



Annex II

Developments and Trends in the Mature Capital Markets

During the period under review, prices and volumes in the mature international capital markets responded favorably to low or declining inflation rates, efforts toward fiscal consolidation, continued strong growth in the United States and the United Kingdom, and the expected strengthening of economic activity in most other countries. An improved macroeconomic environment—along with ample liquidity—also curtailed volatility in the major markets. Equity prices in most advanced countries surged as corporate earnings forecasts were progressively marked up. Large yield spreads among the three largest economies—favoring dollar-denominated securities—attracted unprecedented capital inflows to U.S. securities markets, which were a key factor behind the dollar's sharp rise against the yen and deutsche mark during the past two years. The first section of this annex discusses developments since early 1996 in foreign exchange markets. The second and third sections summarize recent developments in bond and syndicated loan markets, respectively, and the next section reviews developments in international equity markets. The fifth section reviews developments in global derivative markets, and the final section discusses supervisory and regulatory developments.

Exchange Rates

Overview

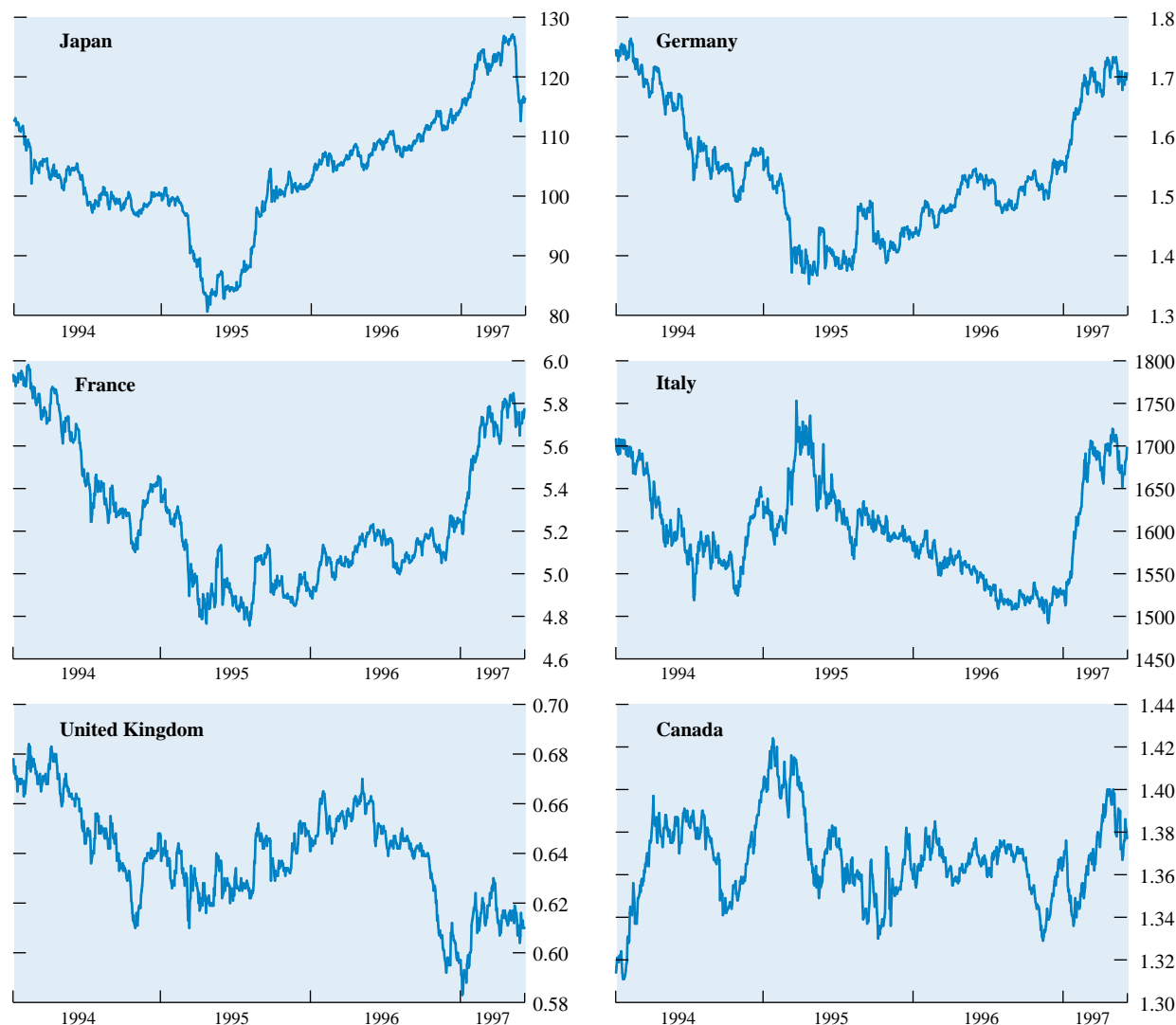
The dollar appreciated sharply against the deutsche mark and yen in 1996 and through May 1997, in large part because of record-high capital inflows into U.S. securities markets and the relatively strong performance of the U.S. economy vis-à-vis Europe and Japan. From its all-time low of ¥80 and DM1.35 in the spring of 1995, the dollar rose fairly steadily over the subsequent two years, peaking in May 1997 at a level that amounted to a cumulative appreciation of about 60 percent against the Japanese yen and about 30 percent against the deutsche mark (Figure 32). The dollar has since reversed some of its gains against the yen in anticipation of higher Japanese interest rates as well as concerns that the Japanese monetary authorities might sell some of their dollar reserves, though it remains more than 40 percent above its low in early 1995.

In percentage terms, the movement in the dollar–deutsche mark rate over the past two years has been large but not unprecedented over similar time frames during the past two decades. By comparison, the movement in the dollar–yen rate from the spring of 1995 to its peak in May 1997 was one of the largest moves ever for this exchange rate. The dollar's depreciation from ¥260 at the end of February 1985 to below ¥122 in November 1988 was the same order of magnitude in percentage terms as the recent experience (although opposite in sign), but it occurred over a longer period of time. The 42 percent depreciation of the dollar from October 1978 through February 1980 is perhaps the only instance in the postwar period that rivals the magnitude and speed of the recent change in the dollar–yen rate.

The dollar's appreciation in 1995–97 occurred against the backdrop of relatively high yields on dollar assets. With interest rates low in Japan and core Europe, investors' search for higher yields produced large capital inflows not only into the U.S. markets but into higher-yielding markets globally. As a result, traditionally higher-yielding currencies—in Europe and in the dollar bloc—were supported by capital inflows, as well as improved macroeconomic fundamentals. Within Europe, lower inflation, efforts toward fiscal consolidation, and renewed optimism about European Economic and Monetary Union (EMU) were instrumental in the appreciation of most EU countries' currencies against the deutsche mark after early 1996 (Figure 33). Despite improved exchange rate fundamentals in Europe and in the dollar-bloc countries, however, record-high capital inflows to dollar markets prevented most currencies—the notable exception being the pound sterling—from strengthening appreciably against the U.S. dollar.

Interest Differentials, Capital Flows, and the Dollar's Rise

Market participants in the major financial centers attribute much of the dollar's momentum to abundant liquidity in international financial markets that has disproportionately been funneled into the dollar markets, especially dollar-denominated fixed-income markets. This concept of liquidity in international financial markets refers to both looser monetary policies in some

Figure 32. Major Industrial Countries: Exchange Rates, January 1994–May 1997*(Local currency/U.S. dollar)*

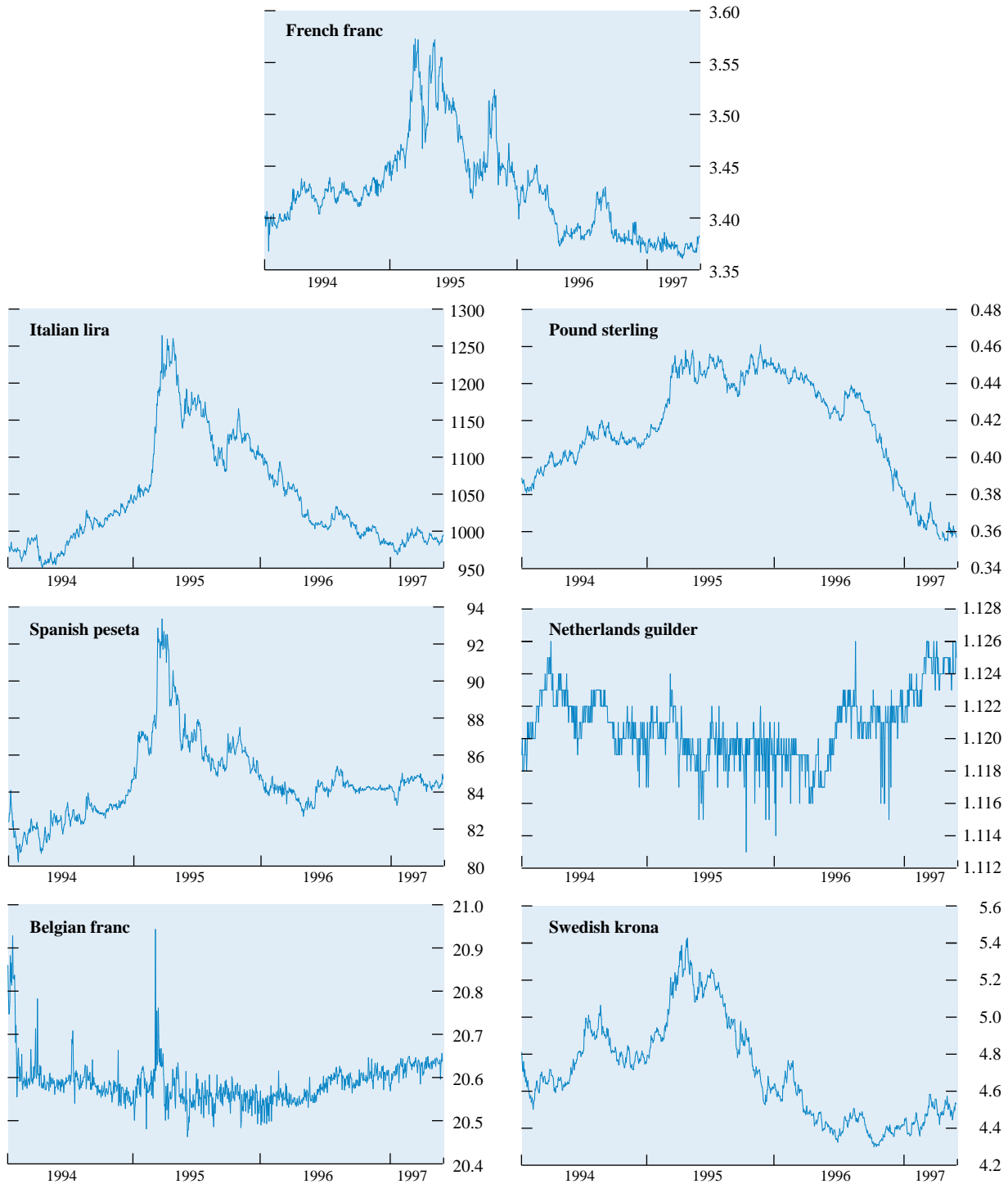
Source: Bloomberg Financial Markets L.P.

countries as well as simply large flows of capital internationally. Monetary stimulus in the major industrial countries has on balance shifted toward an easier stance since early 1996, with slightly tighter monetary conditions in the United States and the United Kingdom partially offsetting the monetary stimulus from Europe, Japan, and Canada (Figure 34). In addition, growth in firms' demand for bank financing in some of the major countries has been low in relation to monetary growth rates, and thus monetary easing may have significantly affected liquidity (see Figure 34).

The difference in cyclical positions and in the stances of monetary policies—which reflect the dif-

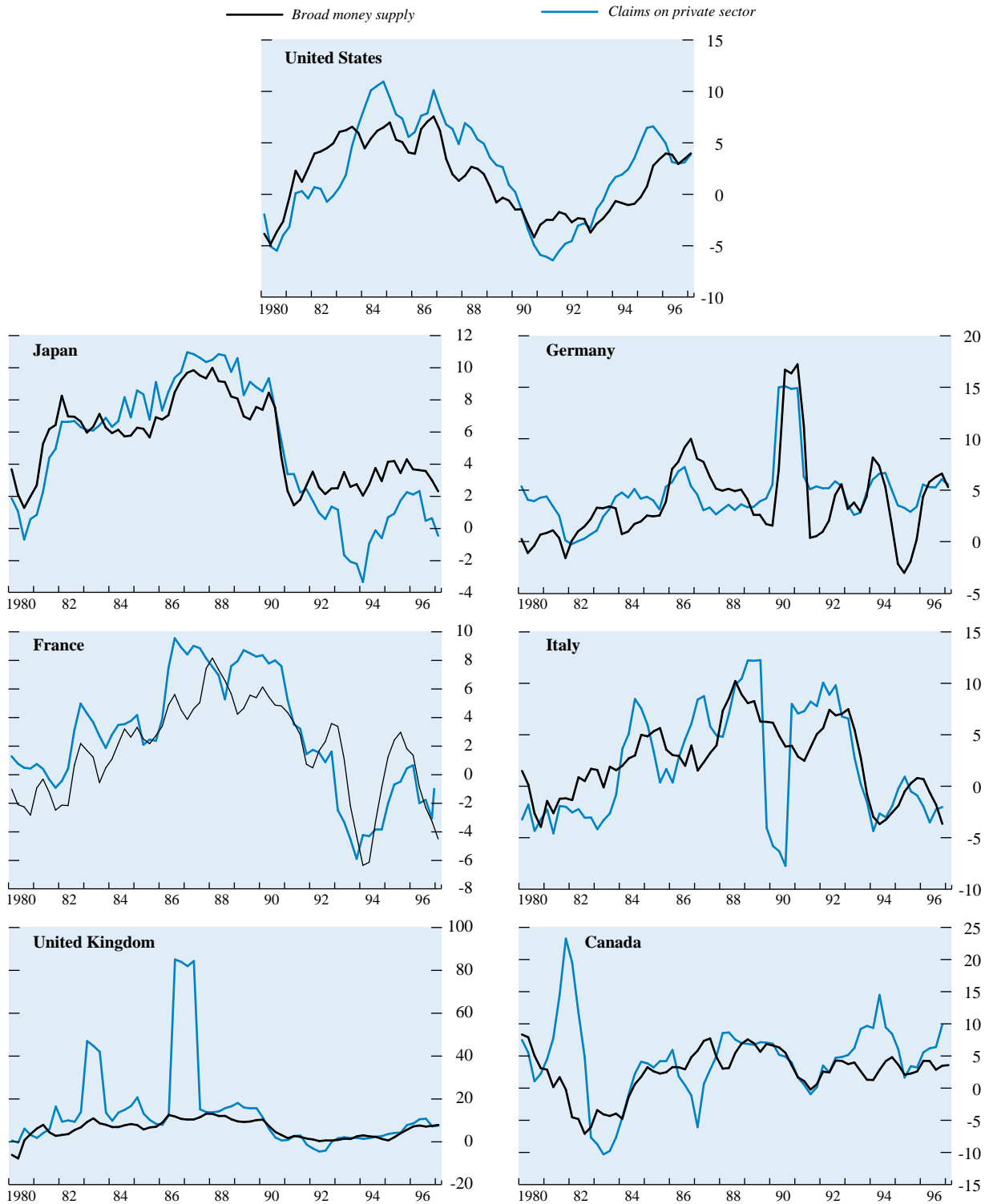
ference in cyclical conditions—among the major countries have created large interest differentials between countries. Of particular significance are the higher interest rates in the United States versus the two next-largest economies, Japan and Germany (Figures 35–37; see also Figure 2). The interest differential between yen- and dollar-denominated fixed-income securities has been especially large during the period under review. At the short end of the yield curve, the differential between three-month yen and dollar rates has been more than 4.5 percentage points since January 1996, and in May 1997 exceeded 5 percentage points. At the long end of the yield curve, the

Figure 33. Major European Countries: Local Currency vs. Deutsche Mark, January 1994–May 1997



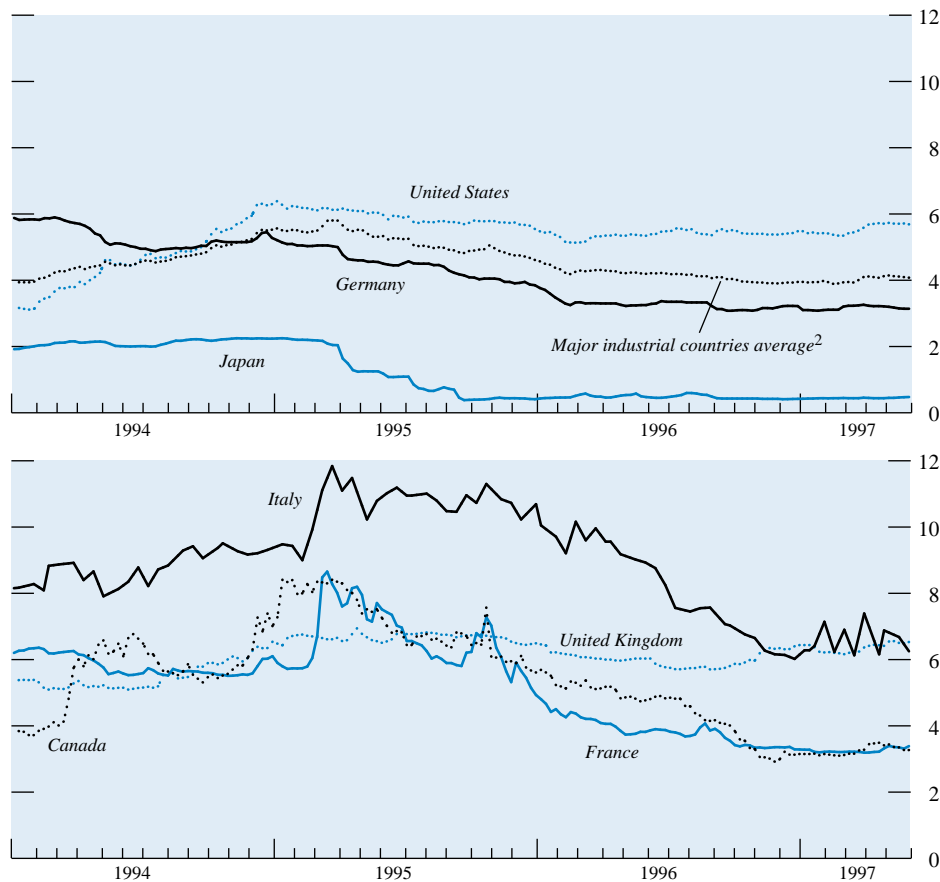
Source: Bloomberg Financial Markets L.P.

Figure 34. Major Industrial Countries: Real Growth in Broad Money Supply and Claims on Private Sector¹
 (In percent from four quarters earlier)



Sources: International Monetary Fund, *International Financial Statistics* database; and The WEFA Group.
¹M3 for broad money supply for all countries except the United Kingdom, for which M4 is used. Claims on private sector are taken from International Monetary Fund, *International Financial Statistics* (line 32d). Data for 1980: Q1 through 1997: Q1.

Figure 35. Major Industrial Countries: Short-Term Interest Rates¹
(In percent a year)



¹Three-month certificate of deposit rates for the United States and Japan; three-month treasury bill rate for Italy; rate on three-month prime corporate paper for Canada; and three-month interbank deposit rates for other countries. Weekly averages of daily observations are plotted for all countries other than Italy and Canada. For Italy, results of fortnightly treasury bill auctions are shown. For Canada, weekly observations are plotted.

²1987 GDP weights.

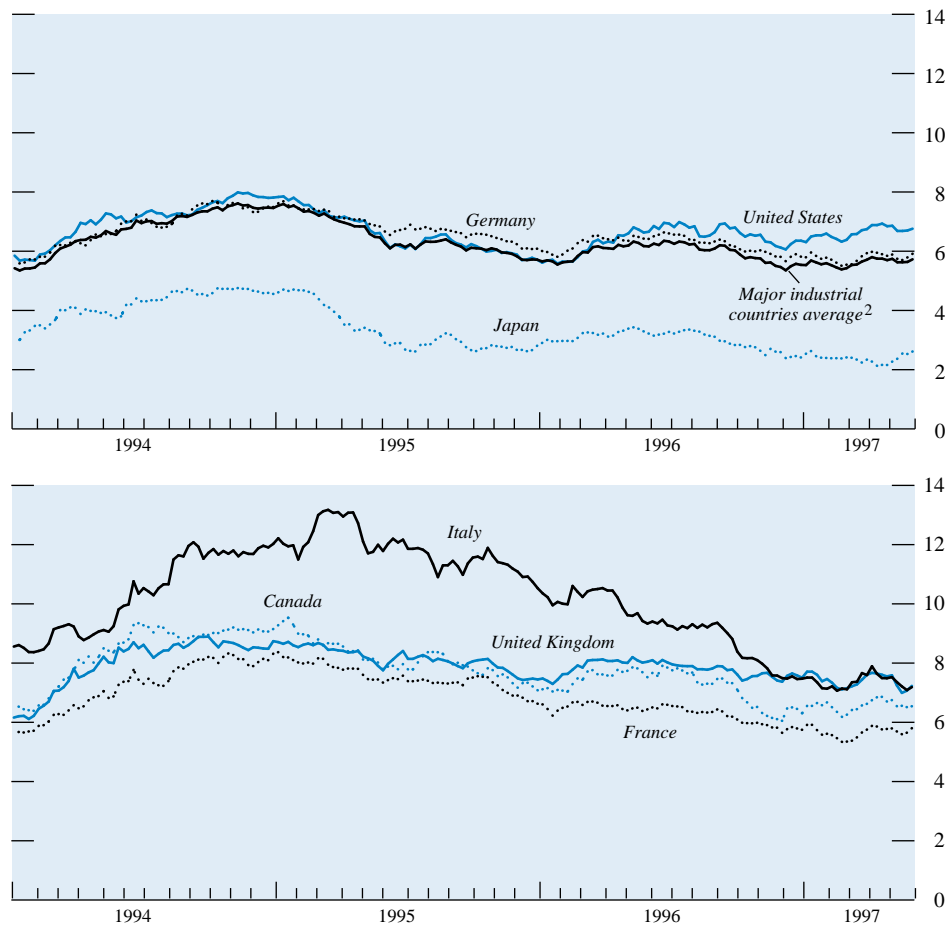
spread on long-term yen and dollar government bonds rose steadily from early 1996, and in May 1997 stood at more than 4 percentage points. The spread between deutsche mark and dollar yields has increased steadily since early 1996, reaching about 2.5 percentage points in May 1997 for short-term rates and about 1 percentage point for long-term rates.

The relatively attractive yields on dollar investments encouraged Japanese and European investors to increase the weight of dollar bonds in their portfolios. This is reflected most clearly by survey data on currency exposures of investors: since early 1995, investors have clearly tilted their portfolios in favor of assets denominated in dollars, pounds sterling, and other high-yielding currencies (Statistical Appendix Table A1). The appreciation of many of the higher-

yielding EU countries' currencies, as well as currencies in the dollar bloc (Canada, Australia, New Zealand), against the deutsche mark and yen, is consistent with yield-seeking international capital flows. Further, the attractiveness of the relatively higher yields in the United States (and elsewhere) has been compounded by uncertainties about investing in core Europe and Japan, which might have caused risk-adjusted interest differentials to be even larger. Specifically, uncertainty about financial system problems in Japan and uncertainty about the future value of the euro—which has been highlighted by renewed optimism about EMU—might have further increased the relative attractiveness of dollar-denominated investments.

The available data on capital flows strongly suggest that investors have been seeking higher yields by in-

Figure 36. Major Industrial Countries: Long-Term Interest Rates¹
(In percent a year)



¹Yields on government bonds with residual maturities of 10 years or nearest. Weekly averages of daily observations.

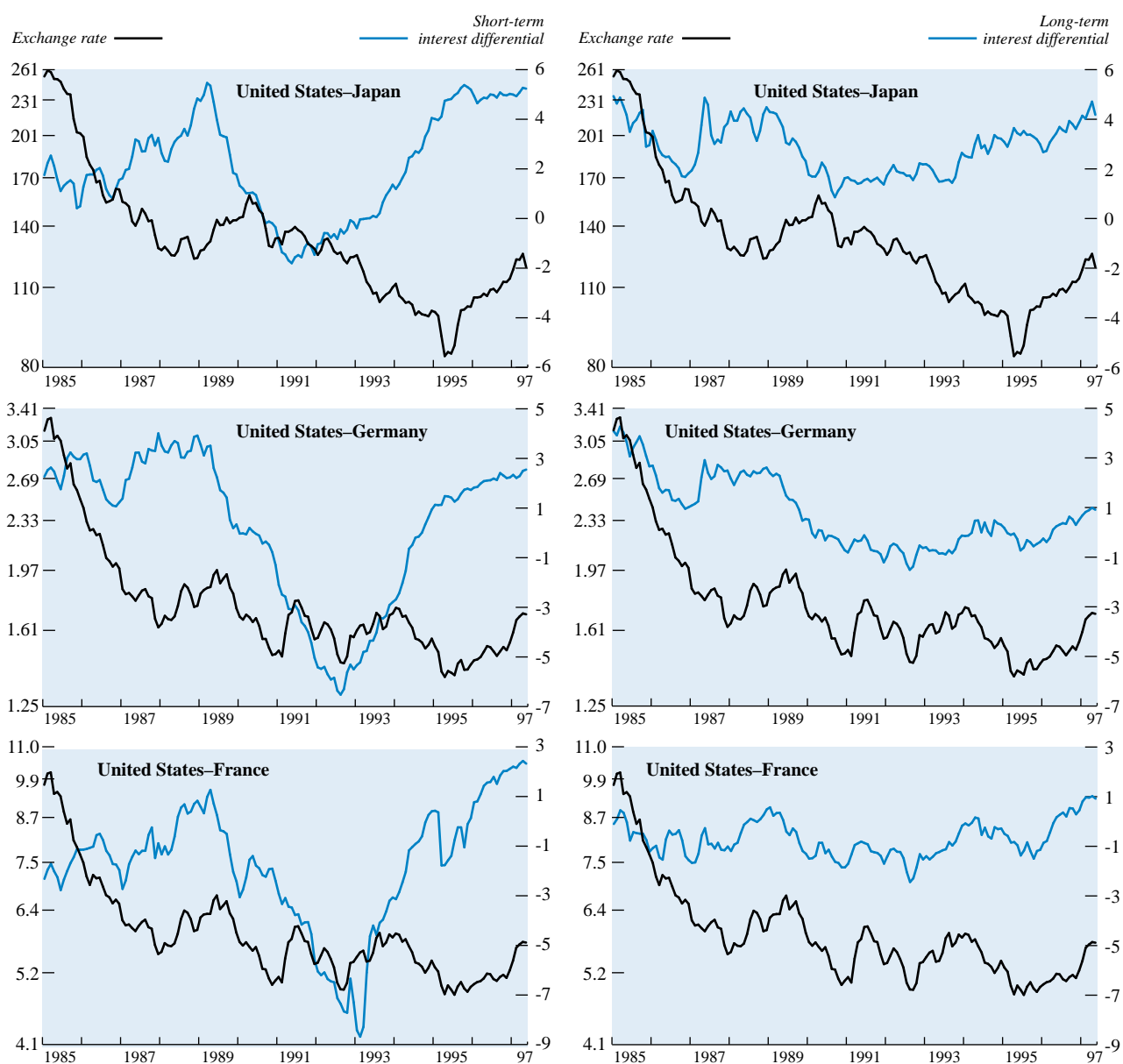
²1987 GDP weights.

vesting abroad. Outward portfolio flows during the past 18 months have been associated with aggressive buying of foreign securities by U.S., Japanese, French, Spanish, and German investors, as well as positions booked in the major international financial centers outside the United States—the United Kingdom, Singapore, and Hong Kong, China (Statistical Appendix Tables A2–A3). As for the recipients of these capital flows, the United States has clearly been a major target of non-U.S.-based investors. Foreign purchases of U.S. treasury and government agency bonds and notes reached \$293.7 billion in 1996, and there was a further \$78 billion of foreign purchases of U.S. corporate bonds. Similarly strong capital inflows to U.S. securities markets have been apparent in the first quarter of 1997: foreign purchases of government and corporate

bonds during the first quarter of 1997 were slightly above the quarterly average during 1996. In comparison, despite the sharp increase in U.S. equity prices in recent years, there were only \$13.2 billion of foreign inflows into the U.S. equity market in 1996.

As noted in Chapter II of the report, particularly wide interest differentials between the United States and Japan, in conjunction with the belief that the Bank of Japan did not want the yen to strengthen in 1996–97, were viewed by some large global hedge funds as a potentially lucrative situation. These so-called yen-carry trades involved borrowing in yen, selling the yen for dollars, and investing the proceeds in relatively high-yielding U.S. fixed-income securities. In hindsight, these trades turned out to be considerably more profitable than simply the interest differ-

Figure 37. Bilateral Exchange Rates and Short-Term and Long-Term Interest Differentials vis-à-vis the U.S. Dollar¹



Source: International Monetary Fund.

¹Interest differentials shown are U.S. interest rates minus domestic interest rates in percent a year. Exchange rates are drawn on logarithmic scales and are defined in terms of national currency units per U.S. dollar, except for the United Kingdom, where it is defined as U.S. dollars per pound sterling. The figures show monthly averages of daily data from January 1985 through May 1997.

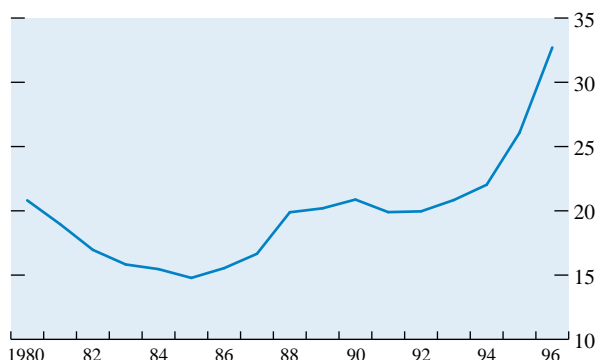
ential, for the yen depreciated continuously over the two years from May 1995 through May 1997, which reduced the yen liability relative to the dollar investment that it financed.

With available data, it is difficult to determine the scale of yen-carry trades implemented over the past two years. It is noteworthy, however, that while Japan-

ese banks reduced total cross-border assets by \$20 billion in 1996, they increased lending by almost \$19 billion to nonbank entities located just in the Cayman Islands (British West Indies)—a home for some of the major hedge funds. Over the same period, entities located in the British West Indies accumulated \$20 billion of U.S. long-term bonds. Further, lending by

Figure 38. Foreign and International Holdings of U.S. Public Debt¹

(Percentage of gross marketable public debt)



Source: Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*.

¹Foreign and international holdings are U.S. Treasury estimates and consist of investments of foreign balances and international accounts in the United States.

Japanese banks to U.S. nonbank entities expanded by an additional \$28.8 billion during 1996.¹ Viewed in light of the significant contraction in total cross-border assets of Japanese banks in 1996, the fact that Japanese banks increased their cross-border claims on nonbanks in the Cayman Islands and the United States by almost \$48 billion is consistent with parties in these regions instituting significant yen-carry trades.

The volume of international inflows into U.S. bond markets in 1996 is by far the largest ever—70 percent larger than the previous record set in 1995. Net foreign purchases of U.S. government bonds alone (\$294 billion) accounted for 250 percent of the increase in the stock of privately held public debt securities in 1996. This pushed the share of foreigners' total ownership to one-third of the stock of public debt securities, up from 26 percent in 1995 (Figure 38).

Yield-seeking by private investors accounted for much of the large capital inflows to dollar markets during the past eighteen months, but foreign exchange reserve accumulation by central banks was also an important source of inflows to dollar markets. Central banks accounted for 35 percent of total foreign net purchases of U.S. treasury bonds in 1996. Much of this official accumulation of U.S. treasury securities has been a consequence of efforts by developing countries to manage the impact of large inflows of foreign capital on their respective currencies, which required the accumulation of official reserves. Indeed, more

than half of reserve accumulation by all central banks in 1996 was by central banks in developing countries. Among industrial countries, the Japanese monetary authorities have been most aggressive in accumulating reserves during the past two years. During 1995–96, the Bank of Japan accumulated more than \$90 billion in reserves, bringing the total in early 1997 to about \$218 billion (14 percent of global official reserves). The Bank of Japan's reserve accumulation in 1996 was almost four times greater than that of the other six G-7 countries combined, and it represented 45 percent of reserve accumulation by central banks in all industrial countries (20 percent of global official reserve accumulation). By contrast, the G-7 countries excluding Japan were responsible for only 5.4 percent of total official reserve accumulation over the year, and about 12 percent of reserves accumulated by all industrial countries during the year.

The magnitude of capital inflows into the dollar markets has also been large relative to the U.S. current account position (Table 22). The U.S. current account deficit in 1996 was \$148 billion (or about 1.9 percent of GDP). Capital inflows amounted to \$547 billion, or 370 percent of the current account deficit. Accumulation of U.S. securities by foreign central banks alone was only \$26 billion less than what was required to finance the current account deficit. Private security purchases by foreigners, however, contributed inflows of \$289 billion. Thus, total accumulation of U.S. securities by foreigners amounted to 5.4 percent of GDP, or 275 percent of what was necessary to finance the current account balance. This record level of portfolio inflows—both in absolute value and as a percentage of GDP—was intermediated in U.S. financial markets and invested abroad through purchases of foreign securities by U.S. investors (\$108 billion) and by net lending abroad by U.S. banks (\$98 billion).

The aggressive purchase of foreign securities by U.S. investors is consistent with the continued international diversification of U.S. investors' portfolios. The relatively large net amount of cross-border bank lending by U.S. banks reflects two factors. First, U.S. banks have lent to their foreign subsidiaries to meet strong demand in the Eurodollar market and to finance the demand for dollar securities by foreigners. Second, as discussed under "International Syndicated Loan Markets" below, the international interbank markets have increasingly used repurchase agreements for interbank funding, and U.S. treasury securities are the predominant form of collateral in these markets.

The volume of foreign purchases of U.S. bonds has also been large relative to current account positions in many of the other major countries. In Japan, residents accumulated foreign fixed-income securities in 1996 amounting to 142 percent of the current account surplus of Japan, with well above half of these purchases being bonds issued by the U.S. government and U.S. corporations. Similarly, the German current account

¹Data on international bank lending from the Bank for International Settlements.

Table 22. United States: Selected External Account Variables

| | U.S. Assets Abroad, Net ¹ | | Foreign Assets in the United States ² | | Current Account Balance | U.S. Assets Abroad, Net ¹ | | Foreign Assets in the United States ² | | Current Account Balance |
|-----------------|--------------------------------------|---------|--|---------|-------------------------|--------------------------------------|---------|--|---------|-------------------------|
| | Total | Private | Total | Private | | Total | Private | Total | Private | |
| | ← (In billions of U.S. dollars) → | | | | | ← (In percent of GDP) → | | | | |
| 1963 | -7.27 | 5.99 | 3.22 | 1.23 | 4.41 | -1.18 | 0.97 | 0.52 | 0.20 | 0.71 |
| 1964 | -9.56 | -8.05 | 3.64 | 1.98 | 6.82 | -1.44 | -1.21 | 0.55 | 0.30 | 1.03 |
| 1965 | -5.72 | -5.34 | 0.74 | 0.61 | 5.43 | -0.79 | -0.74 | 0.10 | 0.08 | 0.76 |
| 1966 | -7.32 | -6.35 | 3.66 | 4.33 | 3.03 | -0.93 | -0.81 | 0.46 | 0.55 | 0.38 |
| 1967 | -9.76 | -7.39 | 7.38 | 3.93 | 2.58 | -1.17 | -0.89 | 0.89 | 0.47 | 0.31 |
| 1968 | -10.98 | -7.83 | 9.93 | 10.70 | 0.61 | -1.21 | -0.86 | 1.09 | 1.18 | 0.07 |
| 1969 | -11.59 | -8.21 | 12.70 | 14.00 | 0.40 | -1.18 | -0.84 | 1.29 | 1.43 | 0.04 |
| 1970 | -9.34 | -10.23 | 6.36 | -0.55 | 2.33 | -0.90 | -0.99 | 0.61 | -0.05 | 0.23 |
| 1971 | -12.48 | -12.94 | 22.97 | -3.91 | -1.43 | -1.11 | -1.15 | 2.04 | -0.35 | -0.13 |
| 1972 | -14.50 | -12.93 | 21.46 | 10.99 | -5.80 | -1.17 | -1.04 | 1.73 | 0.89 | -0.47 |
| 1973 | -22.87 | -20.39 | 18.39 | 12.36 | 7.14 | -1.65 | -1.47 | 1.33 | 0.89 | 0.52 |
| 1974 | -34.75 | -33.64 | 35.34 | 24.80 | 1.96 | -2.32 | -2.25 | 2.36 | 1.66 | 0.13 |
| 1975 | -39.70 | -35.38 | 17.17 | 10.14 | 18.12 | -2.43 | -2.17 | 1.05 | 0.62 | 1.11 |
| 1976 | -51.27 | -44.50 | 38.02 | 20.33 | 4.30 | -2.82 | -2.45 | 2.09 | 1.12 | 0.24 |
| 1977 | -34.79 | -30.72 | 53.22 | 16.40 | -14.34 | -1.72 | -1.52 | 2.63 | 0.81 | -0.71 |
| 1978 | -61.13 | -57.20 | 67.04 | 33.36 | -15.14 | -2.67 | -2.50 | 2.93 | 1.46 | -0.66 |
| 1979 | -66.05 | -61.18 | 40.85 | 54.52 | -0.29 | -2.58 | -2.39 | 1.60 | 2.13 | -0.01 |
| 1980 | -86.97 | -73.65 | 62.61 | 47.12 | 2.32 | -3.12 | -2.65 | 2.25 | 1.69 | 0.08 |
| 1981 | -114.15 | -103.88 | 86.23 | 81.27 | 5.03 | -3.66 | -3.33 | 2.77 | 2.61 | 0.16 |
| 1982 | -122.34 | -111.24 | 96.42 | 92.83 | -11.44 | -3.77 | -3.43 | 2.97 | 2.86 | -0.35 |
| 1983 | -61.57 | -55.37 | 88.78 | 82.93 | -43.99 | -1.75 | -1.58 | 2.53 | 2.36 | -1.25 |
| 1984 | -36.31 | -27.69 | 118.03 | 114.89 | -98.95 | -0.93 | -0.71 | 3.02 | 2.94 | -2.54 |
| 1985 | -39.89 | -33.21 | 146.38 | 147.50 | -123.99 | -0.95 | -0.79 | 3.50 | 3.53 | -2.97 |
| 1986 | -106.75 | -105.04 | 230.21 | 194.56 | -153.19 | -2.41 | -2.38 | 5.21 | 4.40 | -3.46 |
| 1987 | -72.62 | -82.77 | 248.38 | 203.00 | -168.05 | -1.55 | -1.76 | 5.29 | 4.33 | -3.58 |
| 1988 | -100.02 | -99.28 | 246.07 | 206.31 | -128.25 | -1.98 | -1.97 | 4.87 | 4.09 | -2.54 |
| 1989 | -168.74 | -144.71 | 224.39 | 215.89 | -104.23 | -3.10 | -2.66 | 4.13 | 3.97 | -1.92 |
| 1990 | -74.01 | -74.16 | 140.99 | 107.08 | -91.89 | -1.29 | -1.29 | 2.45 | 1.86 | -1.60 |
| 1991 | -57.88 | -66.56 | 109.64 | 92.25 | -5.66 | -0.98 | -1.12 | 1.85 | 1.56 | -0.10 |
| 1992 | -68.77 | -71.02 | 168.78 | 128.30 | -56.38 | -1.10 | -1.14 | 2.70 | 2.05 | -0.90 |
| 1993 | -194.54 | -192.82 | 279.67 | 207.92 | -90.77 | -2.97 | -2.94 | 4.27 | 3.17 | -1.39 |
| 1994 | -160.52 | -165.51 | 297.34 | 256.95 | -133.54 | -2.31 | -2.39 | 4.29 | 3.70 | -1.93 |
| 1995 | -307.21 | -296.92 | 451.23 | 340.51 | -129.10 | -4.24 | -4.09 | 6.22 | 4.69 | -1.78 |
| 1996 | -352.44 | -358.42 | 547.56 | 425.20 | -148.18 | -4.65 | -4.73 | 7.23 | 5.61 | -1.96 |
| Period averages | | | | | | | | | | |
| 1963-69 | -8.88 | -5.31 | 5.90 | 5.26 | 3.33 | -1.13 | -0.67 | 0.75 | 0.67 | 0.42 |
| 1970-74 | -18.79 | -18.03 | 20.90 | 8.74 | 0.84 | -1.50 | -1.44 | 1.66 | 0.70 | 0.07 |
| 1975-79 | -50.59 | -45.79 | 43.26 | 26.95 | -1.47 | -2.45 | -2.22 | 2.09 | 1.31 | -0.07 |
| 1980-84 | -84.27 | -74.37 | 90.41 | 83.81 | -29.41 | -2.54 | -2.25 | 2.73 | 2.53 | -0.89 |
| 1985-89 | -97.60 | -93.00 | 219.09 | 193.45 | -135.54 | -2.05 | -1.96 | 4.61 | 4.07 | -2.85 |
| 1990-96 | -173.62 | -175.06 | 285.03 | 222.60 | -93.65 | -2.63 | -2.65 | 4.32 | 3.37 | -1.42 |

Sources: International Monetary Fund, *World Economic Outlook* database; and U.S. Department of Commerce, *Survey of Current Business*.

¹A negative value represents an increase in U.S. assets abroad, a capital outflow.

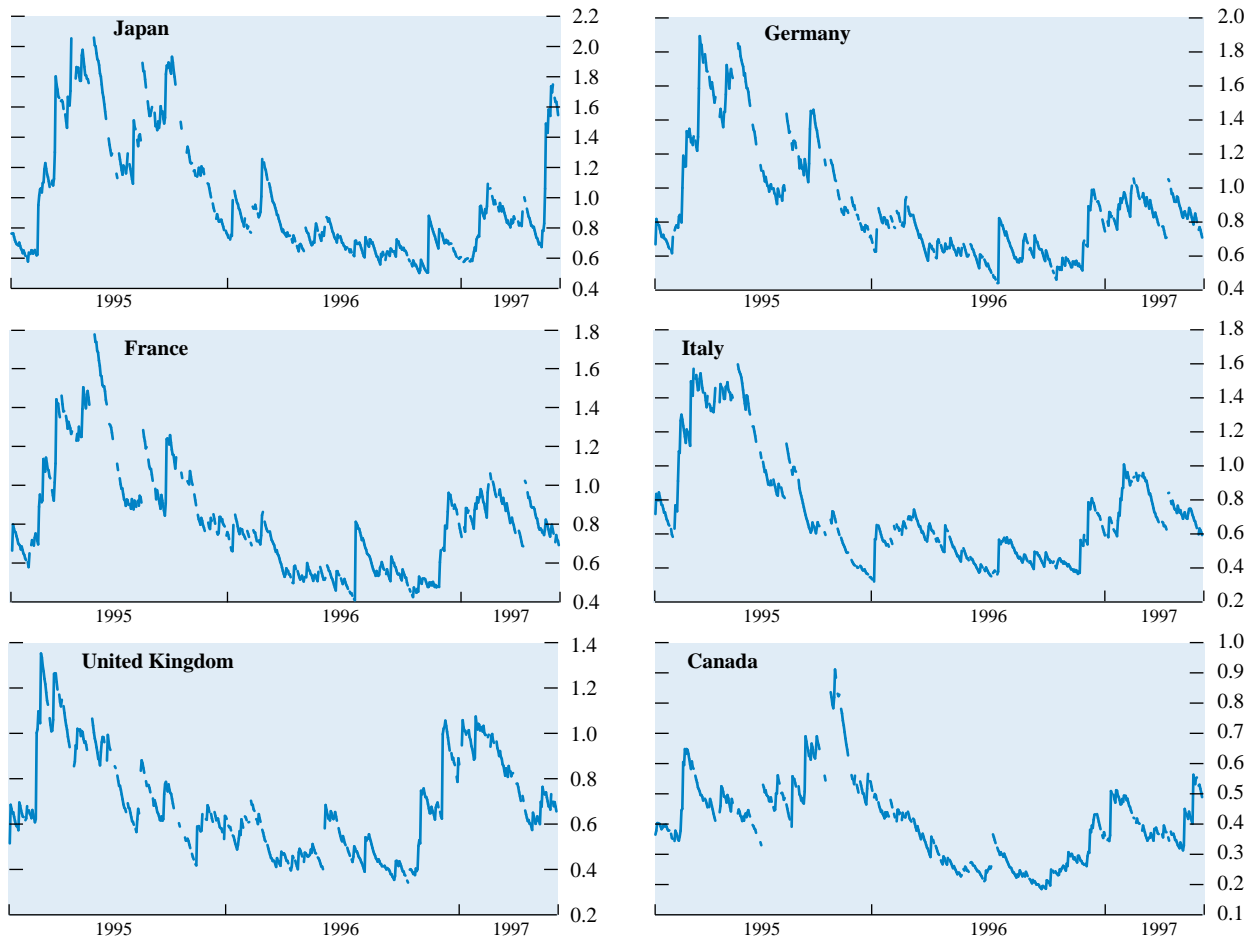
²A positive value indicates an increase in foreign assets in the United States, a capital inflow.

deficit was $\frac{3}{4}$ of a percent of GDP, but residents accumulated U.S. government and corporate bonds equivalent to 1 percent of GDP. And in France, purchases of U.S. government and corporate bonds were almost 3 percent of GDP, or more than double the current account surplus. Finally, although the U.K. current account was roughly in balance, net purchases of U.S. government and corporate bonds booked in the United Kingdom were equal to more than 10 percent of GDP.

In summary, there have been large inflows into dollar markets during the past two years, and these capital flows have been attributed to three factors: liquidity spilling over into international capital markets associated with a loosening of monetary policy in Europe and Japan, which has been facilitated by the weak demand for funds by firms in several European countries and in Japan; wide interest differentials among the three largest economies, which have favored dollar assets; and uncertainties associated with

Figure 39. RiskMetrics Daily Price Volatility for U.S. Dollar Spot Exchange Rates, January 19, 1995–May 30, 1997

(In percent)



Source: J.P. Morgan.

EMU in Europe and with the financial system in Japan. It is difficult to quantify the role of these various factors in recent movements of the exchange rates among the major currencies. Perhaps the least tangible factor is that associated with uncertainties about EMU and banking problems in Japan. It is noteworthy, however, that recent analysis by some market participants attribute about half of the dollar's rally against the deutsche mark since mid-1996 specifically to EMU optimism.²

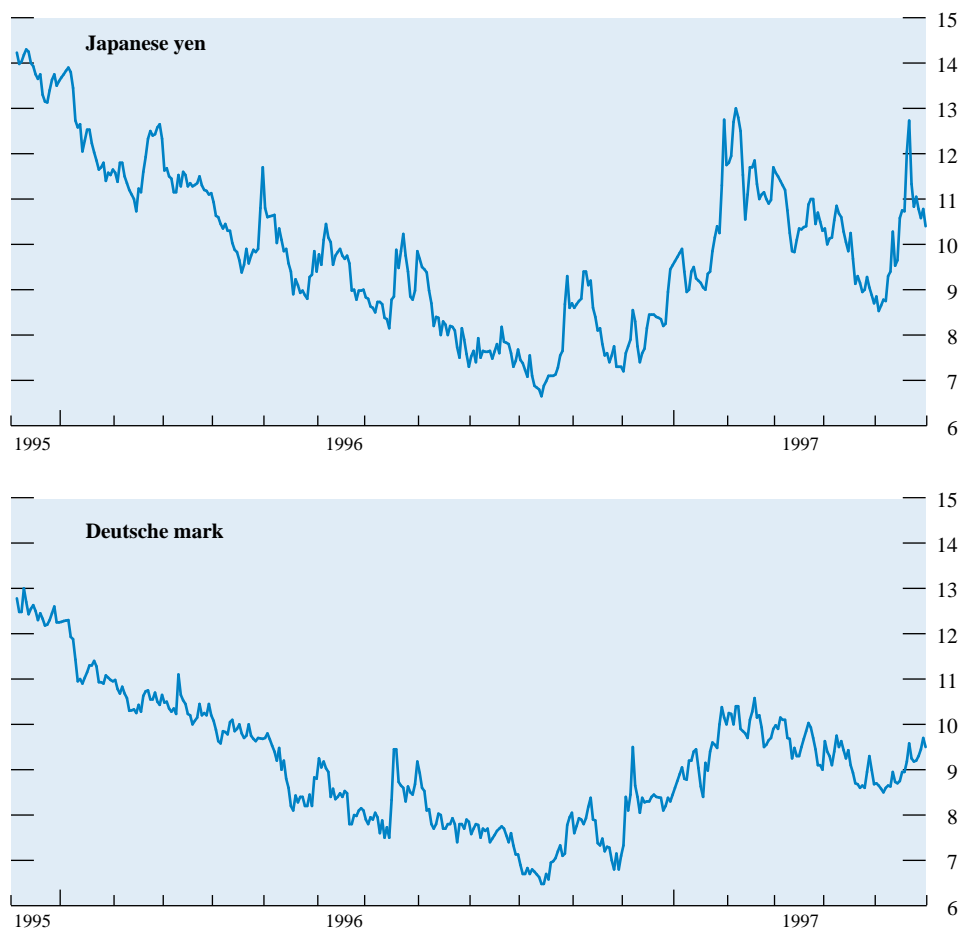
Volatility in Foreign Exchange Markets

Ample liquidity in the international financial markets and the lack of inflationary pressures helped to

maintain low volatility in foreign exchange markets despite large movements in exchange rates among the major currencies (Figures 39–40). The absence of volatility has been especially marked for the currencies of the traditionally higher-yielding industrial countries, both because capital inflows to higher-yielding markets added liquidity to foreign exchange markets, and because the same factors that worked to strengthen many of these currencies also reduced risk premiums for holding these currencies. Specifically, a change in the stance of macroeconomic policy, which has emphasized low inflation and fiscal conservatism, contributed to a sharp reduction in uncertainty regarding the key currency market fundamentals—inflation and fiscal policy.

In the European Union, improved fundamentals have been closely tied with increased optimism that EMU would proceed in 1999. As a result, markets have

²See J.P. Morgan (1997a).

Figure 40. Implied Volatility: Yen and Deutsche Mark Three-Month Forwards

Source: Bloomberg Financial Markets L.P.

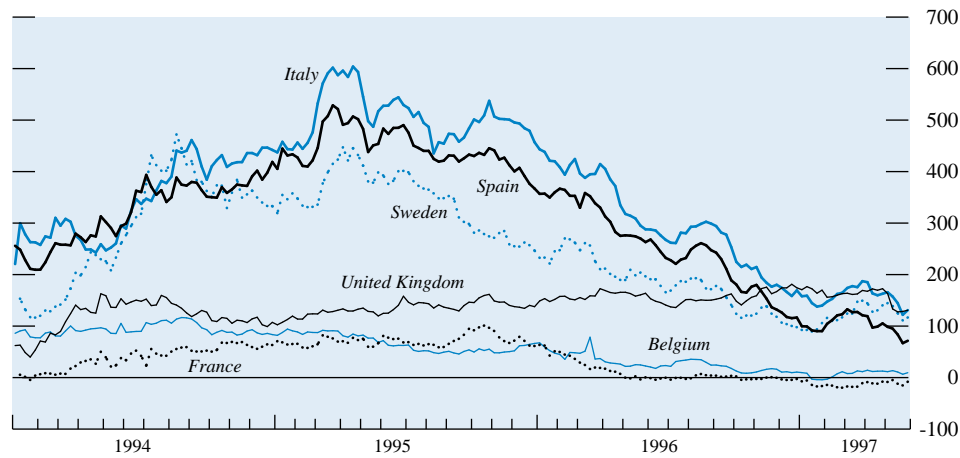
Note: Implied volatility is a measure of the expected future volatility of the currency based on market prices of the call options on forwards on the currency.

priced in not only observed improvements in fundamentals, but also an improved outlook for the future course of macroeconomic policy as EU countries seek to participate in EMU at an early stage. As a result, the currencies of most EU countries, and particularly those of the higher-yielding—or “non-core”—countries, have appreciated against the deutsche mark. This facilitated the reentry of the Italian lira, and the entry of the Finnish markka, into the ERM in late 1996. The strongest currencies in Europe since early 1996 have been the pound sterling and the Irish pound, both of which have received additional support from strong economic growth and expectations of rising interest rates. The strength of the Irish pound has attracted considerable attention because of its inclusion in the ERM and the fact that it has risen about 10 percent since mid-

1996 above its central rate against the deutsche mark. The market’s interest in the Irish pound’s strength within the ERM stems from concerns about what entry rate will be used for the pound when EMU begins.

Reduced volatility in foreign exchange markets in 1996 strongly affected turnover in spot foreign exchange markets, particularly European foreign exchange markets. Although recent data on turnover in the global foreign exchange market are not available, lower volatility has been widely pointed to as an explanation for the marked scaling back of European foreign exchange trading operations of the major market participants. Activity in currency derivative markets was unaffected by the absence of turbulence in the foreign exchange markets, as turnover continued to expand briskly. In the over-the-counter markets, the

Figure 41. Selected European Long-Term Interest Rate Differentials with Germany
(In basis points)



Source: International Monetary Fund.

notional principal of currency swaps rose 18 percent at an annual rate during the first half of 1996. On the exchanges, currency futures and options volumes rose 19 percent in 1996 over 1995, in part reflecting a rebound after the sharp drop in 1995. Reduced volatility and turnover in spot foreign exchange rates undoubtedly slowed the demand for currency derivatives, but the structural growth of derivative markets associated with the prevalence of risk management continues to expand derivative markets (see the “Derivative Markets” section below).

This increased use of foreign exchange derivatives for risk management is reflected by reportedly brisk activity in binary range options. These instruments are an effective tool for hedging volatility because their payoff structure is tied to whether or not the exchange rate stays within a specified range. Market participants report that positions of this type were widely used in the French franc-dollar, dollar-yen, deutsche mark-French franc, and many of the other European bilateral exchange rates in 1996. On the long side of these positions, U.S. hedge funds and other high net worth investors are reported to have placed large bets that EMU or official intervention by the Bank of Japan would ensure stable exchange markets in 1996 and early 1997. A notable instance occurred in the fall of 1996, when there were reportedly a large volume of dollar-yen range barriers issued with a range of ¥112–115. On October 29, the dollar reached ¥114.88, just below the knock-out level. Market participants reported that at the time the dollar was temporarily prevented from strengthening further on account of massive selling of dollars by dealers, hedge funds, and others with large long positions in dollar-yen range barriers.

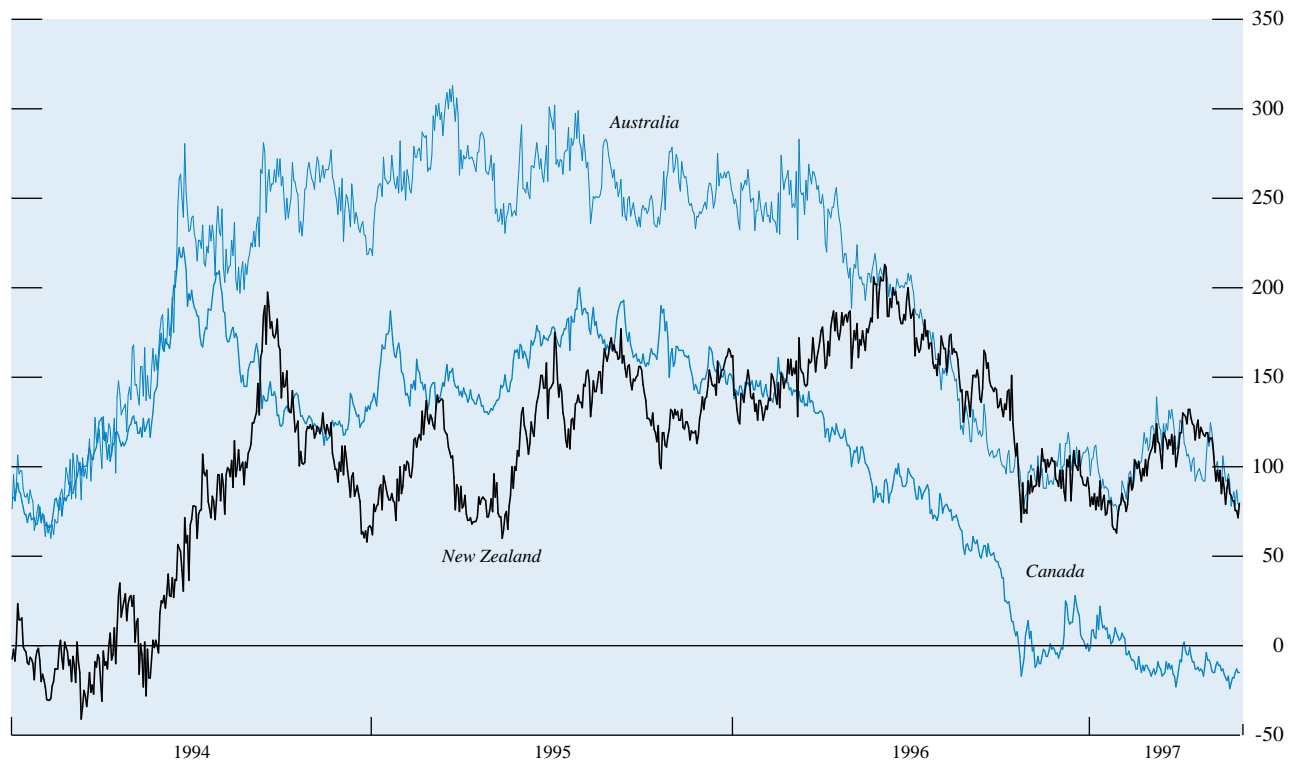
One method of gaining some insight into the market’s assessment of the direction of the major exchange rates in the future is to study information contained in asset prices. Distributions of the major exchange rates computed from foreign currency options premiums are a way to gauge the market’s expectation about the range of possible future values for exchange rates (see Appendix 1 at the end of this annex). This technique reveals considerable dispersion in the market’s assessment of future values for the yen-dollar rate.

Bond Markets

Overview

Low interest rates in core Europe and Japan (see Figures 35–36), as well as continued international diversification of U.S. investors’ portfolios, led to substantial capital flows from the major industrial countries into the higher-yielding bond markets. In conjunction with low, and in some countries declining, inflation rates, these capital flows to the higher-yielding markets were instrumental in reducing yields relative to the major benchmark yield curves and in curtailing volatility in bond markets. The narrowing of spreads attracted considerable attention within the context of EMU as convergence plays were once again established in those markets, but the compression of spreads in Europe was a reflection of a global phenomenon that included the higher-yielding industrial countries outside of Europe—Canada, Australia, and New Zealand—the emerging markets, and corporate bond markets (Figures 41–43). This favor-

Figure 42. Yield Differential for the 10-Year Government Bonds of Australia, Canada, and New Zealand
(In basis points against the yield on 10-year U.S. government bonds)



Source: Bloomberg Financial Markets L.P.

able environment for borrowers caused new issuance of fixed-income securities to reach record levels in the international markets and in most of the higher-yielding domestic bond markets. The yield-seeking behavior of investors was reflected also in international bond markets by the strong demand for dollar-denominated paper: the share of dollar-denominated bonds issued in the international markets more than doubled in 1996 over the previous year, whereas the share of yen bonds fell almost 80 percent and the share of deutsche mark issues fell close to 40 percent.

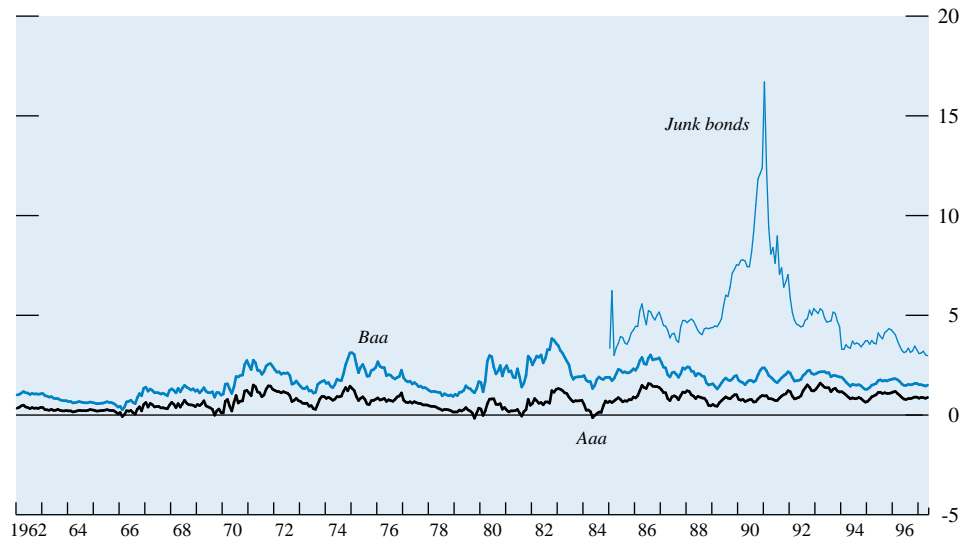
The narrowing of sovereign interest rate spreads globally has in large part been due to low inflation and progress toward fiscal consolidation. Nonetheless, the degree of spread compression may have been amplified by plentiful global liquidity in international financial markets and the related yield-seeking behavior of investors, which has accompanied the sharp decline in interest rates in Japan and core Europe. Additionally, capital inflows into U.S. securities markets were much greater than what was necessary to finance the current account deficit and may, therefore, have contributed to the narrowing in spreads as this capital was effectively

intermediated in the United States and reinvested in foreign bond markets (Table 22; see also Table 3).

European Monetary Union and Convergence Plays

Spreads in European fixed-income markets (relative to German benchmarks) peaked in early 1995 as a result of the flight to quality associated with the global bond market correction in 1994 as well as the Mexican crisis that developed later in the year. The subsequent narrowing of spreads continued in 1996 because of further easing of monetary policy in Europe and an improved outlook for EMU. The most notable narrowing of spreads occurred in those countries with high spreads at the start of the period. Specifically, the Italian 10-year yield spread narrowed by 350 basis points from early 1996 through end-May 1997, Spanish spreads fell 300 basis points, and Swedish spreads fell 130 basis points. In core EMU countries, where spreads were thin at the beginning of the period, they narrowed to the point that French and Dutch long-term yields traded below deutsche mark yields by late 1996. The United Kingdom is the notable exception to

Figure 43. United States: Yield Spreads of Corporate Bonds over U.S. Treasuries¹
(In percent)



Sources: Bloomberg Financial Markets L.P.; Board of Governors of the Federal Reserve System, *Federal Reserve Bulletin*; and Merrill Lynch.

¹Yields on 10-year U.S. treasury bonds of constant maturities are used for U.S. treasuries. Junk bonds are all high-yield bonds weighted by par value.

this latest round of convergence plays, a fact that has been attributed to the asynchronous cyclical position of the United Kingdom versus much of continental Europe, and to considerable uncertainty about when the United Kingdom will participate in EMU.

For the higher-yielding EU countries, from January 1996 to end-May 1997 yield spreads had narrowed by similar magnitudes at the short and long ends of the yield curves. Specifically, from January 1, 1996, through end-May 1997, the difference between rates paid on deutsche mark one-year deposits and Spanish peseta and Italian lira one-year deposits narrowed by 300–350 basis points, compared with the 270–285 basis point reduction in spreads on seven-year deposits for these currencies. Thus, the downward shift in yield curves relative to the deutsche mark curve was only slightly greater at the short end than at the long end of the curves.

The convergence of interest rates in Europe is often attributed to the improved fundamentals (inflation and fiscal accounts) in peripheral countries. The renewed focus on EMU, and the increased likelihood that it will begin on schedule, have shifted expectations of the future path of fundamentals in the higher-yielding EU countries in close alignment with the criteria of the Maastricht Treaty. As discussed below, there is considerable consensus among market participants that these improvements in current and expected fu-

ture fundamentals have been the primary driving force behind the convergence process, rather than extraneous factors such as excess liquidity.

The combination of monetary easing and convergence plays that narrowed interest rate spreads produced a favorable environment for fixed-income investors, especially for investors in the higher-yielding countries (again with the notable exception of the United Kingdom). Total returns on long-term bonds of maturities exceeding 10 years in 1996 amounted to almost 50 percent in Italy, 34 percent in Spain, 25 percent in Sweden, and on the order of 10–15 percent in core Europe. By comparison, with monetary policy leaning in the opposite direction, the total return on U.S. treasury bonds in 1996 was reduced by price depreciation (Table 23).

Statistics on “buy-and-hold” positions understate the (annualized) returns earned on aggressive convergence plays. Market participants report that these convergence plays were very different from those implemented in 1992. In the earlier episode, convergence plays typically exploited yield differentials in spot markets in an environment of managed exchange rates. These spot market convergence positions would involve funding a long position in the higher-yielding bond with a short position in German Bunds, or even more simply—but more capital intensive—establishing a long position in the higher-yielding bond. In either case, if the yield on

Table 23. Major Industrial Countries: Bond and Equity Index Returns
(In percent)

| | 1995 | | 1996 | | January–May 1997 | |
|---------------------------------|----------------|--------------|----------------|--------------|------------------|--------------|
| | Local currency | U.S. dollars | Local currency | U.S. dollars | Local currency | U.S. dollars |
| Bond indices¹ | | | | | | |
| United States | 23.73 | 23.73 | 1.51 | 1.51 | 1.05 | 1.05 |
| Japan | 15.47 | 11.08 | 7.30 | -4.42 | 1.10 | 1.01 |
| Germany | 18.91 | 28.15 | 8.45 | 0.25 | 2.23 | -6.83 |
| France | 19.21 | 29.60 | 13.89 | 7.73 | 2.06 | -8.24 |
| Italy | 19.83 | 22.40 | 30.46 | 35.58 | 2.84 | -7.48 |
| United Kingdom | 18.69 | 17.53 | 7.55 | 18.96 | 4.80 | 0.20 |
| Canada | 22.73 | 26.10 | 13.10 | 12.61 | 2.07 | 1.59 |
| Equity indices | | | | | | |
| United States (S&P 500) | 34.11 | 34.11 | 20.26 | 20.26 | 14.52 | 14.52 |
| Japan (Nikkei 225) | 0.74 | -3.09 | -2.55 | -13.20 | 3.65 | 3.56 |
| Germany (Commerzbank) | 5.26 | 13.43 | 22.51 | 13.26 | 23.25 | 12.33 |
| France (CAC 40) | -0.49 | 8.19 | 23.71 | 17.01 | 11.58 | 0.32 |
| Italy (Banca Commerciale) | -6.78 | -4.78 | 12.38 | 16.79 | 14.34 | 2.85 |
| United Kingdom (FT-SE 100) | 20.35 | 19.18 | 11.64 | 23.48 | 12.21 | 7.28 |
| Canada (TSE-300) | 11.86 | 14.93 | 25.74 | 25.19 | 7.68 | 7.17 |

Source: Bloomberg Financial Markets L.P.

¹For government bonds with maturities of 7–10 years.

the long position fell in relation to German Bunds, then the capital gains on the position represented the excess return to the convergence position.

By contrast, in the recent episode, convergence plays were more sophisticated in that the capital cost associated with establishing positions in cash markets was circumvented to a large extent by taking spread positions in the interbank swaps market. This was reflected in the sharp expansion in swap market activity in 1996: according to the International Swaps and Derivatives Association (ISDA), swaps activity denominated in deutsche mark—the “pay side” associated with convergence positions in the swaps market—soared by 44 percent in the first half of 1996.

To illustrate how convergence plays are executed in swap markets, consider the following simple example. Suppose an investor believes that the spread between five-year lira and deutsche mark rates will narrow from its “current” level of, say, 300 basis points. The investor enters into a swap contract in which he or she agrees to pay a stream of deutsche mark fixed interest payments (calculated based on a given underlying notional sum) in exchange for a stream of lira fixed interest payments. One year later, suppose the spread on four-year lira and deutsche mark rates is 100 basis points, and to simplify things also assume that the lira-DM exchange rate has not changed—alternatively, the investor could have swapped out the currency risk of the original position. The investor could then unwind his position by entering into an offsetting swap in which he or she pays fixed lira rates for four years and receives fixed deutsche mark rates. In sum, the swap portfolio has no open currency position. However, the investor is receiving net lira income of 200 basis points guaranteed for the next four years.

With substantial convergence in interest rates having occurred by late 1996, there was a measure of consensus in financial markets that, based on current fundamentals (including the available information on which countries would participate in EMU in 1999), the convergence process had largely run its course. Convergence positions were, therefore, largely unwound by late 1996. This does not imply that it was unlikely that there would be further narrowing of some spreads in the run-up to EMU, but rather that any further narrowing of spreads would hinge on new information about entry into EMU or further improvements in fundamentals.

The most widely watched indicator of the “maturity” of the convergence process is the difference between current yield spreads and forward yield spreads after 1998 (as implied by current deposit and swap rate curves). For core EMU countries, spreads (over deutsche mark) on seven-year swaps at end-May 1997 were within 20 basis points of implied forward spreads in early 1999, and the levels of these spreads were small (Table 24). In other words, there is little room for further convergence in core Europe in the run-up to the introduction of the single currency in 1999, as the markets have effectively priced in participation in EMU by all core European countries in 1999.

In Italy and Spain, spreads on seven-year swaps at end-May 1997 were about 40–50 basis points above spreads on implied forward swaps in early 1999. As current long-term interest rates are a function of short-term rates in the run-up to EMU and beyond, one can interpret the difference between current and implied forward long-term interest rate spreads as a gauge of the maturity of convergence only by first separating out the (possibly large) component of these spreads that is

Table 24. One-Year and Seven-Year Interest Differentials with Germany, February 28, 1995, January 1, 1996, January 30, 1997, and May 31, 1997¹*(In basis points)*

| | One-Year Interest Differential | | | | Seven-Year Interest Differential | | | |
|------------------------------|--------------------------------|--------------------|---------------------|-----------------|----------------------------------|--------------------|---------------------|-----------------|
| | February 28, 1995 | January 1, 1996 | January 30, 1997 | May 31, 1997 | February 28, 1995 | January 1, 1996 | January 30, 1997 | May 31, 1997 |
| France | | | | | | | | |
| Spot | 118 | 132 | 15 | 39 | 53 | 50 | -20 | -13 |
| January 1, 1999 ² | 29 | 15 | -22 | -23 | ... | ... | -25 | -27 |
| January 1, 2000 ² | 30 | -4 | -29 | -28 | ... | ... | -26 | -29 |
| January 1, 2001 ² | 25 | 4 | -26 | -21 | ... | ... | ... | -25 |
| Italy | | | | | | | | |
| Spot | 546 | 648 | 342 | 345 | 464 | 439 | 150 | 168 |
| January 1, 1999 ² | 424 | 398 | 154 | 189 | ... | ... | 92 | 116 |
| January 1, 2000 ² | 415 | 334 | 105 | 148 | ... | ... | 78 | 98 |
| January 1, 2001 ² | 385 | 322 | 81 | 116 | ... | ... | ... | ... |
| Spain | | | | | | | | |
| Spot | 438 | 532 | 231 | 185 | 467 | 356 | 87 | 73 |
| January 1, 1999 ² | 435 | 310 | 86 | 85 | ... | ... | 46 | 33 |
| January 1, 2000 ² | 410 | 269 | 54 | 49 | ... | ... | 37 | 30 |
| January 1, 2001 ² | 378 | 254 | 33 | 41 | ... | ... | ... | 34 |
| Sweden | | | | | | | | |
| Spot | 319 | 449 | 111 | 144 | ... | 241 | 112 | 122 |
| January 1, 1999 ² | ... | 206 | 137 | 173 | ... | ... | 100 | 123 |
| January 1, 2000 ² | ... | 155 | 131 | 158 | ... | ... | 98 | 111 |
| January 1, 2001 ² | ... | 95 | 112 | 130 | ... | ... | ... | ... |
| United Kingdom | | | | | | | | |
| Spot | 204 | 269 | 370 | 378 | 149 | 133 | 201 | 171 |
| January 1, 1999 ² | 165 | 122 | 293 | 289 | ... | ... | 132 | 103 |
| January 1, 2000 ² | 157 | 94 | 211 | 202 | ... | ... | 99 | 63 |
| January 1, 2001 ² | 143 | 86 | 146 | 132 | ... | ... | ... | ... |
| European currency unit | | | | | | | | |
| Spot | 132 | 135 | 87 | 95 | 103 | 73 | 20 | 28 |
| January 1, 1999 ² | 91 | 79 | 6 | 22 | ... | ... | 5 | 14 |
| January 1, 2000 ² | 70 | 12 | 10 | 14 | ... | ... | 4 | 12 |
| January 1, 2001 ² | 56 | 18 | -5 | 12 | ... | ... | ... | ... |

Source: Bloomberg Financial Markets L.P.

¹Calculated based on the one-year and seven-year forward rates embedded in the yield curve.²Based on the data for the first available day of the year.

attributable to the convergence that has yet to take place in short-term rates in the run-up to EMU. There is, in general, substantial room for convergence in short-term rates for the peripheral countries because risk premiums for credit and currency risks have become concentrated to a considerable degree at the short end of yield curves. Specifically, spreads over deutsche mark one-year deposits were less than 100 basis points for core EMU countries in May 1997 as well as for implied one-year swaps in 1999 and beyond, but were several hundred basis points for lira and peseta deposits in May 1997, and the implied forward spreads narrow by early 1999 by roughly 50 percent for Spain and Italy. Thus, the fact that the difference between current and forward swap spreads suggests that there will be considerable further convergence in the interest rates of the non-core EMU countries reflects to a considerable degree the fact that short-term rates are expected to converge sharply over the next few years.

Trading positions in European fixed-income markets have most recently focused either on the prospects of participation in EMU by the various countries and exploiting what is considered to be overly optimistic or pessimistic pricing, or else on buying insurance (for spot positions) against an unraveling of the convergence process.³ A particularly

³To varying degrees investors have sought to combine positions in derivative markets with spot positions in European bond markets with the objective of having some measure of insurance against adverse shocks to the EMU process. Some of the more common strategies in this regard involve combining long positions in call options on deutsche mark-lira spreads (for example) and short put option positions on the same spread at a lower strike price (so that the cost of the option position is negligible). In this example, if the spread were to widen, the option positions' value would offset the decline in the cash position in bonds. More simply, combining long positions in put options on lira bonds, say, with short positions on deutsche mark puts provides a qualitatively similar hedge.

notable instance of the former was the negative spread between French and German rates prevailing in late 1996 and early 1997. Strong domestic demand (especially by insurance firms) for French government bonds—caused by a large shift of funds from money market mutual funds into insurance products and administered savings products—reportedly was instrumental in pushing the French yield curve below the German yield curve.⁴ Market participants report that this caused a massive deconvergence position taking; these convergence and subsequent deconvergence trades are estimated to be among the largest speculative positions ever taken in the international capital markets—some estimates put U.S. hedge funds' and proprietary trading desks' positioning in the French franc–deutsche mark sector at end-1996 in excess of \$50 billion. U.S. hedge funds in particular amassed considerable positions in forward swaps designed to profit from a narrowing in the negative spread of French franc forward rates to deutsche mark.

Spreads in Dollar-Bloc Countries and Corporate Markets

The terms “spread compression” and “convergence” also well describe developments in the bond markets of industrial countries outside Europe, in the corporate bond markets, and in the emerging markets. As discussed in Chapter II, the narrowing of spreads on emerging market credits in 1996 was no less impressive than that which occurred in the context of EMU. Spreads in the U.S. corporate bond market fell sharply for all credit qualities, and there was compression in spreads across credit ratings—high-yield (“junk”) bond spreads neared the all-time lows of the mid-1980s (see Figure 43). Spreads on Canadian, Australian, and New Zealand credits also narrowed dramatically (Figure 42), as reflected most clearly by the fact that the Canadian government yield curve through 10-year maturities slipped below the U.S. curve for the first time in two decades, and 30-year Canadian bonds traded at par with U.S. 30-year treasury bonds for the first time ever.

This spread tightening in global bond markets occurred in an environment of low volatility in both foreign exchange markets and bond markets (see Figures 39 and 44, and Appendix 2 at the end of this annex). As discussed above under “Exchange Rates,” this should not be surprising, for the same factors that led to improved exchange rate fundamentals—low inflation and efforts toward fiscal consolidation—had similar consequences in fixed-income markets—as well as on volatility in these markets—as risk premiums decreased. A notable exception to this is Japan, in

which volatility in fixed-income markets has been high in recent years (see Appendix 2). In the United States, although anticipation of a tightening of monetary policy caused periodic retrenchment from U.S. fixed-income markets and caused volatility to rise—as with the massive sell-off in early 1996—these concerns subsequently dissipated in the absence of compelling signs of inflationary pressures. When the Federal Reserve finally did raise the federal funds target rate by 25 basis points in late March, the markets had little reaction as the action had already been discounted in asset markets.

Fund-Raising in Fixed-Income Markets

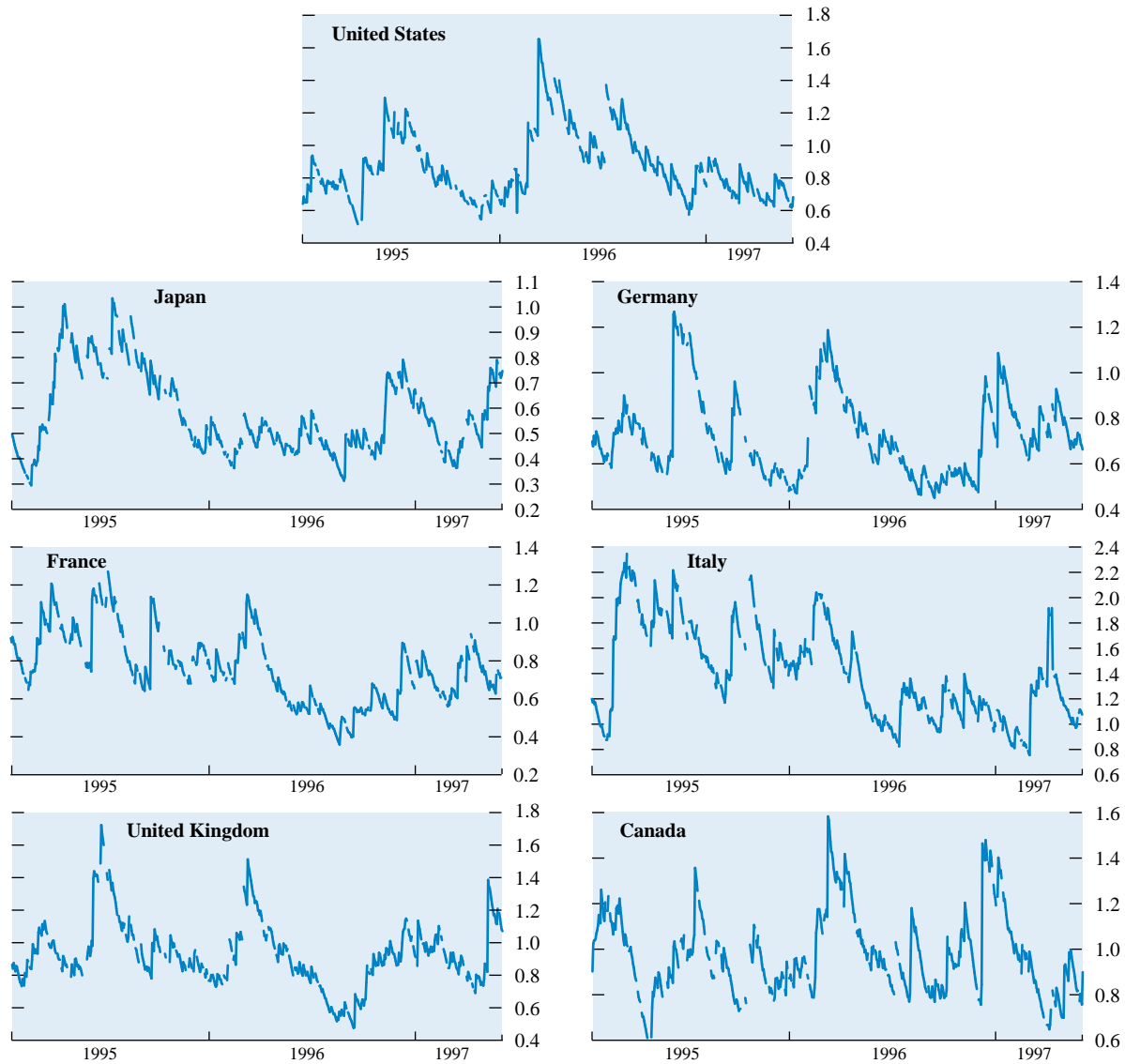
Stability in the major bond markets and convergence in the higher-yielding markets provided favorable conditions for issuance of debt securities by private sector institutions in the domestic and international markets. Issuance was strongest by private sector entities from the dollar-bloc countries and from the higher-yielding EU countries—particularly those that experienced the sharpest narrowing in interest rate spreads. Issuance from Japan and from core Europe was less robust. In addition, efforts toward fiscal consolidation had the effect of dampening overall new issuance activity in most domestic debt securities markets.

In the international securities markets, net new issues grew by 73 percent in 1996, setting a new record (Tables 5, 25, 26). Dollar issues accounted for almost half of all new issues in 1996—compared with less than a quarter the previous year—and this trend has continued in 1997. In terms of growth rates, dollar-denominated issues rose 353 percent in 1996, compared with a decrease in the amount of new issues denominated in yen and deutsche mark. To some degree, the surge in new issues of dollar-denominated securities reflects the strong demand for funds by U.S. corporations and financial institutions, as issues by private sector entities from the United States rose 164 percent in 1996 and accounted for 25 percent of total new issues in 1996, compared with 19 percent in 1995. This suggests, however, that the strong surge in dollar issues reflects also issuance of dollar-denominated bonds by entities located outside the United States. It seems plausible that this is attributable to the demand by investors for dollar issues, as discussed above.

Much of the growth in new issues in the international markets came from entities located in the United States and the United Kingdom. Issuance by other industrial countries generally increased as well, but at much slower rates. The strong demand for funds in the United States derived from both corporations and financial institutions, whereas in most other countries the demand for funds came mostly from financial institutions. This points to a more general develop-

⁴See J.P. Morgan (1997b).

Figure 44. RiskMetrics Daily Price Volatility for 10-Year Government Bonds, January 19, 1995–May 30, 1997
(In percent)



Source: J.P. Morgan.

ment in the international securities markets: financial institutions are accounting for a larger percentage of new issues by industrial countries in these markets. Indeed, currently almost three-quarters of issuance in the international markets by industrial countries is attributable to financial institution fund-raising.

In domestic debt securities markets, issuance grew at a much more moderate pace, just over 3 percent in

1996. Private sector issuance grew somewhat faster at about 11 percent, whereas public sector issuance fell in all of the major countries except Germany, Italy, Spain, and the United States. Among the major countries, private sector issuance was particularly strong in most dollar-bloc countries—Canada, Australia, the United Kingdom, and the United States. By contrast, issuance actually fell by private sector entities from

Table 25. Outstanding Amounts of International Debt Securities*(In billions of U.S. dollars)*

| | 1993 | 1994 | 1995 | 1996 | 1997:Q1 |
|-------------------------------|---------|---------|---------|---------|---------|
| All countries | 2,037.8 | 2,441.2 | 2,802.5 | 3,225.9 | 3,240.7 |
| Industrial countries | 1,650.3 | 1,977.6 | 2,282.1 | 2,594.3 | 2,600.9 |
| Of which: | | | | | |
| United States | 176.9 | 209.6 | 272.8 | 402.6 | 418.1 |
| Japan | 340.1 | 361.3 | 369.2 | 356.7 | 344.6 |
| Germany | 120.1 | 188.6 | 269.1 | 342.4 | 356.4 |
| France | 153.1 | 185.5 | 207.4 | 215.9 | 211.6 |
| Italy | 70.2 | 85.2 | 92.8 | 95.8 | 92.2 |
| United Kingdom | 186.7 | 212.5 | 227.2 | 274.2 | 275.5 |
| Canada | 146.9 | 165.4 | 177.6 | 182.6 | 183.7 |
| Developing countries | 121.8 | 161.9 | 192.1 | 276.3 | 289.7 |
| Offshore centers ¹ | 11.3 | 18.3 | 19.4 | 36.3 | 39.4 |

Source: Bank for International Settlements.

¹The Bahamas, Bahrain, Bermuda, the Cayman Islands, Hong Kong, China, the Netherlands Antilles, Singapore, and other offshore centers.

most of the EU countries, although there was some modest increase in new issuance by entities in the higher-yielding EU countries.

Risks in Fixed-Income Markets

Low, and in many cases declining, inflation in the major countries, progress on the fiscal front, and low volatility in foreign exchange markets have created a favorable environment for fixed-income investors as well as lower borrowing costs for issuers. The bond market rally in 1996–97 rests on some assumptions about the future, which could change.

First, the markets have priced in an improved outlook for macroeconomic fundamentals—most important, low inflation—in all the major markets. The bal-

ance of risks points to accelerating economic activity and thus a tightening of monetary policy in at least some of the major countries. In the United States, capacity constraints evidently have little slack, and economic growth in Japan and several European countries appears to be gathering momentum. The main risk to the compression of yield spreads—in Europe, in the U.S. high-yield market, in emerging markets, and in smaller industrial countries—is that cyclical factors will increasingly imply a significant global tightening of monetary policy. If, however, growth does not accelerate in Japan and the major continental European economies, a further tightening of monetary policy in the United States will result in a further reallocation of global fixed-income funds toward the dollar markets.

Table 26. Outstanding Amounts and Net Issues of International Debt Securities by Currency of Issue*(In billions of U.S. dollars)*

| | Amounts Outstanding | | | | Net Issues | | | | | | |
|---------------------|---------------------|---------|---------|---------|------------|-------|-------|-------|---------|---------|---------|
| | 1993 | 1994 | 1995 | 1996 | 1993 | 1994 | 1995 | 1996 | 1996 Q3 | 1996 Q4 | 1997 Q1 |
| U.S. dollar | 836.4 | 910.1 | 983.7 | 1,245.9 | 31.5 | 73.4 | 74.2 | 262.1 | 46.7 | 86.5 | 55.5 |
| Japanese yen | 272.3 | 412.6 | 496.7 | 517.6 | 33.8 | 106.8 | 108.3 | 81.2 | 24.5 | 19.0 | 14.1 |
| Deutsche mark | 192.8 | 244.0 | 318.8 | 347.1 | 31.2 | 27.5 | 55.1 | 54.8 | 10.6 | 12.6 | 13.9 |
| French franc | 92.7 | 131.6 | 149.0 | 168.1 | 34.5 | 27.0 | 5.2 | 29.1 | 7.0 | 7.1 | 7.2 |
| Italian lira | 37.7 | 57.5 | 69.7 | 99.7 | 13.0 | 18.4 | 10.4 | 27.3 | 3.7 | 11.7 | 12.1 |
| Pound sterling | 154.8 | 178.2 | 186.7 | 237.3 | 31.7 | 14.5 | 10.1 | 30.8 | 3.7 | 17.2 | 22.9 |
| Canadian dollar | 81.7 | 83.5 | 83.7 | 77.0 | 20.5 | 6.7 | -2.1 | -6.3 | -2.6 | -2.9 | -0.2 |
| Spanish peseta | 10.6 | 10.7 | 13.2 | 17.9 | 3.5 | -0.7 | 1.4 | 5.7 | 1.2 | 1.9 | 1.2 |
| Netherlands guilder | 44.9 | 65.9 | 84.5 | 95.3 | 7.9 | 14.8 | 13.5 | 18.1 | 3.8 | 6.3 | 4.0 |
| Swedish krona | 3.5 | 5.1 | 5.3 | 5.2 | 0.6 | 1.0 | -0.4 | 0.0 | -0.2 | -0.2 | -0.4 |
| Swiss franc | 149.1 | 161.2 | 189.0 | 165.7 | -2.3 | -6.4 | 4.4 | 4.2 | 0.4 | 0.3 | 0.2 |
| Belgian franc | 2.2 | 2.3 | 4.3 | 13.4 | -0.4 | -0.3 | 2.0 | 9.3 | 0.2 | 8.0 | 0.1 |
| Other | 159.1 | 179.0 | 217.9 | 235.7 | -8.0 | 2.7 | 29.5 | 23.8 | 9.2 | 9.1 | 7.0 |
| Total | 2,037.8 | 2,441.7 | 2,802.5 | 3,225.9 | 197.5 | 285.4 | 311.6 | 540.1 | 108.2 | 176.6 | 137.6 |

Source: Bank for International Settlements.

In early 1994 the tightening of policy by the Federal Reserve Board was associated with one of the greatest corrections in global bond markets in history. Increased interest rates in the major industrial countries caused portfolio rebalancing in fixed-income markets away from the riskier markets, in part because of expectations of slower economic activity and thus a weakened ability of riskier credits to service their debts. In 1994, the correction was exacerbated by the unwinding of highly leveraged positions along the then very steep U.S. yield curve—when the Federal Reserve tightened monetary policy in February 1994, the rush to cover these short positions hastened and steepened the correction in bond markets. By contrast, market participants report that currently there is not a lot of leverage in the fixed-income markets. As noted above, there have been leveraged positions associated with the yen-carry trades, but these positions appear to have been unwound in 1997 because of the yen's strengthening and concern that interest rates may soon rise in Japan.

Markets have largely priced in the supposition that EMU will go ahead on time and that there is a high probability that many of the non-core countries will participate, if not in early 1999, then within the subsequent one to two years. It is widely believed that the major risk to EMU going ahead on time is that weak economic growth in Germany and France would prevent both countries from meeting the deficit criteria specified in the Maastricht Treaty. In such an event, proceeding with EMU by adopting a looser interpretation of the Maastricht criteria would open the door to a larger number of countries being eligible to participate in EMU from the start. The implications of continued weak growth and a larger number of initial participants in EMU could lead to increased volatility in European bond markets.

Spreads in Europe, whether current spot spreads or implied forward spreads, could in general reflect two factors: first, improved fundamentals—lower inflation, fiscal consolidation, and currency stability—and, second, the possibility that the conversion of currencies into a new (blended) currency has the effect of imputing value to fixed-income assets denominated in the weaker currencies. Short-term yield spreads are still quite large for the traditionally high-yield countries, and this, in tandem with the fact that yield curves for these countries are much flatter than for the core EMU countries, explains why implied forward yield spreads are projected to narrow significantly over the next few years. An important uncertainty is whether this expectation of further convergence is attributable to further improvements in economic fundamentals or to expectations that EMU will impute a direct benefit—in terms of lower yields—to the higher-yielding currencies.

Empirical studies have found that most convergence can be attributed to improved economic funda-

mentals.⁵ There is also a consensus among market participants that current spreads reflect improved inflation and fiscal outlooks in the higher-yielding countries, and by implication are not simply reflecting the expectation that some countries will benefit directly from a new currency that is supported by a firm monetary policy of the future European Central Bank (ECB). Nevertheless, concerns have been raised by market participants about two issues. First, it has been suggested that there is some risk that positions currently in place in European fixed-income markets could be sensitive to, say, a change in German monetary policy. In such a scenario, this could be associated with a sell-off in the U.S. markets to cover losses in the European swaps market. Second, market participants report that there exists a risk of the convergence plays on the high-yielding currencies unwinding if concerns arise in financial markets about the EMU process that call into question the future macroeconomic policies of peripheral countries. While an announcement of delayed entry for some of these countries is widely thought to imply some widening of spreads in these markets, such consequences could be managed so long as entry itself was not threatened.⁶

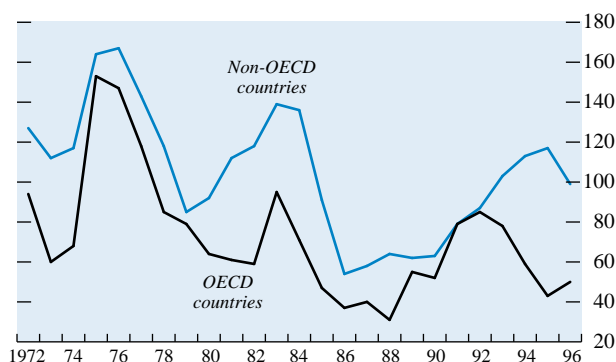
International Syndicated Loan Markets

Volumes and Margins

Keen competition from securities markets and from within loan markets maintained high volumes and slim margins in the international loan markets (Figure 45, and Table 6). Stimulative monetary policy in Europe boosted liquidity in European banking systems and, in tandem with sluggish growth in Japan and continental Europe, this liquidity spilled over to the international banking markets, and from there into those countries with buoyant economic activity (e.g., the United Kingdom, Australia, and the United States). Syndicated lending volumes have been spurred by refinancing operations, funding associated with mergers and acquisitions (particularly in the United Kingdom), backup facilities associated with commercial paper and asset-backed securities issues, and project financing—including loans arranged as components of financing packages involving securities and bank loans. Overall, announced syndicated credits rose 68 percent

⁵See, for example, Goldman Sachs International (1997a).

⁶As a major U.S. investment bank wrote in February 1997: "Our results suggest that the market valuation of Italian bonds has generally moved independently of the debates concerning the actual starting date for the EMU project and the timing of Italian participation in it. Unless the whole EMU project and/or Italy's eventual participation are put very seriously at risk, Italian assets would not necessarily suffer from Italy's delayed participation in EMU. Movements in economic fundamentals will continue to be the bond market's main driving forces." (Goldman Sachs International, 1997a, p. 1).

Figure 45. Spreads on Eurocredits¹*(In basis points)*

Source: Organization for Economic Cooperation and Development (OECD).

¹Weighted average of spreads (over LIBOR) applied to Eurocredits signed during the period. Tax-sparing loans as well as facilities classified under "other debt facilities" are excluded.

in 1996 over 1995, or more than double the level in 1994. Syndicated loans to U.S. borrowers, however, soared 386 percent in 1996, an increase of \$218.4 billion, which is more than the \$213 billion increase in announced credits to all other countries combined.

Japanese banks continued their retreat from international lending markets in 1996, and this worked to hold back overall activity, especially in the interbank market: international lending by Japanese banks contracted by \$20 billion in 1996, while fund-raising by Japanese banks in the international markets fell by \$7.5 billion (Table 27 and Statistical Appendix Table A4). In terms of the share of international banking assets by nationality of banks, Japanese banks dropped 3 percentage points in 1996, which pushed their share to a 13-year low of 22 percent.⁷ Activity by U.S. banks in the international markets was buoyed by increased demand in the Eurodollar market and financing associated with the increased demand by foreigners for U.S. bonds. Much of the activity in international banking markets was associated with the aggressive pursuit of foreign business by European banks, and especially German, Italian, Benelux, Swiss, and U.K. banks. Market participants report that convergence plays associated with EMU have been an important factor in the increased activity of European banks.

It has been widely reported that margins continued to come under pressure in 1996, but this is not reflected in data on weighted-average spreads for OECD countries (see Figure 45). These aggregate loan margins may mask the fact that lending activity

has expanded into new areas geographically as well as to new, lesser-known names with reportedly slim risk-adjusted margins. Indeed, the evidence is clear that margins on loans to non-OECD credits did narrow in 1996. In any case, these considerations prompted once again warnings from regulators that diligence must not be ignored in extending credits at razor-thin margins. U.S. regulators, in particular, expressed concerns also with the lengthening of maturities and relaxation of covenants to higher-risk borrowers.

Structural Developments

A notable development in cross-border banking is an increased displacement of traditional interbank credit by repurchase agreements (repos). There are many varieties of transactions that could be classified as repos, but they all consist of a contract that functions as a collateralized loan, and an agreement to repay the loan—repurchase the collateral—by a specified time (typically less than a week). The U.S. repo market is the oldest and also the largest such market, not least because most other countries have only recently introduced repo markets—most often owing to deregulation of money markets. For instance, repo markets opened in 1997 in Germany and in 1996 in the United Kingdom.

Only the international repo market comes close to the size of the U.S. repo market, a fact that reflects in large part the key role of U.S. institutions in the international markets and, thus, the integration of the U.S. domestic repo market with the international repo market. Recent estimates place outstanding repos at about \$1 trillion in the international market—or roughly 10 percent of the stock of gross international bank lending—which is similar in magnitude to the U.S. market (Table 28).⁸ Assuming an average life of about one week, this suggests annual turnover in the neighborhood of \$40–\$50 trillion. More important, the growth rates of repo markets have been high: the U.S. repo market has grown at about 20 percent annually in the 1990s, and during their first year of operation, repo markets in the United Kingdom and elsewhere have expanded very quickly.

The proliferation of repo agreements in interbank markets is attributable to several factors. First, there has been a heightened awareness of the credit risk associated with banks' expansion into less familiar geographic markets and also perhaps increased concern about the credit risk associated with advancing traditional lines to some of the major banks active in the international markets. Second, with banks increasingly active in securities markets, the repo market provides access to cheaper short-term funds than uncollateralized funds. Similarly, the other side of the

⁷Bank for International Settlements (1997).

⁸See Bank for International Settlements (1996b).

Table 27. Changes in Net Assets of BIS-Reporting Banks vis-à-vis Banks in Selected Countries and Regions¹*(In billions of U.S. dollars)*

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|----------------------|-------|-------|-------|-------|--------|-------|-------|
| All countries | -38.3 | 73.7 | 95.4 | 267.1 | -299.0 | 206.8 | ... |
| Industrial countries | -22.7 | 87.1 | 22.2 | 179.9 | -146.7 | 172.1 | 51.9 |
| Of which | | | | | | | |
| United States | 28.1 | 3.8 | 74.1 | 124.4 | 3.4 | 53.2 | -21.3 |
| Japan | 47.0 | -24.1 | -59.9 | -7.8 | -6.3 | -12.4 | 18.7 |
| Germany | -21.5 | 13.1 | 55.2 | -37.5 | 61.7 | 43.8 | 23.9 |
| France | -17.0 | -7.5 | -52.1 | 0.8 | 12.0 | -10.1 | 21.9 |
| Italy | 26.0 | 36.3 | 43.3 | -18.0 | 1.7 | -22.2 | -9.3 |
| United Kingdom | -32.1 | 44.4 | 27.4 | 116.0 | -141.9 | 88.7 | 19.0 |
| Canada | 2.6 | 3.9 | 10.9 | 12.4 | -5.8 | -6.2 | -10.9 |
| Developing countries | -29.0 | 50.1 | 79.6 | 80.9 | -115.3 | 112.0 | 54.5 |
| Africa | -3.9 | -3.7 | -3.1 | -1.0 | -5.4 | -3.9 | -2.7 |
| Asia | 43.4 | 58.1 | 43.6 | 44.7 | 37.1 | 128.7 | 78.8 |
| Europe | -1.8 | -1.4 | -8.2 | -5.8 | -29.4 | -6.0 | 14.5 |
| Middle East | -22.8 | 4.1 | 23.0 | 16.7 | -0.9 | -13.9 | -19.4 |
| Western Hemisphere | -43.9 | -7.0 | 24.2 | 26.3 | -116.8 | 7.1 | -16.7 |

Source: Bank for International Settlements (BIS).

¹BIS-reporting banks comprise banks in the Group of Ten countries (Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom, and the United States) plus Austria, Denmark, Finland, Ireland, Luxembourg, Norway, and Spain, and foreign affiliates of these banks.

repo transaction—a “reverse repo” (a purchase with an agreement to resell at a specified price on a future date)—provides greater security because of the collateralization of the loan advanced. Third, (reverse) repo transactions are a more efficient use of a bank’s capital than traditional interbank lines: capital requirements on banks’ lending activities—including those of the Basle Capital Accord of 1988—provide for capital weights on collateralized loans corresponding to the weight attached to the collateral, which is zero for OECD government securities. Fourth, the increased emphasis on repos has fostered the development of standardized collateralization procedures and documentation which has, in turn, further facilitated the use of this method of interbank funding.

The rapid proliferation of repos in interbank markets has resulted in a closer integration of securities

markets and banking markets. This integration has also been promoted by the participation of institutional investors and investment banks in the international loan markets. This is evidenced by the prevalence of securities structures such as note issuance facilities—including commercial paper facilities and medium-term notes programs—that have reduced the distinction between bank loans and securities issues. Further, financing packages that entail a blend of securities financing and bank loans have also become common. The distinction between loans and securities will undoubtedly narrow as new tools are developed for pricing (and thus trading) credit risk and as mergers between commercial and investment banks proceed.

The increased integration of securities markets and banking has also been facilitated by progress in securitizing loans, which has been fostered by the desire of many banks to economize on capital and thus pare loans from their balance sheets. The securitization of loans has proceeded along two dimensions. One dimension is establishing secondary markets for loans, which has already been implemented in the United States and is the objective of the recently formed Loan Markets Association in London. The second dimension is bundling portfolios of loans with the objective of securitizing the bundle. The issuance of these asset-backed securities (ABS) has grown rapidly in recent years. According to the Federal Reserve Board, in the United States asset-backed securities outstanding reached \$738.1 billion in 1996. Although this represents less than 4 percent of all U.S. credit market debt—amounting to \$19.9 trillion in 1996—its rate of

Table 28. United States: Outstanding Repurchase Agreements (Repos)*(In billions of U.S. dollars)*

| | Overnight and Continuing Repos | Term Repos |
|-------------------|--------------------------------|------------|
| 1990 | 242.72 | 188.64 |
| 1991 | 276.80 | 237.57 |
| 1992 | 367.26 | 324.23 |
| 1993 | 438.66 | 372.86 |
| 1994 ¹ | 441.94 | 344.27 |
| 1995 | 522.44 | 360.79 |
| 1996 | 571.03 | 428.55 |

Source: Board of Governors of the Federal Reserve System.

¹Break in the series.

growth has been two to three times that of overall credit market debt. Although asset-backed securities markets include the packaging of claims on bank loans to consumers and firms, credit card debt, and, in the international markets, the securitization of various types of receivables from developing countries, the market for securities-backed syndicated loans and junk bonds—collateralized loan obligations and collateralized bond obligations, respectively—are two segments of this market that have been particularly robust in the 1990s, after suffering a setback associated with the collapse of the high-yield bond market in the United States in the late 1980s.

Equity Markets

Recent Developments

Equity prices in industrial countries rose sharply in 1996 and this trend has continued in 1997. In local currencies, European markets have generally been the star performers, with most markets comfortably outperforming the 20 percent advance in U.S. equity prices in 1996 and the further 14 percent gain in U.S. equity prices during the first five months of 1997 (see Table 23 and Figures 8–9). Some of the momentum in European equity markets has been attributed to improved prospects for the exporting sector associated with the depreciation of most currencies in continental Europe against the dollar. This depreciation of local currencies against the dollar is clearly reflected by the fact that European equity prices rose substantially less when measured in U.S. dollar terms, although they still generally posted gains on a par with the U.S. market.

Underlying the strong performance of equity prices has been a downward trend in inflation and interest rates in the industrial countries, both of which are important for the discounted real value of future corporate earnings. In Japan, very low inflation and interest rates in 1996 were not sufficient to boost equity prices, largely because of lingering concerns about the health of the financial sector. On a risk-adjusted basis, the performance of Japanese equities relative to money market rates in recent years has lagged behind the performance of other major industrial country equities (Table 8 and Figure 8), although Japanese equity prices have shown evidence of strengthening in 1997.

Among the major industrial countries, the U.S. equity market has clearly been the star performer in the 1990s (see Figure 8). Canada has trailed the U.S. market somewhat, and Japan has followed a different course after the collapse of its asset-price bubble at the beginning of the decade. In Europe, the U.K. market has been the strongest performer, reflecting the relative performance of the U.K. economy and thus

corporate earnings. Equity prices have picked up recently in France and Germany, while following a more erratic course in Italy. The key questions that these very different performances raise are, first, whether there are indications of overvaluations in the United States given the duration of the market's rally and, second, why the Japanese equity market has languished.

Japanese equity prices have been weighed down by at least two factors. For one thing, there has been net selling pressure by important segments of the domestic investor base—life insurance companies, banks, nonfinancial companies, and equity investment trusts. Negative cash flow experienced by some of the major institutional investors in Japan (e.g., life insurance companies) has forced these investors to be net sellers of equities; in addition, weak balance sheets of other financial sector companies have led them to liquidate their equity holdings. Prior to the collapse of the asset-price bubble in 1989, investment trusts had more than half of their assets invested in Japanese equities. Since 1989, this share has fallen steadily, and by the first quarter of 1997 was just over 20 percent. This drop in portfolio allocation has been due in part to lower equity prices, but in recent years there have also been net redemptions from equity investment trusts. The large amount of liquidity in the nonfinancial corporate sector—which, as discussed above, has resulted in stagnant loan growth in the banking system—has not had the effect of supporting equity prices through share buybacks because of the current tax code. Indeed, if not for the net buying of Japanese equities by foreign investors and public institutions, Japanese equity valuations would have been even weaker.

Second, lower equity prices have raised concerns about their potentially damaging effects on business and consumer confidence as well as on bank balance sheets. The latter concern stems from banks' direct holdings of equities, their reduced ability to issue convertible bonds to raise capital, and the possible deterioration in both the quality of bank loans that weakness in equity prices might reflect as well as the value of the collateral underlying loans.⁹ Reflecting these concerns, bank stocks have underperformed the broader market by a substantial margin: from the beginning of 1996 to May 1997, the TOPIX index recorded a drop of about 10 percent, whereas the TOPIX bank index fell about three times as much.¹⁰

A rebound in Japanese equity prices, therefore, rests on the resolution of some important sources of uncer-

⁹At end-1996, banks' direct holdings of equities were on average about 6 percent of total assets, although equity holdings vary considerably across banks (Bridgewater Associates (1997a)).

¹⁰The TOPIX is a capitalization-weighted index of all companies listed on the First Section of the Tokyo Stock Exchange. The TOPIX bank index represented 18 percent of the TOPIX index on July 10, 1997.

tainty. There can be little doubt about the positive prospects for Japan's exporters—automobile, machinery, and electrical equipment companies—in the current environment, but the overall index is likely to be held back by financial stocks and the lack of local investor support to the market. A resolution of the financial system problems in Japan would undoubtedly be an important positive development for Japanese equity prices.

In the United States, the rise in equity prices since early 1996 has been matched by stocks in many other industrial countries. However, this rise in the U.S. market came on top of larger and more sustained price gains in the first half of the 1990s. Indeed, since the beginning of the decade, U.S. equity markets have outperformed most other industrial country markets, in some cases by a factor of two or more. To some extent, these differences reflect the different stages of the economic cycle, with the U.S. expansion at a much more mature phase than that in Europe and Canada. It is also worth noting that over a longer historical period—going back to 1970—the performance of the U.S. market adjusted for exchange rate changes is quite similar to the performance of the French, German, and U.K. markets and still falls well short of the Japanese market (Figure 46). While the Japanese market has been particularly weak in the 1990s, it remains at relatively high levels given the very rapid price growth prior to the 1989 crash.

Although improved profits and lower interest rates may account for a large part of the rise in U.S. equity markets, the size and pace of the upswing, as well as its longevity, have raised questions about possible overshooting. The Dow Jones Industrial Average has taken just 4 years to double in value since 1992, compared with a previous historical average of 17 years. From 1900 through early 1997, the Dow Jones index has risen at an average annual growth rate of just under 5 percent (excluding dividends), but it rose more than 25 percent in 1995 and then again in 1996. Indeed, about two-thirds of the market's gain since 1970 has occurred in the 1990s, and about half since the beginning of 1995. Measured relative to GDP, U.S. market capitalization has increased from 69 percent in 1970 to about 107 percent in 1996.

To put the market's recent performance in context, it is helpful to compare it with the other great bull markets. Two previous periods of rapid increases in U.S. equity prices stand out. The first ran from October 30, 1923, through September 3, 1929, and the second great bull market ran from April 28, 1942, through January 18, 1966.¹¹ During the 1923–29 period the Dow Jones index rose by 343 percent, which translates into a 25 percent annual increase. During the 1942–66 period the index rose 969 percent, which

represents an annual growth rate of 10 percent. In comparison, the Dow has risen about 800 percent from August 1982 through early 1997, or about 15 percent annually. Focusing on a narrower window covering just the past two or three years would double this annual rate of increase. In any case, the current bull market is of the same order of magnitude as the two previous great bull markets. It should be borne in mind, however, that two of the greatest bear markets in the United States occurred after these two bull markets.

Improved fundamentals clearly underlie an important part of the rise in U.S. equity prices since the beginning of the decade. First, reductions in inflation and interest rates are generally correlated with movements in stock values—Japan is the lone, notable exception in recent years. Second, the rise in corporate profits, absolutely and as a share of national income, since early in the decade corresponds to an important part of the rise in market valuation relative to the size of the U.S. economy. The share of corporate profits in national income has reached its highest level in 20 years (Figure 47). But the key question is whether current market valuations also reflect expectations of further increases in the share of profits that may prove unrealistic.

On March 5, 1997, Federal Reserve Board Chairman Alan Greenspan addressed this question when he stated: “If you look at a normal pricing model for stocks, what you get is a not unreasonable level of prices if the earnings forecasts which the analysts are publishing are accurate.”¹² These earnings forecasts are indeed high in a historical context, especially longer-term forecasts. In the mid- to late-1980s, five-year real earnings growth forecasts fluctuated between 5 and 6 percent. Since 1990, they have gone straight up and by the second quarter of 1997 they were about 10 percent.¹³ An important reason for these unusually high earnings forecasts was noted above: actual earnings have been remarkable in the past five years or so, and thus earnings forecasts have simply been brought into line with recent experience. Earnings for the Standard & Poor 500 companies in the first quarter of 1997 grew by about 15 percent over the level a year earlier, and a majority of companies' actual earnings exceeded analysts' forecasts.

Risks to U.S. Equity Prices

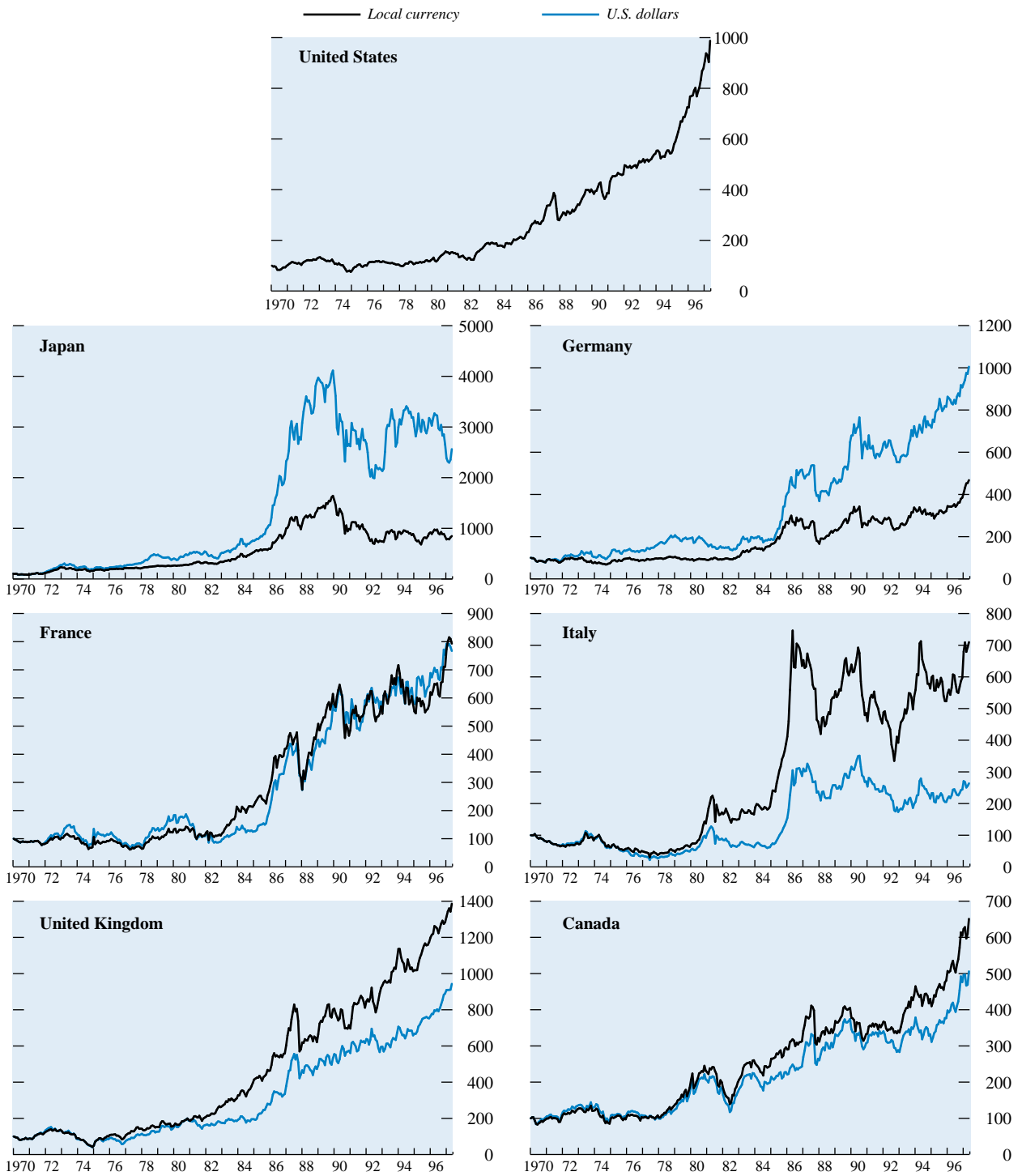
Perhaps the key question in assessing the sustainability of U.S. equity prices is whether companies can continue to grow their earnings at double-digit rates. Average five-year real earnings growth since 1960 has been just over 2 percent; this raises the likelihood that

¹¹See Emmons (1997).

¹²Quoted from Bloomberg Business News (1997).

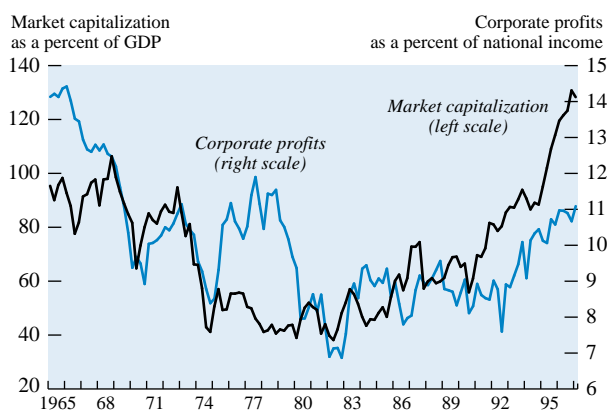
¹³Bridgewater Associates (1997b).

Figure 46. Major Industrial Countries: Stock Market Indices¹
 (Indices, January 1970 = 100)



Sources: Bloomberg Financial Markets L.P.; International Monetary Fund, *International Financial Statistics* database; and The WEFA Group.
¹Monthly averages of daily observations from January 1970 through May 1997.

Figure 47. United States: Corporate Profits and Market Capitalization¹



Source: The WEFA Group.

¹Corporate profits are before deducting the federal, state, and local taxes. Data for 1965:Q1 to 1997:Q1.

the balance of risks to earnings is below analysts' forecasts. These risks derive from the observation that profit margins cannot continue to improve in an environment of near-capacity economic activity and tight labor markets. The unemployment rate in the United States reached a quarter-century low of 4.9 percent in April 1997.

There are other reasons to be cautious about current valuations of U.S. equities (see Figure 10). First, dividend yields at about 2 percent have fallen to historic lows and are about half their long-term average. This fact may be partly explained by changes in tax laws and an increasing share of tax-exposed investors. Moreover, current dividend yields are not unusual in an international perspective: dividend yields in 1996 were under 2.5 percent in Japan, Germany, Italy, Canada, Sweden, Switzerland, Austria, Denmark, Finland, and Norway, and above 3.5 percent only in the United Kingdom, Australia, Belgium, and New Zealand.¹⁴ Second, the market-price-to-book ratio, and the closely related Tobin's q ratio, indicate substantial departures from their historical ranges. Although largely explained by the shift away from capital-intensive industries to services, the rise in the ratio of equity prices to book value is still extraordinary. And third, the average price-earnings ratio, while not yet outside its long-term range, is clearly approaching the upper end. On the other hand, given the favorable interest rate environment, the equity-yield gap, which measures the difference between long-term bond yields and the inverse of the P/E ratio, remains within

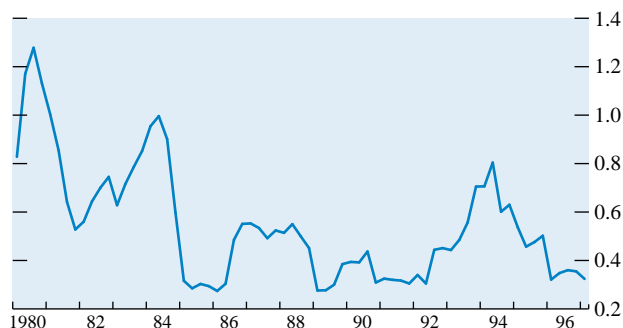
its historical range and, significantly, is still well below the levels reached prior to the 1987 stock market crash. Also, some analysts have argued that the dividend yield is now a less relevant indicator because many investors hold equities for capital gain rather than current income, and also that price-asset ratios have become less meaningful in view of the growing importance of service-based industries.

Some market commentators have suggested that it is inappropriate to judge current valuations by comparing standard valuation indicators to historical ranges. The argument put forward is that the U.S. business cycle has fundamentally changed insofar as the length of economic expansions has increased while the length of economic recessions has decreased.¹⁵ Possible reasons for this structural change include just-in-time inventory management, trade liberalization, more flexible labor and capital markets, and financial market deregulation. Thus, the argument goes, corporate earnings have become less volatile, so the equity risk premium (over government bonds) has declined. Interpreting this argument in the context of the usual model for equity prices as representing the present discounted value of dividend payments, the associated decrease in the discount rate (from a drop in the risk premium component) can easily produce the conclusion that equity prices could increase sharply over a short period of time just owing to a modest decrease in the risk premium. Note that this hypothesis is equally applicable to explaining the narrowing in corporate bond yield spreads discussed under "Bond Markets" above. It is difficult to test this hypothesis as the risk premium is unobservable and estimates can vary widely. Nonetheless, although equity price volatility has shown some increase recently, earnings volatility has dropped sharply, which is consistent with this hypothesis (Figure 48).

On balance, it does not seem that U.S. equity markets are as far out of line as they were in 1987 or as Japanese markets were in 1989, when bond yields were high and rising, corporate earnings were much weaker, monetary policy was stimulative for several years leading up to the markets' corrections, and general asset-price inflation was apparent, especially in real estate markets (see Appendix 3 at the end of this annex). However, they clearly are at levels that make them vulnerable to negative shocks in the form of higher interest rates, which played an important role in the last two major stock market crashes (the 1987 U.S. and 1989 Japanese corrections), or lower corporate earnings. Also, market volatility has increased significantly in 1996, though this appears to represent a return to more normal levels after a period of unusual stability (see Appendix 2). Finally, the rapid run-up in

¹⁴BZW Securities Limited (1997).

¹⁵For instance, this view is advanced in Goldman Sachs International (1997b).

Figure 48. United States: Corporate Profits Volatility¹

Source: IMF staff calculations using data from The WEFA Group.

¹Calculated as standard deviation for the previous two years ending in the quarter shown of corporate profits (in percent of national income). Data for 1980:Q1 to 1997:Q1.

equity prices in late 1996 and into 1997—which seems more difficult to justify on the basis of improved fundamentals—also may suggest a cause for concern.

One of the factors that has helped propel the U.S. market upward has been significant net inflows from small investors, routed mostly through the conduit of equity mutual funds (Table 29 and Box 5). From 1989 to 1995, household (direct and indirect) holdings of

equities rose from 32 percent of all households to 41 percent, and equity holdings as a share of total financial assets of households rose from 26 percent to 40 percent.¹⁶ The net inflow into U.S. equity mutual funds from January 1995 through April 1997 totaled \$424 billion, almost \$300 billion of which occurred since the start of 1996. To put the role of equity mutual funds into perspective, in April 1997 they managed \$1.88 trillion in assets, which is equal to 20 percent of the market capitalization of the New York Stock Exchange, the American Stock Exchange, and NASDAQ (the over-the-counter market) combined.¹⁷ The relative attractiveness of expected returns on equities, in comparison with other savings vehicles, has been at work here. But the historically low volatility of stock prices in recent years (see Appendix 2) may also have reassured investors. Recently, volatility, as reflected in options premiums, has been picking up (Figure 49). It remains to be seen how recent equity investors will react to an environment where equities appear more risky and turn in less spectacular gains.

There are reasons to expect that a sharp correction in equity prices—which would reduce price-earning ratios to near the long-term average—need not have serious consequences for the U.S. economy. Consumer spending has not been driven sharply upward

¹⁶See Board of Governors of the Federal Reserve System (1997).

¹⁷These data are from the Investment Company Institute.

Table 29. U.S. Mutual Funds: Net New Cash Flow and Total Assets

(In billions of U.S. dollars)

| | Net New Cash Flow | | | | | | Assets | | | |
|------------------|-------------------|-----------------|----------|---------|--------------------------|-----------------------|---------|--------------|-----------------------|--------------------|
| | Total | To equity funds | | | To bond and income funds | To money market funds | Total | Equity funds | Bond and income funds | Money market funds |
| | | Total | Domestic | Foreign | | | | | | |
| 1984 | 54.2 | 5.9 | 4.9 | 0.9 | 13.3 | 35.1 | 370.6 | 83.1 | 54.0 | 233.6 |
| 1985 | 68.3 | 8.5 | 7.7 | 0.8 | 65.2 | -5.4 | 495.5 | 116.9 | 134.8 | 243.8 |
| 1986 | 164.4 | 21.9 | 17.7 | 4.2 | 108.6 | 33.9 | 716.2 | 161.5 | 262.6 | 292.2 |
| 1987 | 40.1 | 19.1 | 19.6 | -0.6 | 10.9 | 10.2 | 769.9 | 180.7 | 273.2 | 316.1 |
| 1988 | -23.1 | -16.2 | -13.8 | -2.4 | -7.0 | 0.1 | 810.3 | 194.8 | 277.5 | 338.0 |
| 1989 | 73.0 | 5.8 | 4.6 | 1.2 | 3.1 | 64.1 | 982.0 | 249.0 | 304.8 | 428.1 |
| 1990 | 44.5 | 12.8 | 6.3 | 6.5 | 8.5 | 23.2 | 1,066.8 | 245.8 | 322.7 | 498.4 |
| 1991 | 112.3 | 39.5 | 36.4 | 3.2 | 67.2 | 5.5 | 1,395.5 | 411.6 | 441.4 | 542.4 |
| 1992 | 156.5 | 79.2 | 72.1 | 7.0 | 93.7 | -16.3 | 1,646.3 | 522.8 | 577.3 | 546.2 |
| 1993 | 229.2 | 129.6 | 91.1 | 38.5 | 113.7 | -14.1 | 2,075.4 | 749.0 | 761.1 | 565.3 |
| 1994 | 84.6 | 119.3 | 75.4 | 43.9 | -43.4 | 8.8 | 2,161.5 | 866.4 | 684.0 | 611.0 |
| 1995 | 212.8 | 128.2 | 116.5 | 11.7 | -4.8 | 89.4 | 2,820.3 | 1,269.0 | 798.3 | 753.0 |
| 1996 | 323.7 | 221.6 | 175.3 | 46.3 | 12.6 | 89.4 | 3,539.2 | 1,750.9 | 886.5 | 901.8 |
| 1997 | | | | | | | | | | |
| January | 53.9 | 29.1 | 23.0 | 6.1 | 3.6 | 21.2 | 3,687.0 | 1,854.7 | 897.6 | 934.7 |
| February | 40.9 | 16.1 | 13.7 | 2.4 | 2.3 | 22.5 | 3,731.1 | 1,865.5 | 907.2 | 958.4 |
| March | 10.1 | 10.7 | 8.1 | 2.7 | -2.0 | 1.4 | 3,666.0 | 1,810.2 | 890.3 | 965.5 |
| April | -5.8 | 15.7 | 10.6 | 5.1 | 0.8 | -22.3 | 3,729.0 | 1,879.0 | 903.1 | 946.9 |
| May ¹ | ... | 18.5 | ... | ... | 2.5 | ... | ... | ... | ... | ... |

Source: Investment Company Institute.

¹Estimated.

Box 5. Trends in Funds Management

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. In 1985, the 10 largest 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.¹ Growth has been especially marked in mutual funds. U.S. mutual fund assets have risen at double-digit growth rates since 1970 when they amounted to just \$48 billion.² By the mid-1980s mutual fund assets had reached \$495 billion, and by April 1997 they totaled \$3,729 billion. Over the 1970–97 (April) period, the number of U.S. mutual funds increased from 361 to almost 6,500, and the number of individual accounts with mutual funds increased from about 11 million to 151 million. Although the institutionalization of savings, and especially the shift by households from bank accounts toward mutual funds, has not been as marked in most other industrial countries as it has in the United States, the trend is apparent in other countries also and this process is widely expected to gather momentum in coming years.

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. In part because the fund management business is a low-overhead busi-

ness, the response of the industry to intensified competition for funds has been consolidation. This consolidation activity has been evident in two main features of the fund management business.

First, in an increasingly global financial market, the importance of geographic presence has lessened, and thus fund management companies have responded to competitive pressures by consolidating their operations geographically. Global asset management companies are increasingly consolidating operations in one center, such as San Francisco, Boston, or London. For instance, Dresdner Bank, Germany's second-largest bank, and Barclays Bank, the largest bank in the United Kingdom, both announced in late 1996 that they were consolidating their global asset management operations in San Francisco. This geographic consolidation has been facilitated by the ability of fund management companies to contract out aspects essential to the business of fund management, but which are distinct from the management of funds per se. In particular, the development of mutual fund "supermarkets" that offer the services of a wide variety of fund management companies at the retail branch level has led to a geographic separation of the fund manager and the investor in those funds. Similarly, fund management companies have increasingly contracted out back-office functions to third parties, which themselves may be geographically far removed from the fund managers.

Second, there has been a great deal of merger and acquisition activity among fund management companies, particularly in the past few years. Fidelity Investments, the largest institutional investor in the United States, managed \$426.7 billion in assets at end-1995, almost two-and-a-half times the assets (in 1995 dollars) of the largest institutional investor in 1985, Pru-

¹*Institutional Investor* (July 1996).

²Data on U.S. mutual funds are from the Investment Company Institute.

by the rise of the market during 1996, and a market fall back would presumably not induce a sharp fall in final demand. Moreover, the strength of the economy and financial institutions along with an improved securities market infrastructure all suggest the consequences of a significant correction could be managed without having major consequences for the health of the economy. Such expectations are consistent with the experience after the 1987 crash (see Box 6 on Circuit Breakers).

Derivative Markets

Recent Developments

Growth of the global derivative markets during the past decade has been phenomenal both in the exchange-traded sector and in the over-the-counter markets (Statistical Appendix Tables A5–A7; see also Ta-

bles 9–10). During the period 1986–96, the annual trading volume of exchange-traded contracts—including interest rate futures and options, currency futures and options, and stock market index futures and options—nearly quadrupled, reaching 1.16 billion contracts at end-1996. The growth of these markets has been even larger when measured by outstanding notional principal: the average annual growth rate of outstanding notional principal of exchange-traded contracts has been 32 percent over the past decade and stood at \$9.9 trillion at end-1996. The growth and the size of the over-the-counter markets is even more impressive: the notional principal of outstanding currency and interest rate swaps and interest rate options reported by members of the International Swaps and Derivatives Association (ISDA) rose from \$0.9 trillion in 1987 to \$24.2 trillion in 1996, representing an annual average growth rate of 45 percent.

More comprehensive surveys of the current size of global derivative markets paint an even more striking

dential.³ 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 1995 dollars) managed by the 300th-largest asset manager in 1985. This points clearly to a consolidation of assets, with the largest asset managers growing much more rapidly than the smaller asset managers. Although Fidelity's growth in total assets under management slowed in 1996—it received just 10 percent of net equity mutual fund inflows versus 20 percent in 1995—it is a very large player, with some estimates attributing 12–15 percent of turnover in U.S. equities to Fidelity alone. In Europe, too, consolidation in the fund management industry has taken hold in recent years. In late 1996, two French insurance groups, AXA and UAP, announced plans to merge to create one of the world's largest asset managers, with combined assets of \$420 billion (end-1995 figures), rivaling Fidelity of the United States.

So, while it is clear that consolidation is having profound effects on the size of the larger asset managers, can one conclude that investment assets are concentrating in the hands of just a small number of mammoth asset managers? The evidence does suggest that consolidation is working in this direction, but the pace is not as fast as might be imagined, particularly in the United States. In 1985, the top 10 asset managers accounted for 23 percent of the assets of the largest 300 asset managers, and this share was the same five years

³The figures reported here and below on institutional investors are calculated from figures reported in *Institutional Investor* (various issues) and the IMF's *International Financial Statistics*.

later.⁴ By end-1995, however, this figure had increased modestly, to 27 percent. Moreover, the top 100 asset managers increased their share of the assets managed by the top 300 asset managers by 9 percentage points over 1985–95, accounting for 83 percent of assets at end-1995. Similarly, in Europe, the top 10 asset managers increased their share of assets managed by the top 100 asset managers by 7 percentage points over the period 1991–95, from 31 to 38 percent of the assets of the largest 100. Consolidation activity, therefore, seems to have increased the relative size of the largest asset managers much more in Europe than in the United States. In the United States, consolidation activity has been more broadly based, increasing the relative size of the largest hundred or so asset managers. However, it is noteworthy that classification of asset managers geographically is becoming increasingly meaningless—as mentioned above, recently some large European asset managers have consolidated global asset management activities in the United States. Moreover, consolidation activity has increasingly been across borders, reflecting a tendency toward the evolution of global asset managers.

In light of the forces affecting the fund management industry in recent years and the response of the industry to those forces, it is widely held that the outlook for the industry contains considerably more consolidation in the industry as well as geographically. An oft-painted scenario for the industry early in the next century is one in which there are a relatively small number of very large global companies each managing assets well in excess of \$150 billion and a number of smaller management companies surviving in regional niche markets.

⁴*Institutional Investor* (July 1996).

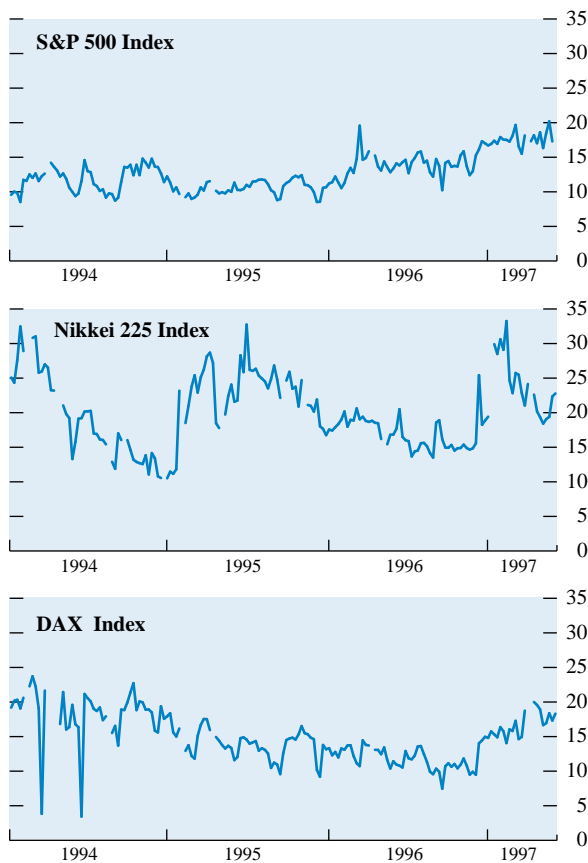
picture.¹⁸ According to the survey conducted by the Bank for International Settlements in early 1995, the notional value of outstanding OTC foreign exchange, interest rate, equity, and commodity derivative contracts totaled \$47.5 trillion (after adjusting for double counting and including estimated gaps in reporting) at the end of March 1995. About 98 percent of this total

¹⁸In April 1995, the Bank for International Settlements (BIS) coordinated the first survey by central banks in 26 countries of OTC and exchange-traded derivative markets in these countries, providing the most comprehensive survey to date and believed to capture about 90 percent of the intermediaries active in the derivative markets. The survey included swaps, forwards, and options for foreign exchange, interest rates, equities, and commodities, whereas the ISDA survey was limited to interest rate and foreign exchange swaps and options. Moreover, the BIS survey included many derivatives positions that were not recorded in the ISDA survey, not only because the BIS survey captured more market participants, but also because it reported many arm's-length derivatives contracts that are netted out in the ISDA survey.

is accounted for by interest rate (\$28.85 trillion) and currency derivatives (\$17.7 trillion). In addition to OTC derivatives, intermediaries that were involved in the survey coordinated by the BIS reported that they were engaged in a further \$16.6 trillion of exchange-traded derivatives. In aggregate, therefore, respondents to this survey of users of derivatives in 26 countries revealed that (after adjusting for double counting) they were involved in about \$64 trillion, by notional principal, of derivative contracts. To put this in perspective, the aggregate market value of all bonds, equities, and bank assets in Japan, North America, and the 15 European Union countries totaled \$68.4 trillion at end-1995, which is about 7 percent larger than the size of derivative markets as measured by the above survey.

Considering the sheer size of the derivative markets, sustained growth rates of the magnitudes reported above are unprecedented in global financial markets. This fact clearly points beyond purely cycli-

Figure 49. Implied Volatility: S&P 500, Nikkei 225, and DAX Indices



Source: Bloomberg Financial Markets L.P.

Note: Implied volatility is a measure of the expected future volatility of the index based on market prices of the call options on futures on the index. The annualized percent rate of change plotted in the figure is a weighted average of the estimates of the implied volatility of call option futures.

cal influences on derivative volumes, and in particular to the importance of structural factors fueling growth of these markets. Hedging and position taking associated with cyclical conditions are surely key motives for the use of derivative financial instruments to begin with—as reflected clearly in the sharp rise in the volume of interest rate products during the 1994 global bond market correction, for example—but the sustained growth of these markets does not derive from cyclical influences per se. Rather, the key structural factors influencing the growth of these markets are an increased understanding by financial and nonfinancial institutions of the capabilities these instruments offer for repackaging and reengineering major cyclical and balance-sheet risks, in tandem with technological, analytical, and numerical advances in pricing and evaluating the risks of derivative contracts.

Although the markets for derivative financial instruments, particularly in the major industrial countries but increasingly also in the developing world, are large by any measure, it is clear that sustained growth of the global derivative markets is not likely to abate soon. This momentum derives both from the major countries—where derivative markets for some of the largest risks, such as credit risk, are far from mature—as well as from the newer markets in the developing world—which have recorded the most dramatic growth in exchange-traded derivatives activity in the 1990s. Further growth in the global derivative market will present challenges to private risk management technologies and to supervision and regulation. Nonetheless, these markets, and the instruments traded in them, are increasingly better understood by dealers in the over-the-counter markets and by the financial and nonfinancial institutions that are the end users of derivative products.

Structural Changes in Derivative Markets

Three key structural changes have accompanied the rapid growth of derivative markets. First, derivatives have increasingly become a low-margin, high-volume business. This commoditization of derivative markets does not necessarily imply that the markets are becoming less personalized, or more centralized, but rather simply that the products traded in these markets have become familiar to market participants, and these markets have also become concentrated in well-understood, or “standard,” instruments. Some have attributed this standardization of products to the huge losses incurred by financial and nonfinancial enterprises associated with large derivative positions—including Orange County, Procter & Gamble, MG Corporation, and Barings. Although these losses were not always associated with positions in exotic products, the magnitude of the losses provoked an awareness and reevaluation of the purposes and risks of derivatives in general. The immediate consequence was a widespread withdrawal of demand for exotic, highly leveraged structures and a shift toward simpler structures—especially currency and interest rate swaps—and a refocusing on the risks and benefits of using these instruments. Some structures that have traditionally been regarded as exotic—notably, digital and barrier structures—have become mainstream products. This category of derivative products has its payoff tied—often in a binary fashion—to whether an underlying asset price reaches some trigger level; it has become mainstream because it facilitates the trading of volatility of asset prices directly. Products in this category accounted for an important share of activity in the currency and interest rate segments of the over-the-counter markets in 1996 and 1997.¹⁹

¹⁹See, for example, *Euromoney* (1997).

Second, derivative markets are consolidating, planting the seeds for an integrated, concentrated global market. In the over-the-counter market, the concentration of activity is already large. For instance, U.S. commercial banks had \$20 trillion notional principal of derivatives on their books at the end of 1996, of which 8 banks accounted for 94 percent and the top 25 banks accounted for 98 percent.²⁰ This concentration of derivatives activity among a small number of institutions in the United States mirrors the reality in global derivative markets, in which these same U.S. institutions account for a large share of OTC derivatives activity. Although it remains to be determined which, and how many, institutions are able to establish themselves as truly global financial institutions, it is clear that OTC derivatives activity has increasingly become concentrated among the handful of institutions that are best positioned to be global institutions, as these institutions are best able to intermediate risk management needs on a worldwide basis.

This globalization of derivative markets is also apparent in the exchange-traded segment of derivative markets. This is reflected most clearly by the proliferation of trading links among both major and smaller exchanges in all regions of the world. For example, the major U.S. derivatives exchanges—the Chicago Mercantile Exchange and the Chicago Board of Trade—have established links with foreign exchanges, and discussions continue between the two main U.S. exchanges over the possibility of a direct link between them. In 1996 alone, the Chicago Mercantile Exchange unveiled alliances with the *Marché à Terme International de France* (MATIF), London International Financial Futures Exchange (LIFFE), and Deutsche Terminbörse (DTB), the three major derivatives exchanges in Europe. For instance, the link between the Chicago Mercantile Exchange and the DTB permits DTB trading screens to be placed directly on the floor of the Mercantile Exchange for trading in German stock index (DAX) futures, while in the case of MATIF and LIFFE, the Chicago Mercantile Exchange is permitted to trade short-term European interest rate products after closing hours in Europe (an arrangement that mirrors the alliance between the Chicago Board of Trade and LIFFE for longer-term interest rate products).

Within Europe, consolidation of exchange-traded derivative markets has occurred as a result of trading links as well, but it has also been reflected in mergers and closures of exchanges. For instance, the Swiss (Soffex) and German (DTB) exchanges announced in late 1996 a strategic alliance that will create a common technical platform for trading derivatives and integrate the two clearing and settlement systems, and in 1997 the Danish and Swedish exchanges announced

plans to merge their dealing systems. In London, LIFFE and the London Commodity Exchange have recently been merged, and in Ireland the Irish Futures and Options Exchange was closed in August 1996.

As discussed in Annex IV, EMU threatens to eliminate much of the trading in exchange-traded derivative products in Europe, and thus the three major derivatives exchanges—DTB, LIFFE, and MATIF—are aggressively trying to capture market share ahead of the introduction of the euro. Specifically, the major exchanges have accelerated the introduction of new products in an attempt to establish leadership in the interest rate instruments that are likely to be at the core of fixed-income markets with a single currency. On the heels of the launch in late 1996 of Euromark futures by LIFFE and DTB, a working party of MATIF members suggested in late 1996 that a three-month contract in euros should be introduced by April 1998 and suggested as well the introduction of one-month, 5-year, and even 30-year euro contracts in order to establish a position in a broad range of the euro yield curve.

A third structural change in derivative markets is that OTC markets are fast becoming the cornerstone of global derivative markets. In 1987, the notional principal of outstanding OTC interest rate and currency swaps was 44 percent larger than the global exchange-traded market. By 1990, the relatively faster growth of the OTC market pushed its size to 51 percent larger, and by 1995 it was 65 percent larger. In 1995, trading volume on the major North American, European, and Asia-Pacific derivative exchanges actually contracted, whereas in the OTC markets currency and interest rate swap activity soared—in terms of notional principal outstanding, it expanded by over 40 percent, reaching \$15.2 trillion. The combination of renewed focus on EMU and intense focus on the direction of interest rates in several of the major countries contributed to a slight rebound in activity on exchanges in 1996—particularly in Europe—but the major arena of growth in global derivative markets in 1996 was once again the OTC markets.

There are at least four factors underlying the growth in the OTC markets' share of the derivative business. First, the flexible, personalized nature of the OTC market gives these markets natural advantages in terms of arranging suitable packages of products for customers. Second, the OTC markets have adopted those features of exchange-traded markets that are valuable. For example, in October 1996, 11 of the major players in the swaps market established a swaps collateral depository—the Chicago Mercantile Depository Trust Corporation—which will standardize and automate the process of managing collateral and manage payments netting, trade valuation and administration, and global reporting to dealers involved in OTC transactions. Third, the large risks for which derivative instruments have not yet been fully developed are

²⁰United States, Office of the Comptroller of the Currency (1996).

Box 6. Circuit Breakers

As equity markets around the world continue their upward momentum, many of them reaching new heights, concerns about possible overshooting and a subsequent sudden drop in equity prices are beginning to emerge. Following the equity market crash of 1987, many countries instituted various forms of circuit breakers. Ten years later, these countries and others are taking a second look—deciding whether to reset the conditions for their use or whether to adopt some form of them for the first time. Despite their growing use, especially among emerging market countries, there continue to be misconceptions about the purpose and effectiveness of circuit breakers. Circuit breakers are only a temporary measure for reducing market volatility or unidirectional price movements.¹ If fundamental information is the basis for the price movement, and not features of destabilizing trading strategies or panics, then circuit breakers simply slow the eventual price movement: they do not reverse it.

The two most common circuit breakers are trading halts and price limits. Trading halts can be initiated in two ways: a specialist, or other exchange official, may have the authority to halt trading; or a trading halt may be imposed after a price change of a given amount or percentage. The length of the halt can be pre-established or can be discretionary. Price limits place bounds on the price change but do not limit the period of nontrading: if a price hits a limit, trading beyond that price limit cannot take place; only when prices fall back within the limits can trading resume. Another type of circuit breaker is a limitation on the types of trades or strategies that can be initiated during a period of high volatility, or even in a normal period. For example, some exchanges routinely disallow short sales unless the price has experienced an “uptick,” that is, the price had to have moved up by the

¹In fact, some empirical studies find that circuit breakers may increase volatility (Lauterbach and Ben-Tsiyon, 1993; Lee, Ready, and Seguin, 1994).

trading increment. Another example is that all index arbitrage trades must be executed through an electronic system that delays their execution by five minutes when price changes exceed a given amount.

To choose the circuit breaker mechanism that will be most effective, it is important to define the goals of the circuit breaker and to assess the surrounding environment. In most cases, the goal of circuit breakers is either to dampen price movements caused by speculative activity or to slow down the price effects of trading strategies that are thought to have destabilizing or overshooting effects (e.g., portfolio insurance, the dynamic hedging of options). Even when destabilizing speculative activities or trading strategies are absent, there is often a belief that sharp movements in prices, regardless of their cause, are likely to engender a panic mentality, causing investors to act irrationally, further reinforcing existing price movements. Similarly, even when price movements reflect underlying fundamentals, a limit on the maximum amount lost in a given period may allow participants who would not have been able to pay for their losses had the full price decline occurred to pay on a timely basis. Regardless of which type of circuit breaker is chosen, to operate effectively the market needs to be centralized, information needs to be disclosed during the halt, and there needs to be a well-known method for the resumption of trade.

Trading halts can only truly halt trading when trading is centralized. In the United States, for example, when trading halts were introduced after the 1987 market break, close coordination between the stock exchanges and the futures exchanges, on which associated futures contracts were traded, was required. In October 1996, the Dhaka Stock Exchange in Bangladesh instituted a circuit breaker to limit price movements to a daily 5 percent, only to have its effectiveness undermined by the unofficial curb market where no such impediment to trading could be maintained.

An integral element to using any circuit breaker mechanism is the disclosure of information. It is imperative

most likely to be successful in OTC markets. Most important, the market for credit risk derivative contracts—in which banks in particular could trade loan credit risk—is inherently a highly heterogeneous product market (see Appendix 1 to Annex III), which exchanges are not conducive to handling efficiently. Finally, the OTC derivative markets have an important regulatory advantage over the exchange-traded markets. Specifically, whereas the Commodity Exchange Act of 1974 gives the Commodity Futures Trading Commission regulatory authority over the derivative exchanges, the so-called Treasury Amendment effectively exempted from CFTC oversight certain financial futures traded off of U.S. exchanges. There has been a great deal of uncertainty about the extent of the

amendment’s reach, which has in turn prompted numerous lawsuits and legal uncertainty. Legislation introduced in early 1997 would, among other things, limit the CFTC’s oversight of OTC markets only with respect to foreign currency products²¹ and would also permit the exchanges to establish separate, unregulated markets that are restricted to institutional investors. If passed into law, this latter feature would reduce the competitive advantage of the OTC markets, but the significance of this effect is unclear.

²¹If the proposed legislation is passed into law it would reverse the February 25, 1997, Supreme Court ruling that off-exchange trading in foreign currency options is exempt from CFTC regulation.

that market participants learn something during a trading halt that helps them determine the instrument's price: both fundamental information and order flow information are important. Depending on the trading mechanism, either indicative quotes or postings of bids and offers and the amounts underlying them should be given at intervals during the halt to provide information about order imbalances. If open outcry is used, market participants should freely announce their willingness to buy or sell at various prices.

In addition, there needs to be an established and well-known method for resuming trade. A single call auction, whereby a specialist gathers the bids and offers over a set period of time and establishes a market-clearing price at which all the existing orders receive the same execution price, is thought to be one of the most equitable. It helps to relieve an element found in most panics—the desire to get an order executed before the price falls farther.

In addition to the immediate microstructure issues surrounding the trading environment, there are also infrastructure issues that may require attention. When clearing and settlement procedures are not well established or take extended periods of time to operate, uncertainty regarding the solvency of the participants can arise, limiting liquidity and participation when it is most needed and, in some instances, inhibiting the use of the exchange entirely as a venue for trading.

As an alternative to circuit breakers, share repurchases by corporate issuers may help stem a dramatic price decline in equity markets. At some point, a firm may deem the price of its stock low enough to buy it back and reissue it at a later date for a profit, thereby obtaining additional equity from the market. Share repurchases signal to the market that the firm, with inside knowledge of its value, believes that the shares are undervalued. Similarly, purchases from a major participant in the market can show confidence and help inhibit further sales. To allow these mechanisms to operate, a country may need to relax or eliminate restrictions regarding corporate repurchases.

Other institutional features that may reduce the incidence of a crisis include (1) restrictions on bank lending for stock purchases by requiring various amounts of collateral;² (2) better audit trails to detect market-trading abuses, such as price manipulation that may start a panic; and (3) education of market participants, especially small retail investors, to enable them to understand the practices and procedures surrounding trading during normal times as well as the different procedures that may occur during stressful periods.

While certain types of circuit breakers may achieve some goals, they are all impediments to a freely functioning market—preventing buyers and sellers from executing trades at mutually agreed prices—and have some deleterious effects. Circuit breakers may limit trading by participants that are attracted only by large price moves, and hence eliminate a stabilizing factor. In most instances, the existence of circuit breakers is likely to alter participants' behavior around their imposition. For instance, a “magnet effect” may occur when participants recognize that as the price approaches a price limit they will be unable to execute their desired trades and so they execute early. Alternatively, an opposite “repelling effect” may occur when participants prevent the limit from being hit because they know their ability to trade will be impaired. While these behavioral trading effects are certainly present, the most basic criticism of circuit breakers is that when fundamental information implies a large price movement, circuit breakers merely lengthen the time involved in obtaining the new price level.

²The collateral should not be the same as the instrument being purchased because this would reinforce price movements. For example, if a bank loan is used to purchase equity and the collateral underlying the loan is also equity, a fall in equity prices means that, to maintain the collateral, the borrower needs to sell equity in an already falling market, adding further pressure on equity prices.

The increasingly central role of the OTC markets is reflected also by the approach that market participants took in establishing convergence positions in 1996 in Europe. As noted previously, these convergence positions were heavily concentrated in the swaps market, which pushed deutsche mark-denominated swaps activity up 44 percent in the first half of 1996. Earlier in 1996 these positions entailed paying deutsche mark and receiving a higher-yielding currency. Perhaps the most notable positioning in the context of EMU occurred later in 1996 and focused on the French franc versus the deutsche mark yield spread. Earlier in 1996, convergence positions in this market were mounted on the belief that this yield spread would narrow. However, the French forward curve actually traded below

deutsche mark's later in the year, which in turn caused very large deconvergence position taking—estimates and commentary from market participants suggest that the magnitude of these deconvergence trades made them some of the largest speculative positions ever mounted in international capital markets, with some estimates putting positions amassed by U.S. investors alone in excess of \$50 billion at end-1996.

Developments in Systemic Risk Management

As financial markets become more integrated and increases in technology and telecommunications per-

mit risks to be unbundled and managed on a more centralized basis, regulation will need to adapt to the changing environment of the institutions under its purview. This trend calls for a more centralized, or at least a more coordinated, form of regulation—or as Federal Reserve Board Chairman Greenspan put it, “regulation must fit the architecture of what is being regulated.”²²

A trend toward the removal of regulatory barriers separating financial institutions and toward more integrated regulatory structures is being considered in a number of countries. In the United States, the Treasury Department has proposed a financial sector restructuring that would permit further involvement of commercial banks in the securities and insurance businesses. The Federal Reserve Board has made it known that it would favor a repeal of the Glass-Steagall Act and has already relaxed a number of restrictions placed on commercial banks’ Section 20 subsidiaries, the organizational structures originally permitted to carry out limited nonbanking businesses. In the United Kingdom, the new Labor government has proposed to house all financial institution regulation, including bank supervision, under one roof, within the Securities Investment Board. Japan, too, is introducing financial sector reforms that will allow linkages among banking and securities market activities and establish an independent agency, the Supervisory Agency for Financial Entities, charged with overseeing bank supervision as well as supervision of other financial institutions.

Along with proposals for consolidated new regulatory structures are efforts to increase the coordination among existing regulatory and supervisory entities. The number of bilateral memoranda of understanding (MOUs) signed by various regulatory agencies continues to increase dramatically. Recently a number of countries have signed multilateral MOUs assuring that their information sharing and emergency procedures are mutually consistent. Along these lines is the ongoing work of the Joint Forum, a group made up of bank, securities firm, and insurance regulators previously called the Tripartite Group. The Joint Forum is charged with the improved regulation of financial conglomerates in a global environment. While the forum has made some headway over the last year in facilitating the exchange of information among the groups of supervisors, the establishment of a definition for a “lead regulator” has eluded them so far. In many countries, the regulation of banks, securities firms, and insurance companies is executed in an isolated way and fears of losing influence in a merged regulatory entity or to another regulator have long dominated the political debates in these countries. The forum’s latest progress was reported to the G-7 Summit Meeting in Denver.

²²Greenspan (1997), p. 4.

As the international regulatory community attempts to find more efficient ways to ensure a systemically sound financial system, more reliance is being placed on self-regulation and market discipline. As public disclosure is the cornerstone for market discipline, efforts to harmonize accounting standards and increase meaningful disclosure are accelerating worldwide.²³ For instance, to enhance the functioning of market discipline by setting accounting and disclosure standards for all corporations, the International Accounting Standards Committee (IASC) has agreed to complete a core set of International Accounting Standards by March 1998, 15 months ahead of its scheduled release. If acceptable to the International Organization for Securities Commissions (IOSCO) and the various national regulatory bodies represented on its committees, this set of standards will pave the way for increased cross-border offerings and listings and other international capital flows. Note that IOSCO endorsement would permit companies outside of North America and Japan to have access to those capital markets without the cost or confusion caused by restating their accounts.

The U.S. Financial Accounting Standards Board (FASB) is pursuing a longer-term project that is devoted to studying the conceptual and measurement problems associated with establishing a “fair value” for all financial assets and liabilities appearing on the balance sheet. Although the United States usually leads developments, both the International Accounting Standards Committee and the United Kingdom’s Accounting Standards Board (ASB) are hot on the heels of this development. By March 1998, the IASC intends to have in place, as part of its comprehensive set of standards, a standard that requires all financial instruments to be carried on the balance sheet at their current value. The ASB has also promulgated a discussion paper on the topic. The move toward fair value accounting, whereby financial instruments on the balance sheet will be carried at their current values, is now broadly based, with the FASB, the ASB, and IASC all on board. While it will not happen overnight, balance sheets are likely to provide a fuller picture of the financial health of corporations in the future.

Private sector financial institutions have already responded to increased pressure, both from regulators, but more important from other market participants, to publish additional information about their risk-taking activities. The Basle Committee and IOSCO jointly released a study in November 1996 examining the latest round of derivatives disclosures of banks and securities firms. Last year, for instance, a number of banks voluntarily disclosed more than is legally re-

²³In recognition of the importance of harmonization, the Basle Committee has set up an Accounting Standards Subcommittee to do a cross-country comparison of current accounting and disclosure standards for banks.

quired of them. Financial institutions recognize that well-informed investors are more willing to provide funding and capital than poorly informed ones.

Of course, to report reliable information regarding earnings and the risks undertaken to obtain them, an institution must have the means to calculate the information. Information systems and risk measurement techniques are thus continuing to absorb an increasing share of the resources of most financial institutions. One U.S. accounting firm, utilizing the expertise of a number of private sector experts and regulators, has introduced a set of “Generally Accepted Risk Practices” to help coordinate an assessment of a firm’s risk management system. The comprehensive framework comprises 89 core principles, grouped into the following categories: risk management strategy; risk management function; risk measurement, reporting, and control; operations; and risk management systems. The intention is to provide a robust risk management framework for banks, securities houses, and other financial institutions that will address the whole range of risks faced by these firms. The proposed practices could be used as a benchmark against which private sector auditors would judge firms’ risk management systems, perhaps endorsing or certifying those that exceeded the benchmark. This is one type of self-regulation, potentially enhancing market discipline, that is part of a more general trend toward increased risk disclosure.

In sum, supervisory and regulatory developments mirror the trends occurring in global capital markets—increased consolidation of regulatory structures accompanied by increased coordination. Moreover, there is a movement toward more reliance on mechanisms and rules that are “market friendly,” that is, ones that encourage self-regulation and reinforce market discipline.

Appendix 1

Extracting Information from Options Prices

Forward rates have long been used as indicators of market expectations. Adjusted for risk, these rates can be interpreted as the market’s assessment of the mean of the distribution of possible future values for the underlying price. New techniques based on options prices offer a refinement on this information by providing market-based indications of the probabilities associated with different ranges for the future value of the underlying price, thus lending some context to the mean interpretation of the forward rate.

Options prices can reveal this added information because of the unique way their ultimate value depends on the price of the underlying security. An option has value at its expiration date (expiry) only if, on that date, the price of the underlying security (S) falls within a particular range. If S is outside this range at expiry, the option is worth nothing. The range of pos-

itive value is determined by the option’s type—put (sell) or call (buy)—and its strike price. For a call option to have value at expiry, S must lie above the strike price. For a put to have value, S must lie below the strike price. If S is inside this range at expiry, the value of the option is always positive and equal to the difference between S and the strike price.

Prior to expiry, a call option’s price will reflect the market’s current assessment of the probability that S will lie above the call’s strike price and the market’s assessment of how far above the strike price S is likely to be, assuming that at expiry it does lie somewhere above the strike price. Analogously, a put’s price is determined by the probability that S will lie below the put’s strike price and the market’s assessment of how far below the strike price S is likely to be, assuming that it is somewhere below the strike price.

There are now several techniques to extract market-based probabilities from options prices and they all rely on the fact that options with different strike prices reflect the probabilities associated with S falling within different ranges. By comparing the prices of several options that differ only in strike price, one can infer the probabilities associated with S being within these different ranges at the options’ expiration date.²⁴

When there are many options on a given instrument, so that the strikes are relatively close together and they range over a significant interval of the possible outcomes, the inferences one can draw about the distribution become quite detailed. Nonetheless, even when there are many options, the fact that the strikes do not range over all possible outcomes means that some a priori assumptions must be made about the distribution before it can be estimated from observed option prices. One such assumption is that the distribution comes from a particular family of distributions with unknown parameters. The unknown parameters are estimated by finding those that best explain the observed options prices—often by least squares.²⁵

Figure 50 gives an example for the yen-dollar exchange rate for early September 1997 as estimated on May 20, 1997. It was estimated from options on the futures traded on the Chicago Mercantile Exchange, under the assumption that the distribution can be described by a weighted average of three lognormal distributions.²⁶ From this estimated distribution one can

²⁴See Söderlind and Svensson (1997) for a review of these techniques.

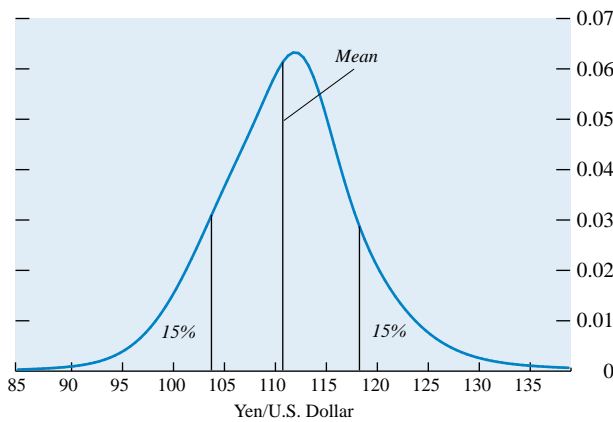
²⁵The familiar Black-Scholes formula and inferences based on it use one option price and the assumption that the distribution is lognormal. The example given below uses 50 options prices and a least-squares technique developed by Melick and Thomas (1997).

²⁶This distribution has nine estimated parameters—a μ and σ for each of the three lognormal distributions and the three weights (π ’s) that mix them. It can be written as follows:

$$f(x) = \pi_1 \cdot \text{ln}d(x; \mu_1, \sigma_1) + \pi_2 \cdot \text{ln}d(x; \mu_2, \sigma_2) + \pi_3 \cdot \text{ln}d(x; \mu_3, \sigma_3);$$

$$0 \leq \pi_i \leq 1; \sum_{i=1}^3 \pi_i = 1.$$

Figure 50. Distribution for Yen-Dollar Exchange Rate in Early September 1997 Implied by Options Prices on May 20, 1997



Source: Bloomberg Financial Markets L.P.; and IMF staff calculations using data from the Chicago Mercantile Exchange.

compute market based probabilities associated with the exchange rate being within specific ranges. For example, on this day the market priced the options as though it assigned a 15 percent probability to the yen-dollar rate being below 104 in early September and an equal probability to the rate being above 118.3. The mean of the distribution, at 111.3, is below the peak of the distribution, reflecting a skew toward relatively large appreciations of the yen against the dollar.

There are two important caveats attached to any technique that extracts probabilities from options prices. The first concerns inferences about the shape of the distribution in the range above the highest strike price and below the lowest strike price. For the day plotted, the lowest available strike price was 98. The only information the options data provide about the distribution below 98 is the probability of S being below 98 and the mean of this portion of the distribution ($E[S | S \leq 98]$). If the mean of this portion of the distribution were 96, for example, then the options data alone could not distinguish between a distribution that assigned this probability evenly over the range from 95 to 97; a distribution that assigned this probability evenly over the range of 94 to 98; and any other distribution below 98 that has a mean of 96. For many purposes, such as the computation of the 15 percent confidence limits given above, the distinction between these “observationally equivalent” distributions is irrelevant. Nonetheless, it is important to note that the particular shape of the distribution above the highest strike and below the lowest strike is largely determined by the assumptions one makes about the functional form of the distribution.

The second caveat pertains to the interpretation of the estimated distribution. As noted above, the distribution implied by options prices can provide a context for the mean interpretation of the forward rate. As with forward rates, option prices incorporate market participants’ preferences, or attitudes toward risk, as well as their beliefs about the possible future values of the underlying price. Thus, the probabilities calculated from options do not reflect market participants’ beliefs alone. Instead, they reflect how much market participants are willing to pay to insure against certain outcomes, which incorporates both the probabilities attached to these outcomes as well as the costs associated with them. Without detailed information about the preferences and portfolio holdings of market participants, it is impossible to disentangle the influence of preferences and beliefs. (This difficulty arises with any inference made from financial market prices and is not confined to forwards and options.) Nonetheless, the information in options prices provides a glimpse at the range of possible outcomes that market participants consider possible and how much they are willing to pay to insure themselves against these various outcomes.

Appendix 2

Have Securities Markets Become More Volatile?

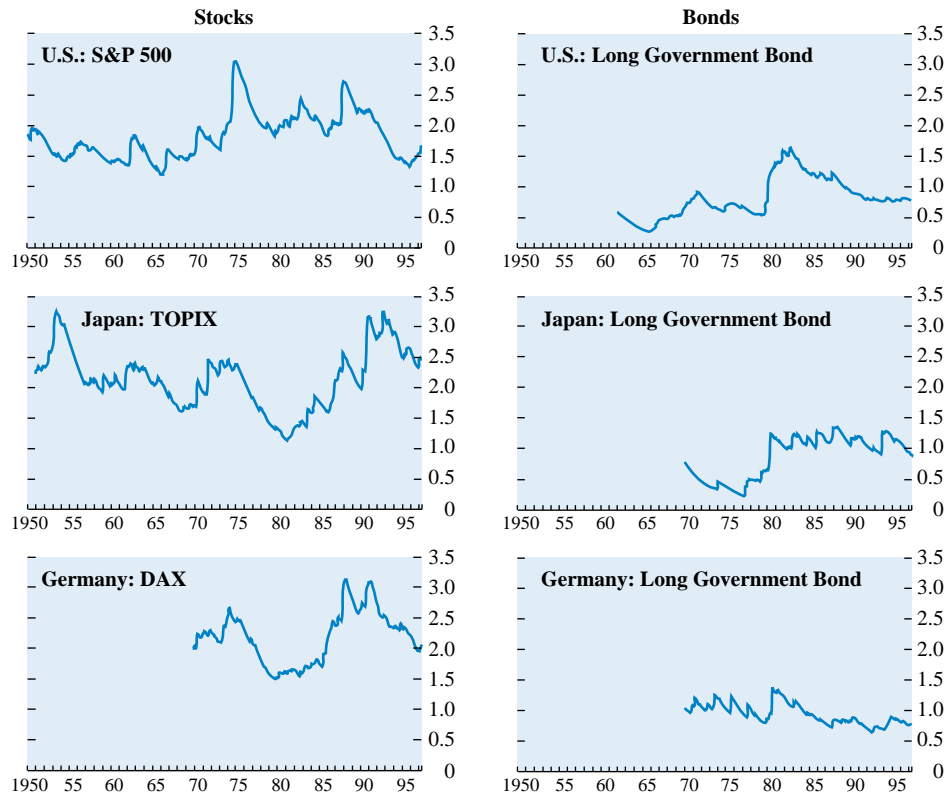
As a measure to dampen volatility in the U.S. equity market, the New York Stock Exchange begins to limit computer-guided trading once the Dow Jones Industrial Average moves by 50 points during the day. In 1996, the Dow Jones Industrial Average changed by more than 50 points from the previous day on 56 days. Compared with previous years, 1996 was truly unusual in that 50-point changes in the Dow Jones index were much more common. While this phenomenon is partly due to the rising index level, the large market deregulation and the increase in international capital flows have fostered a widespread belief that volatility has increased in recent years. Critics have pointed to the introduction of derivative instruments with complex, nonlinear payoffs, and uncertain macroeconomic policies for additional causes of increasing securities market volatility.

Can one conclude that equity markets, and in particular, the U.S. equity market, have become more volatile recently? Similarly, the “bond market massacre” of 1994 has led some observers to conclude that bond markets have become increasingly volatile in recent years. Is that a reasonable assessment?

Consider first the volatility of the U.S. equity market, as measured by the standard deviation of weekly percentage changes in the Standard & Poor 500 index

²⁷For computational details, see figure note.

Figure 51. Historical Stock and Bond Price Volatility in the United States, Japan, and Germany¹
(In percent)



Sources: IMF staff calculations based on data from Bloomberg Financial Markets L.P.; and The WEFA Group.

¹Weekly standard deviation in stock and bond price changes, computed as follows: standard deviations are calculated from a weighted moving average of past weekly squared returns. The weights decline exponentially starting with a coefficient of .01 producing relatively smooth curves designed to highlight long-run changes. Returns are weekly percentage changes in prices. Bond prices are calculated assuming a coupon rate equal to the yield.

(top left panel of Figure 51).²⁷ Comparing recent volatility levels to the postwar record clearly shows that current volatility by this measure is well within the historical range of variation. The U.S. stock market actually displays less volatility now than any time since the early 1970s, and the period following the first oil crisis remains the most volatile since the 1930s (not shown). Any long-lasting effects from the most recent upsurge in volatility following the 1987 crash seem to have all but vanished.

In Japan and Germany, current volatility in the equity markets is not large compared with historical levels, and in both countries the recent trend in volatility is downward sloping. The recent boom and bust of asset prices in Japan have increased volatility but only from a historical low in the early 1980s to a level now just slightly above the average for the last 45 years.

Stock market volatility in Germany peaked around the 1987 crash and again in the aftermath of the reunification and the Gulf War of 1990 but has clearly tapered off in recent years.

Next, consider bond markets, where volatility is generally lower. Events that change investors' beliefs about future inflation typically trigger bond market volatility; oil price shocks and changes in monetary policy are prominent examples. The volatility in weekly long-term U.S. government bonds (top right panel) topped around the shift in monetary policy in 1980, and bond price volatility has fallen markedly since. The bond market turbulence in 1994 associated with the tightening of policy by the Federal Reserve Board halted a further decrease in volatility. The subsequent bouts of turbulence in 1995 and 1996, associated in part with heightened uncertainty about the

strength of the U.S. economy—and thus the possible course of Federal Reserve policy—have also kept volatility from decreasing to the pre-1980s level. This points to the key role of money market volatility in explaining recent bond market volatility, while conventional economic fundamentals such as inflation and economic growth seem to have played only minor roles.²⁸

Comparing volatility of weekly long-term government bond yields across the United States, Japan, and Germany shows that the recent volatility has not been unusual in a historical context in any of the countries. The relatively high volatility in recent years in Japan reflects the fluctuating yen and money market rates, arising from heightened uncertainty about the collapse in asset prices, about the health of the financial system, and about the strength of economic growth. With zero inflation and short-term interest rates near zero, signs of a substantial strengthening of economic growth could have quantitatively important effects on expected inflation and official short-term interest rates, which would then filter into the long end of the yield curve. While bond market volatility in Japan is higher now than in the unusually tranquil 1970s, it is only slightly higher than in Germany and the United States, and the most recent trend in Japan seems to be downward sloping. In Germany, bond market volatility is now close to a historical low by the measure applied here.

The increased popular concern with securities market volatility is not warranted in general. Current stock and bond market volatilities are close to their historical averages in the major economies, and the folklore effects on volatility of the bond market sell-off in 1994 persisted only in the Japanese market and are dissipating now. The Japanese experience does illustrate that economic policies that successfully achieve stable goods prices do not necessarily accomplish the more difficult task of asset-price stability.²⁹

Appendix 3

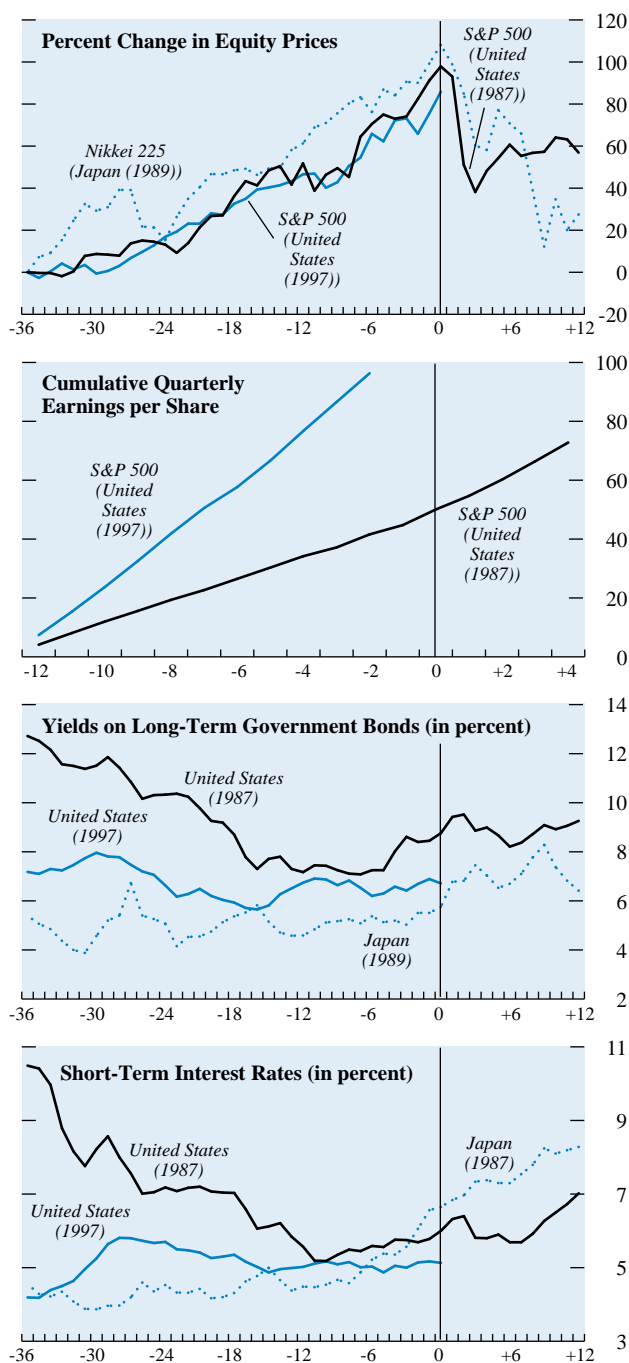
Current U.S. Equity Prices Compared with the 1987 U.S. and 1989 Japanese Bubbles

A natural approach to gauging whether stock prices are overvalued is to compare them with the theoretical price calculated from the discounted (expected) future stream of dividend payments that the stock has claim to. There are significant practical difficulties associated with this approach because of uncertainty about future dividends and the appropriate risk-adjusted discount rates. An alternative approach is simply to com-

²⁸See Bank for International Settlements (1996c), and also IMF (1996).

²⁹See Christoffersen, Lim, and Schinasi (1997).

Figure 52. United States and Japan: Developments in Equity, Bond, and Money Markets Surrounding Significant Stock Market Increases



Sources: Bloomberg Financial Markets L.P.; and The WEFA Group.

Note: Stock markets peaked on August 25, 1987, in the United States and on December 29, 1989, in Japan. The figures show developments taking place in the respective markets 36 months prior to and 12 months after these dates. Earnings per share data for the United States are available only on a quarterly basis and are not available for Japan.

pare characteristics of equity price valuations with features of well-known bubbles in equity markets to determine whether there are clear differences between bubbles and current valuations. This appendix takes the latter approach by comparing some key aspects of the current U.S. equity price rally with the 1987 U.S. and the 1989 Japanese price bubbles.

Figure 52 shows the behavior of key variables for the three-year periods (–36 to 0 months) leading up to the 1987 U.S. and 1989 Japanese market crashes and the subsequent behavior for 12 months (0 to +12 months), compared with the behavior of the same indicator for the past three years in the United States. First, consider the behavior of equity prices themselves in the three cases. In the past three years U.S. equity prices have risen 95 percent, compared with about 100 percent in the United States over 1984–87 and in Japan over 1986–89. Thus, the current market rally is similar in magnitude to the earlier ones. It is noteworthy that the climb in equity prices recently has been much less volatile than in the two historical cases.

Second, consider earnings per share. Here there is clear evidence that the current market rally is much better supported by earnings. Earnings growth in the United States during 1984–87 provided no support for equity price gains. There is some indication that earnings are currently leveling off, however, and this raises concerns. Indeed, the recent upward pressure on the price-earnings ratio (as discussed in the text) reflects this fact.

Third, consider bond yields, which can be important for equity prices both because they are a competing asset and also because they are associated with the cost that firms must incur for servicing their debt. On this score, there is a rather marked difference between the current experience and the two historical experiences. Bond yields had been increasing sharply in the

six months or so leading up to the 1987 U.S. and 1989 Japanese market corrections, whereas recently they have been trendless.

Finally, consider the tone of monetary policy in the three cases, as measured by short-term interest rates. The evidence is clear that monetary conditions had been loosened considerably in the earlier stages of the 1987 and 1989 market rallies, which differs from the current experience. Further, policy was tightened sharply beginning about 12 months prior to the U.S. and Japanese market corrections. By contrast, short-term interest rates have currently been trendless for over 24 months. The explanation for these differences in monetary policy across the three cases is easy to understand. Namely, real GDP growth was about 4 percent at the 1987 and 1989 markets' peaks, and inflation had increased sharply in the year leading up to the markets' peaks; by comparison, currently real GDP growth has been below the levels in the other episodes and inflation has not increased.

In summary, the doubling of U.S. equity prices in the past three years is of the same order of magnitude as in the United States prior to the crash in 1987 and in Japan prior to the collapse of asset prices in 1989. But, in contrast to these historical experiences, some of the critical underlying fundamentals—including corporate earnings and low volatility—provide considerably more justification for recent equity price gains. The key question in assessing the susceptibility of U.S. equity prices to sharp corrections—as occurred in 1987 in the United States and in Japan beginning in 1989—is whether corporate earnings can continue to grow well above the historical average. The answer to this question hinges on whether the recently high rates of corporate profitability derive primarily from possibly temporary cyclical influences or from more fundamental corporate restructuring.