17.8	20.6	19.5	20.0	19.8	19.8
Canada ¹	4.6	5.9	6.4	8.6	10.2	11.6	12.9	14.2
Life insurance companies								
United States	4.1	3.6	3.6	3.6	3.7	...	...	...
Japan ²	...	...	13.5	12.5	11.4	9.0	6.7	6.9
Germany	0.6	0.6	1.0	1.0	...	...	...	...
United Kingdom	4.1	9.4	10.7	12.2	12.4	13.3	13.5	14.2
Canada ¹	0.3	1.5	1.1	1.2	0.7	0.5	0.5	2.4
Mutual funds								
United States	...	...	6.6	...	10.1	...	...	...
Japan ³	...	9.1	7.9	13.0	9.9	...	...	...
Germany	...	...	...	...	...	24.8	20.3	20.2
United Kingdom	17.9	33.0	31.0	34.3	35.2	35.8	36.4	34.5
Canada ¹	19.9	19.4	17.5	16.1	17.0	20.0	24.0	24.6

Sources: Bank of Canada; Bank of Japan; Deutsche Bundesbank; European Federation for Retirement Provisions; International Monetary Fund (1995); Office for National Statistics (United Kingdom); and Organization for Economic Cooperation and Development.

¹Nonresident investment.

²Only bills and bonds.

³Investment trusts.

under management totaled \$11.5 trillion (159 percent of GDP) in 1995, compared with total assets in the U.S. banking system of \$5 trillion in the same year.

As institutional investors have grown in size, they have diversified their portfolios internationally. In 1980, institutional investors in most countries had fewer than 5 percent of their assets invested in foreign securities (Table A5.7). By the mid-1990s, the share of foreign assets in their portfolios had increased to roughly 20 percent on average. For illustrative purposes, if all institutional investors in the Group of Seven countries had 20 percent of their assets invested abroad in 1995, this translates into about \$4 trillion of funds invested in foreign markets.

The growth of institutional investors has been especially marked in the U.S. mutual fund industry. U.S. mutual fund assets have risen at double-digit growth rates since 1970 when they amounted to just \$48 billion.⁷ The magnitude of wealth that has accumulated in mutual funds since the mid-1980s is striking: by April 1998, U.S. mutual funds managed assets of more than \$5 trillion, which is more than the assets of all U.S. banks combined. In addition, from April 1970 to April 1998, the number of U.S. mutual funds increased from 361 to almost 7,000, and the number of individual accounts with mutual funds increased from

about 11 million to more than 170 million. U.S. mutual funds are currently estimated to own 20 percent of all U.S. equities.

Large-scale shifts in households' saving behavior and deregulation of financial industries in many industrial countries have made the fund management industry one of the most dynamic segments of the financial industry in recent years. This dynamism is particularly visible in the hedge fund industry. Although hedge funds have been an acknowledged industry since about the mid-1960s, their growth has accelerated in the 1990s with assets under management increasing 12 times between 1990 and 1997. Since hedge funds are typically offered only to institutional investors, companies, or high-net-worth individuals their investment strategies are only limited by their prospectuses, giving them a large range of investment opportunities, including the ability to go short and use leverage.⁸ Given their use of leverage many view hedge funds as a high risk/high return investment. However, risk-adjusted returns calculated from a large hedge fund data vendor show that, on average, across a variety of types of hedge funds, they have higher returns with lower risk than the S&P 500 index, at least partly demonstrating the advantages of their investment styles.

⁷Data on U.S. mutual funds are from the Investment Company Institute.

⁸For a discussion of hedge funds, see Eichengreen and others (1998).

Demographic changes and the increased sophistication of small investors around the world, in tandem with the deregulation of financial markets, have intensified competition for savings among banks, mutual funds, insurance companies, and pension funds. The response of the industry to intensified competition for funds has been merger and acquisition activity, mostly for strategic reasons, such as the capacity to build and strengthen their business abroad, the ability to add more assets to existing products in order to create significant operating leverage, and a desire to add to the product mix.

The merger and acquisition activity has been apparent in two recent developments. First, gains in information technology have virtually eliminated the importance of geographic location. Fund management companies have begun consolidating their operations geographically, often in locations that are not usually thought of as major financial centers—for example, San Francisco and Boston. Second, there is evidence that the growth of large asset management firms has exceeded the growth of small ones. In 1985, the top 10 institutional investors in the United States managed assets worth \$969 billion expressed in 1995 dollars. A decade later, the top 10 institutional investors managed assets of \$2.4 trillion.⁹ The largest institutional investor in the United States currently manages more than \$900 billion in assets, or roughly five times the assets (in constant dollars) of the largest institutional investor in 1985.¹⁰ In comparison, the 300th largest asset manager at the end of 1995 controlled \$2.7 billion in assets, just slightly more than the \$2.4 billion (in constant dollars) managed by the 300th largest asset manager in 1985. This is consistent with a consolidation of assets, with the largest asset managers growing much more rapidly than the smaller asset managers. In Europe, too, the growth of large fund managers has taken place in recent years. The announcement of a merger in 1997 of two Swiss banks aimed at creating the world's largest asset manager, with close to \$1 trillion under management. The desegmentation of the financial services industry is reflected in the fact that banks and securities firms have been particularly active participants in recent mergers and acquisitions in the asset management industry—four of the top six deals of 1997 involved banks and securities firms.

Accompanying the move of banks and securities firms into the asset management industry is the penetration of nonbank financial institutions into traditional bank activities in credit markets. For example, nonbank financial institutions have become involved in loan syndications and bridge loans. Insurance companies, pension funds, asset managers, and mutual

funds have entered the credit market via bridge loans, syndicated loans, new structured vehicles such as CLOs and credit derivatives.¹¹ And some European insurers have sold home and automobile loans as well as products that compete directly with bank deposits.

Closer Integration of Financial Markets

Liberalization of domestic capital markets and of international capital flows since the early 1970s, coupled with rapid gains in information technology, has been the catalyst for financial innovation and the growth in cross-border capital movements. In part, the globalization of financial intermediation has occurred in response to the demand to intermediate these growing cross-border capital movements. Firms in most countries currently enjoy access to financial services from a more diverse and more competitive array of providers, and at lower cost, while investors have better information and access to an expanded menu of investment opportunities.

There are many ways of assessing the extent of globalization of financial markets, because markets become integrated in a number of ways: through the increasing web of connections among financial institutions, through exchange linkages, and through less formal trading and information linkages. Before exploring some of the mechanisms by which markets are connected globally, evidence is presented that indicates the growing extent to which financial market integration is taking place.

Cross-Border Finance in a Global Securities Market

The integration of national financial systems into a single global financial system is indicated by more diversified investment portfolios, the larger number of firms tapping foreign sources of funds, and the growth of highly sophisticated asset managers, an important subset of which focus exclusively on identifying and exploiting arbitrage opportunities around the globe. Gross flows and net flows of capital have increased markedly since 1970 (see Table A5.8). The 32 times increase in gross direct investment in the industrial countries is impressive, but it pales in comparison to the growth in gross portfolio flows, which has increased by almost 200 times.

Another measure of capital market integration is cross-border securities transactions.¹² Cross-border

⁹*Institutional Investor*, 1996 (London), July.

¹⁰The figures reported here and below on institutional investors are calculated from figures reported in *Institutional Investor* (various issues) and from Fidelity Investments.

¹¹The nature of these instruments are described below.

¹²Even gross portfolio flows are just a net measure of international securities market activity—purchases and sales of foreign securities are reported as a single net entry. This measure approximates the change in stocks of foreign securities held, but says nothing about the level of cross-border financial market activity underlying the change in stocks.

Table A5.8. Major Industrial Countries: Gross and Net Flows of Foreign Direct and Portfolio Investment¹*(In billions of U.S. dollars)*

	1970	1975	1980	1985	1990	1995	1996	1997
Gross flows								
Foreign direct investment	14.45	34.25	82.82	75.94	283.24	369.01	357.53	448.32
Portfolio investment	5.26	27.10	60.93	233.44	329.63	764.34	1,162.64	1,040.19
Net flows								
Foreign direct investment	-4.05	-9.93	-8.14	-12.66	-59.58	-83.18	-87.41	-92.60
Portfolio investment	1.42	8.53	16.02	25.03	41.36	186.53	267.37	272.51

Source: International Monetary Fund, *Balance of Payments Statistics Yearbook*.¹Group of Seven countries.

transactions in bonds and equities in the major advanced economies amounted to less than 5 percent of GDP in 1975, but in 1997 they amounted to between one and seven times GDP (Table A5.9). Securities transactions between U.S. and foreign investors, for example, totaled \$17 trillion in 1997. Foreign participation in securities markets in Europe is even higher than in the United States and Japan. This accords with the stylized fact that about half of all equity transactions for firms located in the European Union (EU) take place outside the home country.¹³

Mirroring the expansion in cross-border trading in financial assets, firms are increasingly turning to international securities markets to raise funds. International issues of equity have risen almost sixfold during the 1990s for firms located in the industrial countries (Table A5.10). The nominal increase in outstanding issues of international debt securities has been even more impressive (Table A5.11): in early 1998, the outstanding amount of international bonds was \$3.7 trillion, or more than six times larger than in 1985. Non-resident holdings of public debt have also increased substantially. Such holdings in Belgium, Canada, Germany, and the United States have more than doubled since 1983, and in Italy there has been a threefold increase since 1990 (Table A5.12).

Market integration is reflected also in the trading of the same securities in multiple geographic areas. The New York Stock Exchange (NYSE), for instance, lists 343 foreign firms, and American Depositary Receipts (ADRs)¹⁴ traded on the NYSE cover 315 non-U.S. companies headquartered in 42 different countries. Similarly, at the end of 1997, the London Stock Exchange listed 526 foreign firms. Likewise in markets for derivatives contracts, in the major international financial centers one can trade in derivative securities on a variety of foreign assets. For example, both LIFFE in London and Deutsche Terminbörse (DTB) in Germany trade a German bund contract. In Singapore, the Singapore International Mercantile Exchange (SIMEX) trades a Japanese Nikkei 225 futures contracts, as does the Osaka Securities Exchange in Japan. On U.S. derivatives exchanges, one can trade contracts on Brady bonds and a wide variety of foreign exchange contracts, including contracts on the Brazilian real, the Mexican peso, the South African rand, the Russian ruble, the Malaysian ringgit, the Thai baht, and the Indonesian rupiah.

Financial globalization has been a counterpart to international trade in goods and services, the growing financing needs of countries, and the globalization of national economies.¹⁵ This is reflected by the observation

¹³See Goldstein and Mussa (1993).¹⁴ADRs and Global Depositary Receipts (GDRs) represent shares listed on local exchanges.¹⁵See Greenspan (1998).**Table A5.9. Selected Major Industrial Countries: Cross-Border Transactions in Bonds and Equities¹***(In percent of GDP)*

	1975	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997
United States	4	9	35	101	89	96	107	129	131	135	160	213
Japan	2	8	62	156	119	92	72	78	60	65	79	96
Germany	5	7	33	66	57	55	85	170	158	172	199	253
France	...	5	21	52	54	79	122	187	197	187	258	313
Italy	1	1	4	18	27	60	92	192	207	253	470	672
Canada	3	9	27	55	65	83	114	153	208	189	251	358

Source: Bank for International Settlements (1998).

¹Gross purchases and sales of securities between residents and nonresidents.

Table A5.10. International Equity Issues by Selected Industrial and Developing Countries and Regions
(In millions of U.S. dollars except as noted)

	1990	1991	1992	1993	1994	1995	1996	1997	1990–97 Change (In percent)
Industrial countries									
United States	990.0	2,230.0	4,228.0	4,664.0	3,731.0	4,470.0	4,072.0	3,081.0	211.2
Japan	480.0	0.0	47.0	28.0	0.0	111.0	438.0	792.0	65.0
Germany	57.0	981.0	400.0	469.0	2,795.0	6,023.0	7,028.0	3,614.0	6,240.4
France	777.0	1,109.0	1,213.0	3,421.0	5,850.0	4,348.0	5,278.0	7,336.0	844.1
Italy	132.0	583.0	756.0	797.0	2,644.0	2,281.0	4,488.0	8,441.0	6,294.7
United Kingdom	3,103.0	4,028.0	3,003.0	1,775.0	870.0	3,966.0	6,281.0	8,656.0	179.0
Canada	111.0	450.0	205.0	471.0	780.0	1,477.0	1,345.0	2,365.0	2,030.6
Netherlands	432.0	536.0	65.0	1,267.0	3,330.0	4,071.0	5,817.0	3,693.0	754.9
Sweden	211.0	6.0	13.0	940.0	2,101.0	1,121.0	2,141.0	2,246.0	964.5
Switzerland	0.0	0.0	353.0	472.0	75.0	671.0	0.0	1,449.0	...
Belgium	0.0	0.0	0.0	265.0	0.0	210.0	845.0	845.0	...
Luxembourg	0.0	0.0	0.0	109.0	363.0	115.0	797.0	341.0	...
Developing countries and regions									
Africa									
South Africa	0.0	143.0	154.0	0.0	176.0	331.0	609.0	698.0	...
Asia									
Hong Kong SAR	0.0	271.0	230.0	837.0	320.0	1,206.0	3,278.0	3,568.0	...
Indonesia	586.0	117.0	119.0	299.0	1,359.0	1,112.0	1,215.0	462.0	-21.2
Korea	40.0	200.0	150.0	328.0	1,168.0	1,310.0	1,051.0	630.0	1,475.0
Malaysia	0.0	0.0	385.0	0.0	0.0	1,294.0	155.0	314.0	...
Philippines	40.0	77.0	333.0	126.0	947.0	886.0	489.0	265.0	562.5
Singapore	152.0	184.0	283.0	564.0	301.0	475.0	344.0	702.0	361.8
Thailand	83.0	91.0	4.0	725.0	759.0	531.0	151.0	28.0	-66.3
Europe									
Czech Republic	0.0	0.0	0.0	0.0	10.0	32.0	104.0	0.0	...
Hungary	52.0	81.0	21.0	8.0	200.0	274.0	227.0	1,589.0	2,955.8
Poland	0.0	0.0	0.0	0.0	0.0	70.0	17.0	695.0	...
Turkey	46.0	0.0	0.0	178.0	375.0	52.0	12.0	368.0	700.0
Latin America									
Argentina	0.0	360.0	392.0	2,655.0	735.0	0.0	217.0	1,627.0	...
Brazil	0.0	0.0	133.0	0.0	1,028.0	296.0	387.0	2,251.0	...
Chile	98.0	0.0	129.0	288.0	799.0	224.0	297.0	563.0	474.5
Mexico	0.0	3,531.0	3,077.0	2,913.0	1,679.0	0.0	668.0	550.0	...
Venezuela	0.0	0.0	146.0	42.0	0.0	0.0	904.0	95.0	...
Middle East									
Israel	0.0	506.0	281.0	336.0	89.0	222.0	544.0	538.0	...

Source: Capital Data Bondware.

that trading in the global foreign exchange market has far outpaced growth in international trade in goods and services. Since 1986, daily nominal foreign exchange turnover has risen sixfold (Table A5.13). World exports of goods and services in 1995 totaled about \$6.1 trillion, compared with almost \$1.2 trillion in *daily* foreign exchange market turnover. Put on the same basis, daily turnover in foreign exchange markets was on the order of 50 times exports of goods and services, almost three times what it was a decade earlier. Foreign exchange trading growth rates of these magnitudes, net of the growth rate in trade in goods and services, is clear indicator of the globalization of financial markets.

Finally, the integration and globalization of capital markets has been reinforced by the yield-seeking behavior of investors across national borders, most apparent by the cross-border arbitrage of differences

in yields on investments with similar risks. Onshore/offshore interest differentials have declined markedly since the 1970s, and are now negligible for most advanced economies. Similarly, covered interest parity holds more tightly across most advanced economies than in the early 1980s.¹⁶ Indeed, a sophisticated and significant segment of the financial industry in the major international financial centers is singly concerned with arbitrage often minute mispricing of financial assets around the globe.

In summary, by many measures national financial markets have become increasingly integrated into a single global financial system. The magnitudes of cross-border transactions in securities, foreign exchange turnover, and financing volumes make inter-

¹⁶See International Monetary Fund (1997).

Table A5.11. Outstanding International Debt Securities by Nationality of Issuer for Selected Industrial and Developing Countries and Regions*(In billions of U.S. dollars)*

	1993	1994	1995	1996	1997	March 1998
All countries	2,027.7	2,401.2	2,722.5	3,154.1	3,542.2	3,691.4
Industrial countries						
United States	175.7	203.9	264.2	389.6	555.4	602.9
Japan	336.8	351.6	351.4	342.0	319.7	309.4
Germany	119.4	184.8	261.3	337.6	392.2	419.2
France	153.0	184.8	205.0	214.7	220.0	229.6
Italy	69.9	84.6	92.0	94.7	97.4	99.2
United Kingdom	186.5	211.4	224.6	272.0	307.0	327.2
Canada	146.7	163.9	174.8	180.4	184.8	190.1
Netherlands	52.6	79.1	101.2	119.0	140.4	149.9
Sweden	74.2	97.2	104.1	107.4	101.7	96.4
Switzerland	18.1	23.9	33.3	42.5	65.4	67.3
Belgium	28.0	34.1	44.7	51.8	52.5	51.4
Luxembourg	2.0	3.3	6.6	11.5	13.8	14.0
Developing countries and regions						
Africa						
South Africa	1.1	2.5	3.7	4.3	4.5	4.8
Asia						
Hong Kong SAR	7.5	13.7	15.4	26.1	33.2	34.2
Indonesia	2.3	4.2	4.3	10.2	16.0	15.7
Korea	15.2	19.6	27.5	43.9	51.5	50.2
Malaysia	4.7	4.2	5.7	10.1	13.2	12.7
Philippines	1.3	2.3	3.1	7.1	10.3	10.3
Singapore	0.8	0.9	1.0	3.0	4.5	4.4
Thailand	3.3	6.0	7.4	12.5	14.4	14.0
Europe						
Czech Republic	0.0	0.0	0.0	0.0	...	...
Hungary	10.3	13.8	15.9	13.5	11.5	10.9
Poland	0.0	0.0	0.3	0.6	2.3	2.2
Latin America						
Argentina	8.5	13.8	19.4	29.8	41.6	44.6
Brazil	10.0	12.9	17.1	28.9	38.6	41.9
Chile	0.8	0.8	0.8	3.1	4.8	4.8
Mexico	22.9	29.9	29.7	42.0	50.3	51.3
Venezuela	4.3	4.1	3.6	3.4	8.5	8.5
Middle East						
Israel	1.5	1.2	1.3	2.1	3.4	3.4

Source: Bank for International Settlements.

national trade in goods and services appear small in comparison. The integration process has advanced considerably over the past two decades, and especially so in the 1990s, but there is further room. Banks and other financial institutions have only recently begun to adjust to the new reality of a developing global financial market, and investment portfolios are not anywhere near most benchmarks of optimal international diversification. For instance, a well-known rule of thumb from modern portfolio theory is that an optimally diversified portfolio should have country weights corresponding to the ratio of a country's market capitalization to world market capitalization.¹⁷ The U.S. stock market represents about 42 percent of

the world stock market, Japan 15 percent, the United Kingdom 9 percent, other industrial countries 23 percent, and emerging markets 11 percent.¹⁸ As the average for institutional investors in the industrial countries currently is somewhere around 20 percent of assets invested abroad, it is apparent that there could be a good deal more cross-border capital flows in the years ahead. The elimination of national currencies in the EU when the euro is introduced in 1999 is an event that might significantly accelerate this process.

Exchange Trading Links

One way in which global markets are becoming more integrated is that exchanges are linking up across

¹⁷In theory, these country weights should be based on all assets (stocks, bonds, real estate, and so on). A common simplification is to use stock market capitalization.

¹⁸Data for 1996 from International Finance Corporation (1997).

Table A5.12. Nonresidents' Holdings of Public Debt¹*(In percent of total public debt)*

	United States	Japan	Germany	Italy	United Kingdom	Canada	Belgium
1983	14.9	...	14.1	...	...	10.7	13.2
1984	15.4	...	14.6	...	7.2	11.3	14.6
1985	15.2	3.7	16.3	...	7.0	12.4	13.9
1986	16.1	3.3	20.1	...	8.0	16.1	14.7
1987	16.6	3.3	21.2	...	10.7	15.5	15.5
1988	18.4	2.0	20.7	...	12.2	15.7	17.5
1989	20.8	3.0	22.1	...	13.7	16.3	19.2
1990	20.1	4.4	20.9	4.4	14.7	17.4	19.3
1991	20.1	5.8	23.1	5.2	15.2	19.0	22.7
1992	20.4	5.5	25.6	6.2	17.6	20.2	21.5
1993	22.2	5.4	32.8	10.1	19.6	21.8	23.3
1994	22.8	5.9	25.9	12.2	20.7	22.6	21.4
1995	28.3	4.3	28.2	13.2	18.8	23.3	21.5
1996	35.0	4.3	29.3	15.9	...	23.8	20.8
1997	40.1	...	...	...	...	23.1	21.9

Sources: Bank for International Settlements, and Bisignano.

¹End-of-year data; definitions vary across countries.

borders. The motivation is economic: cost cutting and the introduction of incentives such as lower trading fees and longer trading hours. With the increasing use of technology, trades can be executed more cheaply, and the accompanying lower fees have spurred competition among the exchanges. Estimates suggest that a doubling of volume reduces the trading cost for each contract by about 25 percent: economies of scale make getting bigger, better.

The first overseas joint venture linked SIMEX and the Chicago Mercantile Exchange (CME) in September 1984, in which the popular Eurodollar contract was traded in two major time zones with cross margining, allowing the opening and closing of positions in either location. Now such linkages are common. The grandest scheme, announced in the run-up to the EMU, is the planned development of a European-wide exchange, to be called Eurex. So far, the DTB (the German derivatives exchange) and Soffex (the Swiss options and futures exchange) have formed the axis of the new exchange. A memorandum of understanding

with the *Marché à Terme International de France* (MATIF, the French futures exchange), SBF-Paris Bourse (the French stock exchange), and Monep (the French options exchange) will serve as a basis for a contractual agreement to be signed in the coming months in the formation of the EURO Alliance. A trading alliance between Eurex and the Chicago Board of Trade (CBOT, a U.S. futures exchange) has already been agreed upon.

Exchanges are also attempting to expand participation in their markets by relaxing their membership criteria to include offsite members. A switch from floor trading to screen-based trading opens the door to remote membership and broader participation, since floor trading essentially requires onsite membership. Broader membership means access to more capital and less risk for the clearinghouse, and, usually, increased volume. Some exchanges are attempting to marry floor trading with electronic trading by allowing some of each. MATIF, for example, plans to introduce parallel trading—screen and open outcry—

Table A5.13. Foreign Exchange Trading

	1986	1989	1992	1995
Global estimated turnover ¹ (In billions of U.S. dollars)	188	590	820	1,190
As a percent of				
World exports of goods and services	7.4	15.8	17.4	19.1
Total reserves minus gold (all countries)	36.7	75.9	86.0	84.3

Sources: Bank for International Settlements; and International Monetary Fund (1997).

Note: Figures are based on surveys of activities in the three largest centers for foreign exchange trading (London, New York, and Tokyo) in 1986, foreign exchange markets in 21 countries in 1989, and in 26 countries in 1992 and 1995. The London, New York, and Tokyo markets together accounted for 57 percent of global turnover in 1989, 54 percent in 1992, and 56 percent in 1995.

¹Daily average turnover, on spot, outright forward, and foreign exchange swap transactions, adjusted for local and cross-border double counting and for estimated gaps in reporting.

which will aim to offer French, German, and Swiss products on a single electronic trading platform. The DTB will be helped by its new electronic software that will enable traders to put on more complicated trades simultaneously, such as butterfly options and other multiposition trades, which may be difficult to execute in a pit environment.

Similarities Between OTC and Exchange-Traded Markets Increase Market Integration

A consensus is emerging that the open outcry method used on exchange floors will disappear eventually. An unresolved question is whether exchange trading can remain competitive with the OTC markets. OTC trading has grown at a phenomenal pace, far outstripping the exchange-traded markets. Since OTC markets more easily accommodate global trading by the use of telephone, fax, telex, and other communications technologies that remain untied to a specific geographical location, globalization of financial markets has occurred predominantly through OTC markets. The largest markets—foreign exchange and government securities—are predominately traded OTC. Still, the process of globalization can be facilitated by some of the features of exchange trading.

OTC market participants as well as exchange members are attempting to alter their respective markets to take advantage of the attractive features of both types of trading. Exchange-traded markets provide liquidity, price transparency, and credit risk mutualization through the auspices of their clearinghouse framework. The OTC markets have adopted ways of mitigating the credit risk that clearinghouses so efficiently manage: use of netting and sophisticated collateral arrangements are now the norm in the OTC market. Additionally, several attempts are being made to create clearing and settlement facilities for OTC contracts, taking into account the idiosyncracies of the contract negotiated. The London Clearing House is planning to introduce a swaps clearinghouse. Exchanges are also introducing more tailored products to capture the advantages of OTC markets and those moving to electronic means of trading are able to distribute their screens geographically, mirroring the disbursed location of participants in the OTC market. And OTC markets now provide more price transparency on plain-vanilla-type instruments and other instruments whose attributes can be easily summarized.

Over time, the differences that separate OTC trading from exchange trading may slowly disappear as each market migrates closer to the other by choosing those aspects that add value to its participants. To some degree, this outcome is being driven by the joint interests that many of the core, global institutions have in these two trading mechanisms. Many clearing members of exchanges, for example, are also active OTC market participants. Moreover, this is a world-

wide phenomenon since many global institutions, with heavy emphasis on OTC trading, are members of exchanges in multiple jurisdictions.

The financial information business, which is dominated by four firms—Reuters Holdings, Bloomberg, Dow Jones Markets, and Bridge Information Services—is also facilitating globalization. The line between information provision and trading is becoming blurred in the race to provide globally accessible financial services. Reuters, for instance, is not only providing financial information but also has successfully devised entire trading systems. Both Instinet, an electronic trading system for primarily retail customers, and the R2000-2 system for the most sophisticated foreign exchange dealers, are examples of Reuters' success in providing real-time trading systems.

At the same time, the Internet is breeding a host of niche players with connections to financial institutions and investors. While it is unclear whether such players can realistically compete with the global information providers, companies specializing in certain types of information or in combining information with the ability to trade via an electronic brokerage unit are a growing industry in their own right. Even large financial institutions are using the Internet to conduct financial business connecting investors and borrowers without regard to geographic location. For example, Santander Investment and Dresdner Luxembourg launched the first Latin American syndicated loan via the Internet in January 1998.

New Markets and Products for Unbundling, Pricing, Trading, and Managing Risk

Financial instruments are bundles of risks. For example, a floating-rate loan in yen from a U.S. bank to a Japanese bank contains three major risks from the perspective of the U.S. bank: foreign exchange risk (one type of market risk); interest rate risk (another type of market risk); and the risk that the Japanese bank may default on its obligations in the loan contract (credit risk).¹⁹

A party to a financial arrangement may not want all the risks associated with that arrangement, or perhaps it may want to leverage certain risks. For example, the Japanese bank might want the loan denominated in yen, but the U.S. bank might want to avoid exposure to the yen/dollar exchange rate—perhaps to avoid a mismatch with currency exposures elsewhere on its books, or because it is discouraged from adding to its currency exposure by managers or regulators. Simi-

¹⁹There are other risks in financial instruments, such as liquidity, operational, legal, and settlement risks, particularly when the instrument is traded in a secondary market. These risks are less obvious than credit and market risks, but no less important.

larly, the U.S. bank might not want the credit or interest rate risk on its books.

Markets currently exist that enable either party to the arrangement to reconfigure the risks of the arrangement, independently of the other party. To unload the currency exposure, the U.S. bank could enter a swap that exchanges the yen payments for dollars at agreed exchange rates. To unload the interest rate exposure, the U.S. bank could enter an interest rate swap that exchanges payments at LIBOR for payments at a fixed rate of interest. And to unload the credit exposure, the U.S. bank could enter a credit-derivative transaction that transfers the risk of default to the counterparty of the transaction.²⁰ In fact, undertaking all three transactions could, in principle, turn the floating-rate yen-denominated loan into a riskless fixed-rate dollar-denominated security. Although the transfer of risks is most easily seen in swap-type arrangements, other derivatives (such as futures, forwards, and options) and even other securities with derivative-like components (such as convertible debt, warrants,²¹ and structured notes) are also used to unbundle and distribute risks.

Recent data that cover the major markets bear out the striking size and growth of the markets for these products. For example, in 1997, the notional principal of major exchange-traded futures and options came to \$12 trillion, more than two and a half times its level in 1992, and almost 17 times its level in 1987 (see Chapter IV, Table 4.6). In 1996, notional principal in major OTC markets (interest rate and currency swaps and interest rate options) came to \$25 trillion, almost 5 times its level in 1992, and almost 30 times its level in 1987 (see Chapter IV, Table 4.7). By comparison, in 1997, estimated world GDP was about \$30 trillion. More comprehensive surveys of global derivatives markets paint an even more striking picture of their size. According to a survey conducted by the BIS, at end-March 1995 financial institutions participating in the survey were involved in (after adjusting for double counting and including estimated gaps in reporting) about \$64 trillion, by notional principal, of OTC and exchange-traded derivatives contracts. To put this in perspective, the aggregate market value of all

bonds, equity, and bank assets in Japan, North America, and the 15 EU countries totaled \$68.4 trillion at end-1995, which is about 7 percent larger than the size of derivatives markets as measured by the above survey.

Recent Developments in Markets for Unbundling Risks

The globalization, rapid growth, and increasing sophistication of capital markets has increased the scope for products that can perform this unbundling. The degree of innovation in financial product development has been large. The objective in this section is not to catalogue all of the recent innovations, but rather to provide some perspective on the types and range of products that have recently entered the marketplace. Such risk-products cover a range of risks, from simple market risks, such as interest rates and currencies, to more unusual risks, such as weather-related catastrophes. They also run the gamut from simple to quite complex. Simple, plain-vanilla arrangements, such as interest-rate swaps, have a relatively long history, are well understood, and are fairly straightforward to price. By contrast, more exotic instruments, such as structured notes, are relatively new, less well understood, and can be technically challenging to price and hedge. The increasing complexity of financial products has resulted in increased emphasis on technical model-building for pricing and managing the risks of these products.

A number of products now enable insurance companies to augment the types of risks that they carry on their balance sheets. For instance, futures contracts based on indices covering property and casualty insurance began trading in 1995, allowing insurance companies and others to trade geographical concentrations of underwritten policies. Similarly, in the real estate market, new specialized instruments enable investors to trade different types of real estate risk, and the CBOT and CME plan to list real estate futures contracts in the near future. Finally, there have been recent considerations to base futures contracts on macroeconomic variables: several global banks and securities firms are currently experimenting with using macroeconomic variables, such as GDP or inflation, as the basis for derivative contracts or, even, as the basis for payments of bonds.

Among the new products devised to split risks and recombine them into new ones, credit derivatives are one of the fastest growing markets, and based on the size of the underlying credit markets, they may be set to become one of the largest segments of derivatives markets. U.S. Federal Reserve bank call reports show that the notional amount of credit derivatives held by insured commercial banks and foreign branches in the United States increased from \$41 billion in the first quarter of 1997 to \$97 billion by the final quar-

²⁰In addition to the credit risk traded in the derivative, OTC derivatives contracts themselves contain counterparty credit risk owing to the possibility that the counterparties to the contract fail to make agreed upon payments.

²¹A convertible is a corporate bond or preferred equity issued by the company which allows the holder to exchange the bond for equity in a fixed ratio anytime prior to maturity of the bond. Sometimes the numbers of shares to be exchanged for each bond is lowered over time to accommodate a generally rising stock price. A warrant is an option to buy the equity security at a fixed price prior to a specific expiration date. Warrants differ from regular options in that they are issued by the company and thus increase the number of shares outstanding when they are used. Often the warrants are attached to an issuance of equity and are not "separable" meaning that only current holders of equity can exercise them.

ter.²² Although there does not exist data on the size of the global credit derivatives market, estimates suggest it is in the neighborhood of \$150–200 billion. While the credit derivatives market may appear small relative to the interest rate swaps market, the notional principle of a credit derivatives contract may be a better measure of exposures than is the case for interest rate swaps.²³

The credit derivatives market is currently dominated by four principle types of products: credit default swaps, total rate of return (TROR) swaps, credit-linked notes, and credit spread options. All credit derivatives transfer (for a price) credit risk between two parties. Of the four principle types, TROR swaps and credit spread options are most common in the market for emerging market debt, constituting about half of the credit derivatives market. In contrast, credit default swaps and credit-linked notes are most commonly associated with the trading of bank loans. Not surprisingly, this segment of the market is the fastest growing. In addition to these four principle types of credit derivatives, structured products that contain credit derivatives as a component are becoming more common. The usefulness of these structured products is related to the trading of very specific types of risks; for example, a portion of the credit risk associated with default on a bridge loan. Newer structured deals are being applied to the lease and insurance markets, even in some equity deals, mixing and matching the types of risk that customers desire to trade.²⁴

Developments in Risk Management

A contributing factor to the increased interest in credit derivative products stems from advances in risk

²²Two motivations for banks' use of credit derivatives are (1) freeing up capital for further loan and bond origination and maintain client relationships, and (2) capital arbitrage. Banks can reduce their regulatory capital reserves by cash-collateralizing existing exposures that have low returns on regulatory capital. The arbitrage opportunity occurs because investors in these trades are not required to hold 8 percent capital against the securitized notes or derivatives they buy. Insurance companies, one of the largest users of credit derivatives, have risk-based capital guidelines, but they are far less than 8 percent against investment grade credit.

²³The true exposure of an interest rate swap is quite small because amounts being transferred depend on the difference between a fixed and floating interest rate, using the notional amount to calculate payments, and the notional amounts themselves are not swapped. However, payments being transferred between buyers and sellers of credit derivatives are likely to be much closer to the notional principle, since the value of the security in the case of a credit event will be much closer to its initial value than the difference in two interest rates. Thus, the seller's possible exposure can be fairly close to the notional principle designated in the derivative, implying the exposures being taken using credit derivatives may not be comparable to those in most other derivatives markets.

²⁴An interesting new credit derivative is inconvertibility options. These options insure investors against a currency becoming inconvertible: their payoff occurs when a central bank prevents a specified currency from being converted into another currency.

management. The ability to simulate the outcomes of credit risk, market risk, liquidity risk, and other types of exposures, and develop estimates of the covariances between the various types of positions a financial institution has, are essential in understanding the overall degree of risk to the institution. There has been considerable progress during the past three years or so in modeling market risk, and recent advances have applied that approach to credit risk, liquidity risk, and operational risk.

Market Risk

The ability to precisely measure and manage market risk (the risk of movements in prices) was the first area of risk management to develop and is now at a stage where further increases in sophistication are unlikely to lead to large changes in the way this risk is managed. The value-at-risk (VAR) methodology, an outgrowth of portfolio theory, was a natural first step to using improved data processing techniques to better measure statistically the probability of losses. Most of the current research is devoted to refinements of existing techniques and better stress testing, while the adoption of standard VAR models is now being undertaken by second- and third-tier banks and other financial and corporate institutions. The Asian crises served as a wake up call to many risk managers who found that their VAR models, since they were backward looking, were unable to predict the true extent of possible losses on their portfolios. Even those models that were built to be more sensitive to recent events failed to account for the correlation between market risk and credit risk. This has led to even greater emphasis on better stress testing and scenario analysis whereby several unlikely configurations of events is considered to evaluate the risks associated with the institution's exposures. In addition, the most advanced risk managers are considering ways of integrating market risk models and credit risk models in ways that can better identify the overall risk of the institution, a movement that was in train prior to the Asian crises, but that is now considered vital.

Credit Risk

Credit risk management is now the focal point for many of the large financial institutions. Credit risk refers to the potential nonpayment of a counterparty to another (counterparty default risk), often associated with inability of the counterparty to make an owed payment. For a bank, credit risk is typically the largest business risk. Ironically, it is also the risk that has, until recently, received the least analytical attention. This situation has improved with the advent of credit derivatives and the realization that better credit risk management can lead directly to an improved bottom line. There are now a number of systems and data

bases available to help piece together credit risk profiles and provide aids to managing large credit portfolios.

The two credit-risk systems receiving the most attention are J.P. Morgan's CreditMetrics and Credit Suisse Financial Products (CSFP) CreditRisk+. Most observers have noted that while the goals of the two products are identical—to evaluate the loss distribution of a portfolio of credit exposures and the capital necessary to support the exposures—they use different methodologies. CreditMetrics follows the method used for RiskMetrics, in which the probabilistic behavior of individual assets is analyzed and then the correlations among the individual assets is used to generate a loss distribution for the portfolio as a whole. CreditRisk+ examines the average default rate associated with each rating or score in a credit rating scheme and the volatilities of the default rates. When added to the exposures these elements produce a loss distribution and an estimated capital allowance.

A problem faced by both systems, and by all those looking to analyze credit risk, has been the lack of data. Actual defaults on securities, in general, are rare and frequently defaults on loans are unreported. Thus, bond defaults, rather than loans, along with data on ratings changes underlie the popular models. More recently, plans to collect proprietary data on loans have been implemented. For instance, the Loan Pricing Corporation (LPC) in New York has accumulated ratings changes and default histories for 20,000 performing loans and 1,400 defaulted loans, drawing from some 30 banks and publicly available information. KPMG, a consulting firm, has entered the credit risk area by providing a product to help with loan valuation called the Loan Analysis System (LAS). This is an attempt to follow the loan from “cradle to grave” to determine how the structure and embedded options (for example, prepayment options) of the loan influenced its price. Others, such as KMV, a San Francisco-based consulting firm, examine the probability of default as related to the firm's equity value, which can be modeled as a call option on the firm's value.²⁵ These techniques demonstrate not only that credit risk can be dissected, but that there are multiple ways of doing so.

The end-game for those purchasing or developing in-house models to analyze credit risk is twofold: (1) better, and more standardized, methods for analyzing and managing credit risk; and (2) lower credit risk capital requirements with the use of an internal model, or at least capital requirements more closely tied to demonstrable credit risk. Most believe that there need to be a number of models being used in the market be-

fore one can be chosen as a market standard: the methodologies are not yet well enough developed to assess their accuracy. Moreover, as with VAR models for market risk, each firm is likely to customize their own model to fit their business needs and portfolio characteristics. The key will be to have enough standardization that certain principles or qualitative features of the models will be deemed essential to these types of models, allowing regulators to attain a degree of conformity of regulatory capital across similar institutions.

Liquidity Risk

Recent turmoil in emerging markets has illustrated that VAR models do not adequately account for liquidity risk. Liquidity risk has been defined as the risk that the holder of a financial instrument may not be able to sell or transfer that instrument quickly and at a reasonable price. Liquidity risk includes the risk that a firm will not be able to unwind or hedge a position.²⁶

Several initiatives are currently under way to examine and more rigorously capture liquidity risk. One approach²⁷ incorporates three potential losses due to liquidation: (1) a “liquidity discount,” that is, the amount by which the price of a security is decreased when large sales are required; (2) the volatility of the liquidity discount; and (3) the volatility of the time horizon to liquidation. These elements can be built into a VAR model to result in a “liquidity-adjusted VAR” model. Another approach²⁸ begins with the observation that hedging risks may require firms to pay out margin on one side of a hedge when no cash flows are being received on the other. Firms typically do not have unlimited funds from which to make these payments and thus limitations on the hedgeable quantities should take account of the firm's ability to meet margin payments. Thus, the “liquidity-at-risk” concept is developed as the maximum of the cumulative margin calls requiring cash payments during a relevant time horizon.

Operational Risk

Many of the recent losses experienced by some financial institutions have been the result of operational malfunctions. “Operational risk is the risk that improper operation of trade processing or management systems will result in financial loss. Operational risk encompasses the risk of loss due to the breakdown in controls within the firm including, but not limited to, unidentified limit excesses, unauthorized trading, fraud in trading or in back office functions including

²⁵ When the firm's value falls below its obligations (debt) the firm defaults. Thus, the strike price for the call is the value of the debt and the volatility of the firm's business risks can be used in an options pricing framework to calculate the probability of default.

²⁶From International Organization of Securities Commissions (1998).

²⁷See Jarrow and Subramanian (1997), pp. 170–73.

²⁸See Singer (1997), pp. 86–87.

inadequate books and records and a lack of basic internal accounting controls, inexperienced personnel, and unstable and easily accessed computer systems.”²⁹ A firm with high operational risk may be viewed as a high credit risk, since the probability of a default may rise when operational systems are inadequate, linking operational risk with credit risk.

Recent reports by the Basle Committee on Banking Supervision (1998), and the International Organization of Securities Commissions (IOSCO) (1998), have stressed the importance of operational controls. For instance, in the IOSCO discussion paper it is noted that “the lack of an adequate control environment and ‘control consciousness’ on the part of a firm’s governing body and senior management has been at the root of such recent losses at Barings, Daiwa, Kidder Peabody, and NatWest.” Some of the problems experienced in these firms were the result of improper separation between the front- and back-office functions and inadequate record-keeping as well as a general lack of separation of trading and support functions. IOSCO recommends the control of operational risk “through proper management procedures including adequate books and records and basic internal accounting controls, a strong internal audit function which is independent of the trading and revenue side of the business, clear limits on personnel, and risk management and control policies.”

Some financial institutions are now evaluating how to better account for operational risk in their internal allocations of capital and many are expecting to expend considerable resources in managing operational risk in the future. A Coopers and Lybrand/Louis Harris study of top management at 80 of the world’s largest capital markets participants found that almost all (98 percent) of sell-side firms surveyed expect to make significant investments in risk management and other enterprise control systems over the next five years.

Settlement Risk

Discussions of risk management seldom isolate settlement risks, but globalization puts increasing strain on settlement systems, particularly foreign exchange settlement systems. Settlement risk is the risk of non-payment through a settlement system and, depending on the source of the risk, is related to both credit risk and operational risk. For instance, nonpayment may arise because of the counterparties’ inability to pay (a credit problem) or due to technical difficulties (an operational problem). As the largest market requiring ongoing use of national payments systems, foreign exchange settlements represent the area comprising the

greatest systemic risk from settlement difficulties. A number of recent studies, including the 1996 report issued by the Committee on Payment and Settlement Systems (1996), have pressed the private sector to reduce foreign exchange settlement risks.

Aside from beginning to measure and monitor the settlement exposures involved, some private sector institutions are developing new methods of reducing the foreign exchange settlement risks. Chase Manhattan has offered for consideration a new product, entitled “contracts for differences,” that would avoid the need to deliver spot foreign currency by creating a spot deal that pays the difference between the original spot deal and a valuation index (consisting of a combination of a spot rate adjusted for overnight interest rates, a TOM outright rate³⁰). The product is in a trial phase and if there is continued interest in the product it will be introduced in the fall. Given that delivery in this contract is the difference between two rates, the “contract for differences” is suited for foreign exchange counterparties who do not have the need to receive or pay actual currency.

Another avenue is being considered for transactions in which at least one of the parties must obtain foreign currency. In 1996, the Group of Twenty, originally consisting of 17 large banks active in foreign exchange markets, formulated a plan to set up a clearing bank that would work on a principle dubbed “continuously linked clearing” that is expected to substantially reduce settlement risks by simultaneously settling the two legs of the transaction. The new firm, CLS Services, Ltd., has obtained an agreement from the two largest multilateral netting facilities, ECHO and Multinet, that transactions flowing through their systems would be settled through the CLS bank. The bank still needs the approval of U.S. regulatory bodies before it can begin functioning.

Another area prone to settlement difficulties is securities settlement. The increased use of delivery-versus-payment systems are helping to reduce securities settlement risks. In addition, the risk of a large participant defaulting can be partially mitigated by the establishment of a clearinghouse. For instance, the Emerging Market Clearing Corp. (EMCC), is being set up within the United States to mitigate these risks. Prior to the development of the EMCC, one bank dominated the clearing and settlement of the Brady market, possibly creating a situation in which its failure, or a failure of one of the interdealer brokers who dominate trading, could spread a problem throughout the system. Initially it will handle clearing and settlement of Brady bonds, but intends to expand to include sovereign Eurobonds and other emerging market debt instruments. The EMCC will process the trades, guarantee them, provide risk management services, and

²⁹See International Organization of Securities Commissions (1998).

³⁰TOM refers to tomorrow.

send settlement instructions to Euroclear and Cedel Bank.

In sum, accompanying the unbundling process has been an increase in the sophistication of private risk management systems covering a number of areas. Overall, the developments in risk management systems examining market risk have improved greatly and are being distributed beyond the institutions located in the advanced countries. These systems can be used to diversify and control consolidated market risks globally. However, private risk management systems, even in the most sophisticated of global players, still lack a robust methodology of connecting market risk with credit risk and still have difficulty quantifying and managing operational risks. Globalization has made these elements of risk management ever more important. When credit extension accompanies new, nontraditional instruments (counterparty risks of derivatives, particularly credit derivatives, collateralized loan obligations, and so on), the connections between credit and market risk are important for managing a global portfolio. Further, when the complexity of global institutions increases dramatically, monitoring and insuring against operational risks and settlement risks become critical for institutions to maintain their reputational capital and their functioning as an ongoing concern. Thus, while globalization has permitted a steady increase in the degree of diversification through better risk management systems, potentially lowering private risks and systemic risks, it has also added new dimensions, and new connections, to old risks that need careful attention by private risk managers.

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