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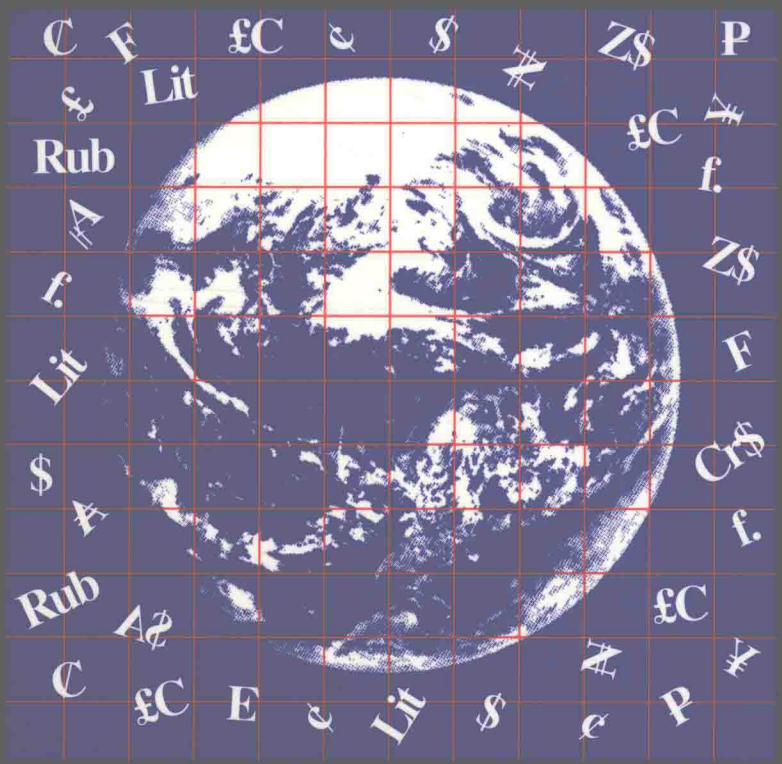
International Capital Markets

Developments, Prospects, and Policy Issues



By a Staff Team from the
International Monetary Fund

led by
Morris Goldstein and
David Folkerts-Landau

INTERNATIONAL MONETARY FUND

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The following symbols have been used throughout this paper:

. . . to indicate that data not available;

— to indicate that the figure is zero or less than half the final digit shown; of that the item does not exist;

– between years or months (e.g., 1991–92 or January–June) to indicate the years or months covered, including the beginning and ending years or months;

/ between years (e.g., 1991/92 to indicate a crop or fiscal (financial) year.

"Billion" means a thousand million.

Minor discrepancies between constituent figures and totals are due to rounding.

The term "country," as used in this paper, does not in all cases refer to a territorial entity that is a state as understood by international law and practice; the term also covers some territorial entities that are not states, but for which statistical data are maintained and provided internationally on a separate and independent basis.

Preface

This report was prepared under the direction of Morris Goldstein, Deputy Director of the Research Department of the International Monetary Fund, together with David Folkerts-Landau, Chief of the Capital Markets and Financial Studies Division of the Research Department. The co-authors of the report are Liliana Rojas-Suárez, John Montgomery, Victor Ng, and Michael Spencer of the Research Department, and Robert Rennhack and Paul Mylonas of the Policy Development and Review Department.

This report was prepared in connection with the annual surveillance of international capital markets conducted by the International Monetary Fund. It draws, in part, on a series of informal discussions with commercial and investment banks, securities houses, stock and futures exchanges, regulatory and monetary authorities, and the staffs of the Bank for International Settlements, the Commission of the European Communities, the European Bank for Reconstruction and Development, the International Swaps and Derivatives Association, the Japan Center for International Finance, and the Organization for Economic Cooperation and Development. These discussions took place in Belgium, Canada, the People's Republic of China, France, Germany, Hong Kong, Ireland, Italy, Japan, New Zealand, Sweden, the United Kingdom, and the United States, between October 1993 and March 1994.

Subramanian S. Sriram provided extensive research and editorial support and, together with Kellett W. Hannah, prepared the data presented in the report. Norma Alvarado and Janet Shelley provided expert word processing assistance. Esha Ray of the External Relations Department edited the manuscript and coordinated the production of the publication.

The study has benefited from comments by staff in other departments of the Fund and by members of the Executive Board. Opinions expressed, however, are those of the authors and do not necessarily represent the views of the Fund or of the Executive Directors.

List of Abbreviations

ADRs	American Depository Receipts
AIL	Approved Issuer Levy
BIS	Bank for International Settlements
BOC	Bank of China
BSA	Bank Support Authority (Sweden)
BTANs	Bons du Trésor à taux annuel (France)
BTFs	Bons du Trésor à taux fixe (France)
CAD	Capital Adequacy Directive
CBOE	Chicago Board Options Exchange
CBOT	Chicago Board of Trade
CCPC	Cooperative Credit Purchasing Company (Japan)
CFTC	Commodity Futures Trading Commission (United States)
CHAPS	Clearing House Association Payments System (United Kingdom)
CHIPS	Clearing House Interbank Payments System (United States)
CITIC	China International Trust and Investment Corporation
CME	Chicago Mercantile Exchange
CSRC	China Securities Regulatory Commission (China)
DCH	derivatives clearing house
DITIC	Dalien International Trust and Investment Corporation
DMO	Debt Management Office (New Zealand)
DTB	Deutsche Terminbörse (Germany)
EC	European Community (former name of European Union)
ECP	Euro-commercial paper
ECU	European currency unit
EMTN	European medium-term note
ERM	(European) exchange rate mechanism
EU	European Union
FAS	Financial Accounting Standard
FASB	Financial Accounting Standards Board (United States)
FDIC	Federal Deposit Insurance Corporation (United States)
FRN	floating rate note
GDP	gross domestic product
GDRs	Global Depository Receipts
GEMMs	gilt-edged market makers (United Kingdom)
GGF	Government Guarantee Fund (Finland)
GITIC	Guangdong International Trust and Investment Corporation
GNP	gross national product
GSCC	Government Securities Clearing Corporation (United States)
ICBC	Industrial and Commercial Bank of China (China)
IFC	International Finance Corporation
ISDA	International Swaps and Derivatives Association
ITIC	International Trust and Investment Corporation (China)
JGB	Japanese Government bond (Japan)
KOP	Kansallis-Osake-Pankki (Finland)

LIBOR	London interbank offered rate
LIFFE	London International Financial Futures Exchange
MATIF	Marché à Terme International de France
MMI	Major Market Index
MTS	Mercato Telematico Secondario (Italy)
NAFTA	North American Free Trade Agreement
NASDAQ	National Association of Securities Dealers' Automated Quotations (United States)
NETS	National Electronic Trading System (China)
NTMA	National Treasury Management Agency (Ireland)
Nymex	New York Mercantile Exchange
NYSE	New York Stock Exchange
OATs	Obligations Assimilables du Trésor (France)
OCC	Office of the Comptroller of the Currency (United States)
OECD	Organization for Economic Cooperation and Development
OFD	Own Funds Directive
OTC	over the counter
OTS	Office of Thrift Supervision (United States)
PBOC	People's Bank of China
PCBC	People's Construction Bank of China
QIBs	qualified institutional buyers
RTGS	real time gross settlement
S&P	Standard and Poor's
SAEC	State Administration of Exchange Control (China)
SCRES	State Council for the Reform of the Economic System (China)
SCSPC	State Council Securities Policy Committee (China)
SDB	Shenzhen Development Bank (China)
SEB	Skandinaviska Enskilda Banken (Sweden)
SEC	Securities and Exchange Commission (United States)
SEHK	Stock Exchange of Hong Kong
SFA	Securities and Futures Authority (United Kingdom)
SIB	Securities and Investment Board (United Kingdom)
SITCO	Shanghai Investment and Trust Corporation (former name of SITICO)
SITIC	Shangdong International Trust and Investment Corporation
SITICO	Shanghai International Trust and Investment Corporation
SRD	Solvency Ratio Directive
SSE	Shanghai Stock Exchange (formerly Shanghai Securities Exchange)
STAQS	Securities Trading Automated Quotation System (China)
SURFs	step-up recovery floaters
SVTs	Spécialistes en Valeurs du Trésor (France)
TITIC	Tianjian International Trust and Investment Corporation

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II

Bond Market Turbulence and the Role of Hedge Funds

Factors Underlying the Turbulence

As illustrated in Chart 1 and Table 1, yields on ten-year benchmark government bonds increased sharply in many industrial countries between the beginning of February 1994 and the end of March. In Japan, Germany, Switzerland, and Belgium, the increase was on the order of 50–70 basis points, while in the Netherlands, Italy, France, and the United States, increases were in the 70–100 basis point range. The United Kingdom, Canada, Sweden, and Australia recorded the largest run-up in yields (130–167 basis points). On the whole, movements in major currency exchange rates were much more modest during this period, although in mid-February and again in early March there were some exceptionally large movements in the yen/dollar exchange rate (with the rate on February 14, 1994 falling from 106.5 yen/dollar to an intraday low of 101, close to its historic low).[2]

If Sherlock Holmes were brought in to work on the case of the fickle bond markets, he would presumably have at least four questions:

- Why did long-term interest rates increase so much over such a short period?
- Why was the increase in long-term interest rates so widespread across industrial countries?
- What accounts for the nontrivial differences across countries in the magnitude of interest rate increases?
- If there were large spillover effects from one industrial country to another, why did those spillover effects occur primarily through bond markets and not through currency markets?

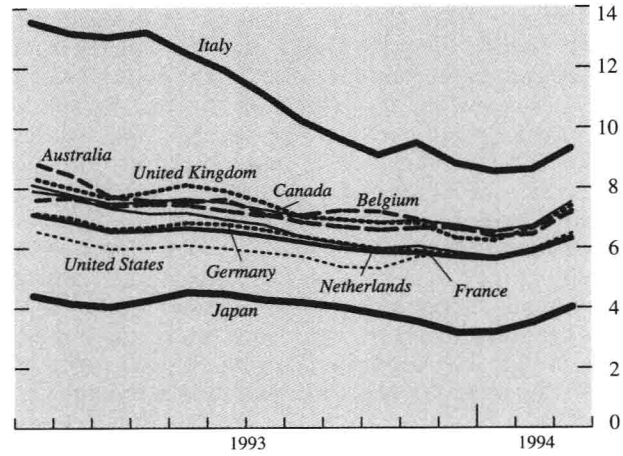
As with many episodes of turbulence in financial markets, it is not possible to provide unambiguous answers to all these riddles—even with the benefit of hindsight. Nevertheless, there is by now enough of a collection of clues and suspects to provide a credible overall story of what happened and why.[3]

[2]Equity prices showed some marked declines in industrial countries (with the exception of Italy, where they actually increased) during this period; see Table 1.

[3]In addition to the factors discussed below, there is also the possibility that, at least to a certain extent, increases in long-term interest rates reflected some element of overreaction of the markets, in the sense that interest rates may have been pushed above what could be attributed to economic fundamentals; see International Monetary Fund (1994).

Chart 1. Yields on *Financial Times* Benchmark Government Bonds, January 1993–March 1994

(In percent)



Source: The WEFA Group.

Probably the best place to begin is with the large, gradual buildup of interest rate—and to some extent, exchange rate—positions in the latter half of 1993 by hedge funds, proprietary traders (at banks and securities houses), institutional investors, and dealers. Just as "convergence plays" provided a key prologue to the ERM crisis, this latest round of large-scale position-taking set the stage for the bond market turnaround in the first quarter of 1994. Ever since the widening of margins in the ERM in the summer of 1993, a wide spectrum of investors had been expecting a fairly rapid and significant fall of interest rates in Europe. It has been estimated that U.S. investors alone may have put as much as $75 billion into Europe in 1993.[4] In the eyes of many international investors, the U.S. and U.K. experiences had demonstrated how helpful lower interest rates could be in spurring economic recovery. With consensus forecasts of weak economic activity and of high and growing unemployment in Europe, with inflationary pressures seemingly in

[4]It has not been possible to obtain quantitative estimates of the total cross-border interest rate positions built up in European bond markets during 1993.

Table 1. Developments in Financial Markets of Selected Industrial Countries

(Changes between February 3 and March 30, 1994)

	Long-Dated Bond Yields[1] *(Basis point change)*	Equities[2] *(Percent change)*	Exchange Rates *(Percent change local currency/ U.S. dollar)*
United States	96	−8.6	. . .
Japan	51	−3.0	−4.7
Germany	59	−0.2	−3.3
France	94	−10.3	−2.7
Italy	78	2.9	−3.4
United Kingdom	130	−11.4	1.3
Canada	144	−5.4	3.9
Netherlands	76	−7.5	−3.1
Australia	167	−10.6	−1.7
Switzerland	63	−8.1	−2.2
Belgium	69	−3.8	−3.8
Sweden	147	−11.3	−0.2

Sources: *Financial Times*, various issues; and Bloomberg Financial Markets.

[1]Ten-year Benchmark Government Bonds. (Bonds mature in 2004 except for German 6 percent bonds, which mature in 2003.)

[2]Share indices used are FT-SE 100 (United Kingdom), Dow Jones Industrials (United States), DAX (Germany), CAC 40 (France), Nikkei 225 (Japan), MIB General (Italy), Composite (Canada), AffarsvardnGen (Sweden), SBC General (Switzerland), BEL20 (Belgium), CBS TtlRtnGen (Netherlands), and ASX All Ordinaries (Australia).

check, with recovery in Germany still uncertain, with wider margins providing more room for maneuver for monetary policy in other ERM countries, and with elections not far down the road, they saw a long position in medium- and long-term European bonds—be it in the cash or derivative markets—as a winning hand.

Turning to the U.S. economy, the perception in the latter part of 1993 (at least to judge from interest rate projections in the forward market) seemed to be that the U.S. cyclical rebound was gaining strength and that it would bring with it (in 1994) a steady but gradual rise in interest rates; however, the containment of inflationary pressures and some progress on fiscal consolidation were regarded as factors that would keep the rise in rates from being too sharp. Confidence in interest rate forecasts had also been buoyed by the considerable profits made on long U.S. bond (and equity) positions in 1993. In Japan, continuing weakness in the banking system and falling share prices may have been regarded as setting the stage for further interest rate cuts. This projected international configuration of interest rates, in turn, led to a seemingly obvious currency play. Since interest rate differentials would increasingly favor dollar-denominated fixed income assets, go long on the U.S. dollar—particularly with respect to the Japanese yen, but also with respect to the deutsche mark.[5] Some participants even combined these interest rate and currency plays by funding long European bond positions in the low-cost yen. On top of all this, long bond and equity positions in emerging markets (including Brady bonds) were on the rise, under the assumption that the increasing recognition of the yield and diversification attributes of emerging market investments, alongside significant policy reforms in some developing countries, would allow impressive returns to be earned in 1994, just as in 1993.

In the event, a set of unforeseen developments combined to derail the projections that had previously been so profitable. Five such developments deserve specific mention.

First, European interest rates did come down—but at a much slower pace than expected; from December 1993 on, the process of interest rate reduction seemed to have stalled. As this gulf between expectations and reality persisted, market participants came under increasing pressure to close out their long European bond positions, which of course pushed rates higher. Somewhat later, the decision by the Bundesbank not to lower official rates at the February 17, 1994 Council meeting, in concert with the announcement a few weeks later of a 20 percent increase in M3 for January, may well have increased pessimism about prospects for future German interest rate reductions.

Second, the small (25 basis points) upward adjustment of interest rates induced by the Federal Reserve on February 4, 1994—in tandem with the very strong fourth quarter U.S. GNP figure (announced as 7.5 percent on March 1) was apparently interpreted as a harbinger of future increases in U.S. interest rates and as an indicator of stronger than expected inflationary pressures.[6] Although futures data suggest that the market had been expecting interest rates to rise in the first quarter, the timing of the "turn" in monetary policy was uncertain and the Federal Reserve's action seems to have been widely interpreted as a message that "the

[5]Some market participants identified a second yen/dollar currency play. Here, the underlying assumption was that the yen/dollar rate would fluctuate over a relatively narrow range—bounded on the upside by the concern that too high a yen would hamper unduly Japan's recovery, and hemmed in on the low side by the concern that a very weak yen would frustrate a reduction in the United States/Japan bilateral trade imbalance. This second currency play called for "going short on volatility" by issuing dynamically hedged, customized, over-the-counter (OTC) derivatives, known in the trade as "strangles," that pay off if the yen/dollar rate stays within a certain range over the relevant time period.

[6]Some analysts also regard the coincident publication of inflation indicators by the National Association of Purchasing Managers and the Philadelphia Federal Reserve Bank, along with congressional testimony by Federal Reserve Chairman Alan Greenspan, as reinforcing the revised forecast of stronger inflationary pressures and of higher interest rates.

turn is now"—with an implication that a series of further increases was in the offing; perhaps the markets also took the increase as a wake-up call that long-term interest rates had been pushed down too low in 1993 by an excessively optimistic reading of inflationary and budgetary trends.[7] A further tightening of the federal funds rate (by 25 basis points) on March 22 was followed by a further increase in long-term bond yields.

Third, the intensification of the trade dispute between the United States and Japan—in mid-February and again in early March—was seemingly read by the market as a signal that the U.S. authorities would be more inclined to tolerate a higher yen as a mechanism for inducing Japan to either implement greater macroeconomic stimulus (than proposed hitherto) or grant greater market-access concessions. The dollar's depreciation against the yen was followed by some (more modest) depreciation against the deutsche mark and some other European currencies.

Fourth, prospects for further interest rate declines in Japan were dampened when Japanese equity prices proved to be more buoyant than expected and when reports surfaced that certain Japanese Government trust accounts would switch from being net purchasers to become net sellers of Japanese Government bonds (JGBs); yields on ten-year JGBs rose sharply in January.

And fifth, bond and equity prices in the emerging markets of the Far East and Latin America declined in February, providing yet another reason for some funds to pull in their horns. It is worth noting that these developments leading to a revision of expectations would have caused an increase in bond yields, even if there had not been a buildup of interest rate and exchange rate positions in 1993. Financial markets do not necessarily require that transactions take place before prices change; if the same revision of expectations is shared by almost all market participants, the price can move almost immediately to the new equilibrium.[8]

In any case, once investors had revised their outlook for interest rates and exchange rates, several institutional practices operated to encourage a sell-off of previous positions. More and more, institutions that engage in aggressive position-taking use mark-to-market accounting methods and explicit loss limits (supplemented by programmed trading) as integral elements of their risk-management systems. When actual trading losses exceed loss limits, the positions are automatically liquidated in the cash market or in the futures market. In addition, the timing of losses was not conducive to sticking with a deteriorating position: many traders had reported their positions marked to market at the end of 1993 and began the year with a zero profit position; hence, there was no cushion of gains to offset losses in January, February, and March 1994. Such risk management guidelines are just what the doctor ordered to reduce the incidence of large losses and of outright failures of institutions, but those same guidelines—in a situation when the change in market sentiment is very one-sided—can contribute to large asset price swings.

Liquidity was another key factor. Although liquidity in practically all European government bond markets has been on the rise over the past decade in response to sets of reforms (see Section V), the fact remains that liquidity in the smaller ones is not yet sufficient to permit the turnaround of a very large, accumulated position in a short time, without a significant change in yields. Even in the largest European government bond markets (German Bunds, the French Obligations Assimilables du Trésor (OATs), U.K. gilts), liquidity is lower than in the market for U.S. Government securities. In a few cases, liquidity considerations may have prompted several European authorities to engage in some limited intervention.

Liquidity also speaks to why large positions in some European bonds were built up a piece at a time (to avoid driving up the price), and why, once the decision was made to exit, many participants rushed for the widest door available, namely, the larger futures exchanges (which frequently offer better liquidity on government bonds than is available on the local cash markets). Trading activity and open interest on European futures exchanges increased markedly during the first quarter of 1994; for example, the total volume of contracts grew by 115 percent on the London International Financial Futures Exchange (LIFFE) and by 83 percent on the Marché à Terme International de France (MATIF) (compared with growth in the fourth quarter of 1993). March was a particularly heavy month. MATIF actually had to briefly suspend trading on the ten-year government bond futures on March 3 (because the contract price dropped by more than the 250 basis points daily limit), and LIFFE, MATIF, and Deutsche Terminbörse (DTB) had to increase their margin requirements. The two largest

[7] If the Federal Reserve had not tightened monetary conditions in early February, it is likely that U.S. interest rates would still have increased significantly as evidence on the unexpected strength of the U.S. recovery accumulated; in fact, the Federal Reserve's action in early February probably advanced somewhat the timing of the interest rate increase but may well have reduced the size of the increase relative to what it would have been in the absence of any action.

[8] In some countries (the United States and Japan), this pure expectations effect may have had more to do with the increase in interest rates than the sell-off of previous interest rate positions, whereas in some others (European countries), the increased selling pressure associated with the liquidation of previous positions may have been the key.

U.S. futures exchanges—namely, the Chicago Board of Trade (CBOT) and the Chicago Mercantile Exchange (CME)—likewise experienced record trading volumes in March.

Leveraging was another element in the volatility picture. By taking full advantage of the high degree of leverage available in repurchase (repo) markets, in foreign exchange, and on futures exchanges, hedge funds, proprietary traders, securities houses, and other market participants were able to use their limited capital to build up very large positions in interest rate and exchange rate contracts, thereby contributing to the 1993 run-up in bond prices. But once bond prices began to decline, losses on investment positions relative to capital were multiplied by this same high leverage. This of course increased the pressure to liquidate losing positions.

But how does one explain the widespread nature of the increase in the long-term rates? Here, four factors are relevant. First, as detailed above, there was a coincident revision of expectations about future interest rates in each of three industrial country regions (Europe, North America, and Japan), driven initially by forces that were largely specific to that region. Second, market participants are not unaware of the increasing correlation of long-term interest rates across the major industrial countries, as shown in Table 2. Capital market integration has been on an increasing secular trend for some time,[9] and a co-movement of long-term interest rates among the industrial countries has long since ceased to be a unique event. Thus, when U.S. long-term rates increased sharply in early February, market participants may well have reasoned that rates would soon be driven up elsewhere in the industrial world. From the timing of interest rate movements, it does indeed look like there was significant positive transmission of the U.S. interest rate increase in early February to other major industrial countries (with the exception of Japan). Third, many of the larger players in today's capital markets operate in many markets simultaneously. Given their risk management systems, losses sustained in one market may call for liquidations in other markets to keep total losses from hitting prespecified limits. In this connection, the large losses suffered on wrong yen/dollar currency plays may have spurred further retrenchment in European bond markets or in emerging market securities. Fourth, in countries where the cash market was not liquid enough to cope comfortably with large selling pressure and where a liquid futures market was also not available, investors resorted to cross-hedging; that is, they built proxy hedges by exploiting the relatively high covariance among certain subsets of country bond yields (particularly within the ERM). Again, this proxy hedging increased the correlation of interest rate movements across markets.

[9]See Mussa and Goldstein (1993).

Table 2. Government Bond Yield Correlations[1]

	1970–79	1980–89	1990–94
Canada	0.930	0.947	0.962
France	0.409	0.907	0.928
Germany	0.191	0.908	0.934
Italy	0.660	0.851	0.593
Japan	0.182	0.826	0.965
Netherlands	0.405	0.866	0.913
United Kingdom	0.590	0.793	0.949

Source: Bank of England.

[1]Correlation coefficient for ten-year bond yields (monthly levels) with U.S. ten-year bond yield.

As regards the quiescence in foreign exchange markets relative to bond markets, several developments appear to have contributed to that outcome. For one thing, some market participants who wanted to take long European bond positions in countries with relatively high nominal bond yields apparently hedged their currency exposure from the outset; that is, they separated the interest rate play from the currency play. As such, when news induced them to revise their expectations about interest rates, there was no need to take parallel action on the currency front since they were already hedged there. The exceptionally high liquidity of foreign exchange markets (where average daily turnover is now in the neighborhood of $900 billion), relative to that in government bond markets, would also suggest that shifts in asset preferences could be accommodated in the former with less price change than in the latter. It is likewise well to note that the revision of expectations about the future path of interest rates in the United States was in the same direction to the revision in Europe (i.e., the news was that interest rates in the United States would increase faster than previously assumed, while those in Europe would decline slower than previously assumed), thereby leaving the interest differential—presumably the key variable for exchange rate caculations—little changed. In the U.S./Japan case, the revisions to the interest rate forecasts also went in the same direction, but there the breakdown of the trade framework talks may have altered the market's forecast of the current account and hence of the future exchange rate as well. Finally, it may be that the significant exchange market intervention undertaken in a few cases dampened exchange rate movements relative to what they would have been in its absence. In any case, one can observe from implied volatilities in option and futures markets that uncertainties in exchange markets in February and March 1994 did not show the same upward jump as uncertainties in bond markets.

Probably the toughest of Mr. Holmes's four questions is what explains the cross-country variation in the size of the interest rate increase. The difficulties here are that the list of suspects is reasonably long (including, intercountry variations in the scale of earlier capital inflows, in risk premiums associated with fiscal or political developments, in changes in real rates associated with revisions of growth forecasts, in changes in inflationary expectations associated with revisions of central bank behavior or revisions of output gaps, and in revisions of real exchange rate forecasts) and that several factors relevant for bond yields can be changing at the same time. For this reason, one can only advance some tentative observations.

In the Swedish case, the inflow of nonresident investors engaging in interest rate plays was large relative to the size of the market. The trigger was probably interest rate increases abroad, but the backdrop of a still extremely high fiscal deficit and a relatively high variance in inflation performance over the past decade may well have prompted these nonresident investors to reverse their position in Swedish bonds more readily than if these latter risk-premium factors had been absent. In Canada, the high degree of integration with the U.S. capital market makes it particularly sensitive to U.S.interest rate developments. But here too a negative turn in investor sentiment in the first quarter may have had something to do with adverse fiscal and political news—after a period in 1993 when the fundamentals looked increasingly positive.

In the United Kingdom, aside from external influences, a comparison of the behavior of indexed and nonindexed bond yields seems to suggest that a rise in both inflationary expectations and in real rates occurred in February and March 1994.[10] In view of the accumulating strength of the recovery and the small reduction of official short-term interest rates in February, markets apparently became more uncertain as to whether the stance of monetary policy was consistent with the maintenance of low inflation over the medium term. In the United States, the main factor would seem to have been the relatively large size of the revision of expectations about the growth of the economy—perhaps supplemented by a relatively large correction of earlier long-term yield developments in the first three quarters of 1993.

In most of the continental European countries, there did not seem to be any evidence of increased inflationary expectations. Political uncertainties in Italy, uncertainties surrounding the release of large M3 figures for January 1994 in Germany, and some deterioration of the fiscal position in France—in concert with the spillover effects from the U.S. rate increase—may have been at work. In Japan, a more positive reassessment of prospects for the economy—with its implications for future interest rate cuts—was probably the dominant factor in pushing bond yields higher.

Some might be tempted to look for a more economical way of explaining the country pattern of increases in long-term rates. More specifically, it might be argued, for example, that the size of interest rate increases was systematically greater for those countries with the lowest degree of anti-inflationary credibility, or with the largest (positive) revisions to growth forecasts, or with adverse news about budget deficits, or with the highest levels of budget deficits or of debt stocks, or with the lowest degree of liquidity in the bond market. Based on some simple bivariate analysis, it seems clear that while each of these variables captures part of cross-country pattern, none of them provides a convincing explanation. For each of them, there are at least two or three dogs—and often more—that did not bark. In the end, there is no alternative but to embrace a more eclectic explanation of the cross-country pattern of rate increases.

Turning to the performance of markets, while some of the more aggressive position-takers suffered considerable losses in February and March 1994, there were no systemic consequences of difficulties at individual institutions. Payments and settlement systems coped well with the increased volume of activity. To be sure, there were unusually large price swings, but that was in part a reflection of an unusually large and sudden revision of expectations. What is more, in contrast to the two big bouts of turbulence in ERM foreign exchange markets, this time the authorities did not act forcefully to supply liquidity to the markets. As such, more of the adjustment to a new equilibrium was taken up by price changes.

Role of Hedge Funds

Because hedge funds have been active participants in the ERM crises of 1992–93, as well as in the recent bout of turbulence in bond markets, and because their potential market influence has been growing over the past decade, it is not altogether

[10]In countries which either do not offer indexed bonds or have offered them only for a short time, recourse has to be made to other methods for separating the inflationary expectations component from the real component in observed nominal interest rates. One such method is to look at the contemporaneous behavior of nominal interest rates and nominal exchange rates. The idea is that if a rise in the nominal interest rate mainly reflects an increase in inflationary expectations relative to other countries, then the nominal exchange rate should depreciate; alternatively, if it is primarily due to a rise in the real interest rate, then the exchange rate should appreciate.

surprising that their activities have come under increased scrutiny.[11]

Defining what is and what is not a "hedge fund" is problematic. The term hedge fund carries no formal definition in securities law, and the private investment vehicles that make up this industry are extremely diverse. While there is no comprehensive data base yet available on hedge funds, it has been estimated that there are 800–900 such firms, with aggregate capital somewhere on the order of $75–100 billion; by way of comparison, there is approximately $27 billion of equity capital in large U.S. securities firms and $90 billion of capital in U.S. money-center banks. A large hedge fund might have as much as $10 billion under management, whereas a small fund might manage only $75–100 million. The fund's investment portfolio could span government securities, foreign exchange, financial futures and options, commodities, real estate, mergers and acquisitions arbitrage, mortgage-backed securities, or even other hedge funds. Alternatively, it could specialize in only one or a few of these markets. More than half of the total capital in the industry is thought to lie in "macro" hedge funds, whose managers seek to profit by betting on changes in interest rates, exchange rates, and equity prices in global markets.

A key question is what is special about hedge funds? After all, the proprietary trading desks of large banks and of large securities houses, as well as some mutual funds, also engage in aggressive position-taking. Several factors warrant explicit mention.

First, hedge funds are less regulated than other large players in financial markets. Because they are private companies with less than 100 partners and are frequently chartered offshore, they escape from many of the registration and reporting requirements and investment guidelines that apply to broker-dealers, mutual funds, and other investment advisers in the United States.[12] For example, hedge funds are not required to and generally do not, report their positions and trading activity to shareholders. Hedge funds are subject in full to antifraud and market manipulation statutes. They are also covered in some major industrial countries by recent "large trader" reporting and information legislation (see below).

The relatively light regulatory burden of hedge funds permits them to have greater flexibility in their investment strategies than do other financial market participants. This operating flexibility of hedge funds is also enhanced by their own limits on redemption and transferability of shares. The most important constraint on their operating flexibility is their own risk-management practices.

Second, hedge fund investors are wealthier and presumably have a higher tolerance for risky investments than the public at large. Hedge funds generally require that 65 percent of their shareholders be accredited, that is, they must have a net worth of at least $1 million or an income in the previous year of at least $250,000. In addition, most hedge funds require a minimum investment, ranging from $250,000 to $10 million. Most investors are simply not willing to allow someone else to take large risks with their money. They would prefer to accept a lower rate of return in exchange for a reduction in volatility.

Third, hedge funds are generally regarded as the most leveraged players in major financial markets. Indeed, it is largely this use of leverage that gives hedge funds their market clout (though the propensity of others to regard them as market leaders also contributes to this clout). Hedge funds are said to leverage their capital by anywhere between 5 and 20 times, with the average for macro funds being closer to the lower end of the range. While a certain degree of leverage is available to any investor who wants to purchase financial assets on margin, hedge funds routinely use collateralized borrowing in the repo markets for government securities to generate very high leverage ratios. The lender is typically a large bank or large securities house. For example, a hedge fund could borrow $1 billion from a bank and purchase a like nominal amount of government securities. The bank would take possession of the securities as collateral, and in addition the fund would be asked to deposit anywhere from $20 million to $40 million (2–4 percent of principal) as interest-bearing margin money—the only actual capital investment of the fund—usually in the form of treasury bills. The size of the margin will depend on the bank's forecast of interest rate volatility and on its assessment of the creditworthiness of the fund. The lending bank may call in further margin or reduce the margin over the life of the contract. Although the maturity of the bonds purchased by the funds will depend on their view of the future shape of the yield curve, the maturity of the repo contract tends to be only a few days.[13]

[11]To say that hedge funds have participated in the recent bout of bond market turbulence should not be taken to imply that their participation was approximately uniform across countries; for example, it has been reported that hedge funds were much less active in Japanese bond markets than in, say, European ones.

[12]By limiting the number of investors, hedge funds avoid registration under the Securities Act of 1933 and the Investment Company Act of 1940. By limiting the frequency with which they trade, they avoid having to register as dealers under the Securities Exchange Act of 1934.

[13]Smaller or less creditworthy hedge funds may not have bank lending available to them. They often use the futures markets to set up risk positions. Margins in the OTC market for foreign exchange positions tend to be higher than on interest rate positions, reflecting the greater volatility of the former.

Yet a fourth distinguishing characteristic of hedge funds—and the one that has most accounted for the industry's explosive growth over the past seven years or so—is their superior performance. Despite their much-publicized recent losses, hedge funds have been extremely successful in their investment activities, and they have handily outperformed the major market indexes and publicly offered mutual funds (see Table 3). For 1993 as a whole, the return to hedge capital was 23 percent, compared with 14 percent for mutual funds and 10 percent for the Standard and Poor's 500. Market developments in the first quarter of 1994 apparently inflicted a 13 percent loss on macro hedge funds, with most of the loss occurring in February and March, after returning 53 percent in 1993. The entire hedge fund industry reportedly lost only about 2 percent of its capital during the turbulent first quarter of 1994. Money flows to performance. That is how funds are marketed, and that is how investors decide where to put their money.

There are at least three areas in which authorities might harbor concerns about the activities of hedge funds.

The first concern lies in the area of credit risk. Since the larger hedge funds receive loans from banks and securities houses to help fund their position-taking, there is the concern that large losses in hedge funds could generate significant loan losses for their creditors. The bulk of lending to hedge funds is thought to be fully collateralized, with the lender holding the financial instrument.[14] From the point of view of the supervisory authorities, they need to be assured that margin requirements on loans to hedge funds are set at the appropriate level, that margins are increased when the market price of the collateral falls, and that there is adequate information on the current, consolidated exposure of hedge funds to their lenders. As indicated above, the historical record on performance of hedge funds suggests that they should be a good credit risk. To this point, we are not aware of banks or securities houses taking large losses on loans to hedge funds. Systemic risk could arise if the price of the collateral took a very large fall (relative to historical experience), or if some lenders in the system had not properly collateralized their exposure. Otherwise, a failure of a number of hedge funds would simply represent a loss to their wealthy shareholders.

[14]U.S. Comptroller of the Currency Ludwig reported (statement to Congress, April 13, 1994) that for the eight banks supervised by the Office of the Comptroller with exposure to hedge funds, most exposure is collateralized by cash and government securities. According to Federal Reserve Governor LaWare (statement to Congress, April 13, 1994), uncollateralized exposures to hedge funds are "considerably" less than 2 percent of the equity capital at each of three major banks supervised by the Federal Reserve.

Table 3. Comparative Returns: Hedge Funds Versus Other Investments

(Annual percentage return)

	Hedge Funds	S&P 500	Mutual Funds
1993	23.2	10.1	14.3
1992	15.8	7.7	6.8
1991	25.4	30.4	36.1
1990	10.9	−3.1	−3.8
1989	24.9	31.6	28.5
1988	22.9	16.5	15.8
1987	14.5	5.2	1.0

Source: Republic New York Securities (1994).

Two questions arise with respect to credit risk. One is whether lenders have been (and will be) sufficiently strict in setting and enforcing margins on hedge funds when the latter are under pressure—now that hedge funds have become such important customers of some banks and securities houses. Not only do hedge funds generate substantial commission and interest income for lenders, but the order flow may also provide lenders with useful information for their own proprietary trading activities. Recall that on futures exchanges, initial and maintenance margins are set by predetermined formulas and failure to maintain margin results in an automatic closing out of positions by the clearinghouse. This is not necessarily so in the OTC market, where there is more room for discretion and negotiation. If lenders were too lax in calling for increased margins when the price of collateral deteriorated for fear of losing the business to a competitor, one of the protective mechanisms against systemic risk would be weakened. A second question is whether lenders—or for that matter, the central bank—know the consolidated exposure of individual hedge funds. If consolidated exposure is greater than each lender realizes, then again, risk is increased because aggregate calls on capital for increased margins could (at times of historically large asset price movements) exceed the ability of the hedge fund to meet its obligations. Bank supervisors are increasing their efforts to get a better picture of the exposure of their banks to hedge funds, but this is not likely to cover positions of the funds vis-à-vis securities houses and foreign lenders. How large the gaps are for estimating consolidated exposure remains to be seen.

A second potential concern is that hedge funds—because of their market clout and reported high turnover of positions—could generate excessive volatility in government bond markets. This is an issue on which the jury is still out. Presumably, the presence of hedge funds adds to the liquidity of these markets. Discussions with country authorities also confirm that there have been cases when hedge funds' presence on the buy side of the market (dur-