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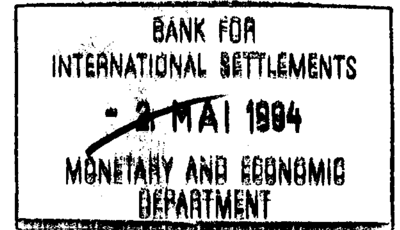
BANK FOR
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MONETARY AND ECONOMIC
DEPARTMENT

GROUP OF TEN

Recent Developments in Bond Markets

A Report to the Ministers and Governors
by the Chairman of the Group of Deputies

April 1994

I. Introduction

1. In a letter of March 8, 1994 the Chairman of the Group of Ten Countries suggested that the Deputies conduct an examination of recent developments in international financial markets. To this end the Deputies met twice, on March 10 and on April 12, 1994. The discussions focused on the sharp increase in bond yields that occurred in the first quarter of 1994. This episode appeared to warrant special attention because of the amplitude and rapidity of the price movements, their high correlation across countries and potential implications for the stability of financial markets and the conduct of economic policies. The Deputies' discussions benefitted from informal contacts between central banks and a wide range of market participants.

2. The Deputies' main findings and considerations are set out in this Report, which is based on material provided by the Deputies themselves and subsequent discussions. Given the short time available, the Report was drafted by their Chairman.

3. The Report is organized as follows. Section II summarizes the main developments in the financial markets. Section III discusses the main factors underlying the fall in bond prices. Section IV analyzes the technical factors that may have amplified price movements. Section V reports on the behavior of the main categories of investors. Section VI describes how markets functioned in the period of turbulence. Section VII summarizes

the main findings and considers some lessons for the international financial system and the conduct of economic policy.

II. The recent events

4. In the first quarter of 1994, but particularly in February and early March, the prices of bonds of all maturities fell sharply in all markets, reversing an upward trend that had started in 1990 and continued until October 1993 in the United States and the beginning of January in most other countries.

5. Taking the G-10 countries as a whole, yields on 10-year benchmark government bonds increased by almost 100 basis points between the beginning of January and the end of March 1994. In late February and early March bond yield volatility approached or exceeded previous peaks in several markets.

6. Although the rise in bond yields was a global phenomenon, there were significant differences across countries: between the beginning of February and the end of March yields rose by less than 60 basis points for 10-year bonds in Germany, Japan and Switzerland; by between 60 and 100 basis points in France, Italy, Belgium, the Netherlands and the United States; and by more than 100 basis points in the United Kingdom, Canada and Sweden.

7. Equity markets also recorded significant price falls, again with

significant differences across countries. From the beginning of February to the end of March share prices weakened slightly in Germany, Belgium and Japan, and actually rose in Italy; in the United Kingdom, France and Sweden they fell by more than 10 per cent, and in the other G-10 countries by between 5 and 10 per cent, primarily towards the end of the period. By contrast, exchange rates remained relatively stable, with the significant exception of the yen/dollar rate, which reached an intraday low of 101.1 on February 14. The UK pound, the Canadian dollar and the Swedish krone depreciated by between 2 and 4 per cent in effective terms.

III. The main underlying factors

8. The events of early 1994 need to be seen against the background of the previous developments, in particular the 1993 bond market rally, which brought investors substantial profits. At the beginning of 1994 market participants anticipated a continuation of this positive scenario for fixed-income securities, as well as a strengthening of the dollar against both the yen and the DM.

9. These expectations were based on a number of assumptions. Japanese interest rates were expected to decline further because of widespread perceptions that the economy would remain weak. The US economy was perceived by investors to be strengthening, but not sufficiently to spark inflation or force short-term rates sharply higher. Interest rates in Germany and other

European countries were expected to decline substantially, against a background of slowing inflation and weak signs of recovery. Long positions were therefore being held in various national bond markets, notably in Europe. Most of these positions were hedged against currency risk, through borrowing in local currencies or equivalent operations in derivative markets. However, with the US economy expected to grow, while those of Germany and Japan were expected to remain weak, many market participants anticipated a strengthening of the dollar against the yen and the DM and opened foreign exchange positions accordingly.

10. Between mid-January and early-March several apparently unrelated events caught market participants by surprise and led them to revise their expectations, in particular about interest rate developments:

- in mid-January Japanese share prices started to rise, thus undermining expectations of a further easing of monetary policy in Japan; furthermore, reports began to circulate that the Ministry of Finance's Trust Fund would reverse its programme of acquiring Japanese government bonds.
- on February 4 the Federal Reserve tightened monetary policy, raising the Federal funds rate by 25 basis points, to 3.25 per cent. Various economic reports published during the month pointed to a stronger-than-expected US recovery and Fed statements confirmed the likelihood of a further tightening of monetary policy.
- on February 11 the breakdown of the Clinton-Hosokawa trade talks, coupled with the market's perception that the US administration favored a strong yen, was followed by a sharp appreciation of the Japanese currency (7 per cent against the dollar in just a few days around mid-February) that

triggered massive liquidation of long dollar/yen positions. The weakness of the dollar against the yen led to a parallel strengthening of the DM.

- on February 17 the Bundesbank lowered the discount rate, but disappointed the markets by leaving the repo rate unchanged at 6 per cent, a level that had obtained for nearly three months.
- in the first two days of March the release of revised figures for US GDP growth in the fourth quarter (7.5 per cent) and German M3 growth in January (20.6 per cent) strengthened market expectations that US rates would move upwards and suggested that further reductions in German rates would be delayed.

11. These developments led market participants to liquidate or cover their long-bond positions. The reasons for the change in strategy nonetheless appear to have differed somewhat from country to country.

12. In the United States, the key factor seems to have been a revision of expectations regarding growth and the likely response of monetary policy. The fact that bond yields rose far more than the Federal funds rate may have reflected the perception that a major turning point had been reached in US monetary policy and was not an unusual result compared with earlier turning points in US monetary policy.

13. In Japan, bond yields rose substantially before the Fed tightening of February 4 and do not appear to have been significantly affected by developments in other markets. The Bank of Japan's decision not to ease short-term rates further, widespread expectations of a strengthening of the

dollar against the yen, the increased supply of government bonds and the publication of better-than-expected economic indicators appear to have affected market sentiment with regard to Japanese bond yields.

14. In Germany and in most other ERM countries the rise in bond yields seems hard to justify in terms of higher inflation expectations, given these countries' position in the economic cycle. Expectations concerning the reaction of German monetary policy to developments in the DM/dollar rate seem to have played an important role. With the firming of US monetary policy, the DM did not appear to have a major appreciation potential against the dollar and a distinct decoupling of German bond yields from US rates looked less likely in the short term. The very large rise in implied volatility following the release of figures for German M3 suggests that a substantial part of the rise in yields reflected an increased risk premium. Yield differentials between Germany and other ERM countries rose only a little in the period, even when market turbulence was at its worst. A reassessment of future prospects for the saving-investment balance may have been another factor common to most European countries, in view of the large government deficits recorded in 1993.

15. In addition to the factors that affected international markets, national bond yields were also influenced by a reassessment of growth and inflation expectations in the United Kingdom, domestic risk factors in Canada, the outlook for the budget deficit in Sweden and political uncertainty in Italy.

IV. The factors that amplified bond yield volatility

16. Although changes in perceptions of economic fundamentals appear to have been the main force driving events in the reference period, other factors contributed to the amplitude of the price movements and their higher-than-normal correlation across markets.

17. The risk management systems of the larger and more sophisticated market participants are predicated on an inverse relationship between risk and exposure. Dealers and investors holding proprietary positions across several markets are reported to have decided almost simultaneously to reduce their positions in response to the increase in perceived risk. While such behavior limits the risk exposure of individual institutions, it may heighten trends and increase volatility in a falling market.

18. An operational procedure aimed at reducing risk frequently adopted by financial institutions is to set stop-loss limits for individual traders for a given period. When losses reach such a limit, the remaining position is liquidated and trading ceases for the rest of the period. However, simply approaching the limit creates an incentive to reduce the position, thereby exerting pressure on the market. There is some evidence that these procedures affected price dynamics during the period under consideration.

19. Leverage appears to have played a significant role in the events of

early 1994 in two ways. First, hedge funds, securities houses and commercial bank trading desks have a leveraged capital structure. As prices move against the trader, the pressure to liquidate positions increases. If prices move very quickly, margin calls may trigger forced liquidations in a falling market. It was widely rumored during the period that major hedge funds were having to take large losses and face margin calls, leading to further forced sales. While hedge funds did reduce their positions, as did other market participants, little evidence of margin calls having actually been made has emerged to date. Nonetheless, the fear that such margin calls were being made certainly added to the market's anxiety. Second, leveraged instruments such as futures and options were widely used in the recent episode. Whether they contributed to price movements is an issue that needs to be examined further since the evidence available is inconclusive. While the rise in bond yields was sharp, it is unclear whether it would have been even sharper in the absence of futures exchanges that offered liquidity outlets for dealers and investors.

20. The mark-to-market accounting practices used by financial institutions may also have influenced the propensity to close out positions in some markets. With 1993 bonuses calculated and paid on the basis of year-end market prices, traders began the year without a backlog of profits. Bonds purchased early in 1993 had produced a large paper profit when marked to market at the end of the year. However, when prices started to fall early this year, traders recorded losses compared with year-end book values, although not in relation to acquisition prices, and were quicker to sell losing positions because they had no offsetting accumulated profits.

21. The other notable feature of this period was the higher-than-normal correlation of price movements across several bond markets. One factor cited by many markets participants was the use of "proxy hedging", a practice whereby investors holding positions in non-core markets seek to lower their risk profiles by selling other, more widely traded instruments. While investors and dealers had built up substantial positions during 1993, the sudden rush to reduce them strained liquidity, especially in smaller European markets. Where viable hedging instruments such as futures were unavailable, dealers and investors sought to lower their risk profiles by selling futures contracts on the larger European markets. Moreover, it was sometimes more efficient to reduce the overall level of risk by unwinding positions in a completely different market from the one where the losses had been incurred, particularly if conditions in the latter were disorderly.

V. The main players in the market

22. The evidence available suggests that large numbers of investors of various types had taken open positions on the same side of the market. When interest rate expectations changed, many market participants attempted to cover or close their positions simultaneously. It is therefore difficult to single out any firm, or type of firm, as having played a special role in causing or amplifying the movement of prices. The factors that were highlighted in last year's Report of the G-10 -- increased integration of

markets, improved information technology and institutionalization of savings -- have to be invoked in order to understand why the flow of funds out of bond markets was so large and rapid.

23. The role of non-resident investors was particularly important, especially in European markets, both when positions were built up in 1993 and in their subsequent unwinding. According to official statistics, non-residents were the principal investors in DM bonds in 1993, having absorbed about 54 per cent of the total issued. Consequently, by the end of that year non-residents' holdings of DM bonds had risen to 30 per cent of the total stock, compared with identified holdings of domestic banks amounting to 35 per cent. In France, non-residents hold about 30 per cent of negotiable government debt and account for practically 50 per cent of the positions taken on Matif. Similarly, at the end of 1993 non-residents held about 40 per cent of the government securities outstanding in Sweden.

24. These figures reflect the widespread cross-border and cross-currency diversification of investment portfolios that has occurred on an increasingly large scale in the last few years. Contrary to what happened during the recent EMS crises, large flows of non-residents' funds produced hardly any effect on foreign exchange markets, as the positions of such investors were typically hedged against currency risk.

25. Hedge funds and investment banks/securities houses engaged in proprietary trading and were active in taking and rapidly unwinding positions in bonds, currencies and derivatives. However, other institutional

investors also played a role, steadying markets at times by absorbing the sales of hedge funds and proprietary traders, although they may have refrained from performing this function during periods of peak instability. In their role as market makers, securities houses may at times have been reluctant to absorb imbalances between supply and demand in some markets.

26. Hedge funds have no precise legal definition in securities legislation and the firms known by this name vary considerably in terms of investment strategies, size and financing. They may not, and often do not, hedge their open risks, but rather take substantial leveraged open positions. Banks and securities houses trading for their own account also take positions, but are constrained by regulations linking their operations to their capital. US-managed hedge funds, often chartered outside the United States, are organized as private partnerships with the number of partners kept small enough (under 100) and the minimum investment large enough to avoid certain regulations of the US Securities and Exchange Commission with respect to sales of shares. Hedge funds generally reveal little about their activities.

27. Hedge funds have been in existence for decades, but it is only in the last few years that they have grown significantly in both number and size. There are no comprehensive data on hedge funds, but there are estimated to be some 800-900 such firms, with aggregate capital somewhere between $50 and $100 billion. The capital of the top four or five firms is reckoned to be on the order of $25 billion. The largest funds are thought to be able to gear up by about 5-10 times, others by more. Rising bond and

equity markets in 1993 gave the largest funds average returns of over 50 per cent.

28. Although the amount of capital committed to hedge funds and the potential to take leveraged positions appears large in absolute terms, the size and depth of the markets are such that it is difficult for one class of firm to move prices substantially. In fact, the G-7 countries' total government debt amounted to $9.6 trillion at the end of 1992, while the BIS has estimated that global foreign exchange contracts amounted to $880 billion per business day in April 1991. It should also be noted that hedge funds typically compete with each other to achieve the highest performance and that they do not all take the same positions. In the recent episode about 40 per cent of the 100 largest US-based funds registered losses, which indicates that they had taken somewhat different positions from the rest of industry.

VI. The functioning of the market

29. Markets came under considerable strain during the recent period of turbulence owing to the rapidity of the fall in prices, the sharp rise in volatility and the surge in trading volumes, but they continued to function well.

30. Volatility was unusually high, especially in European bond markets,

although it rarely exceeded previous peaks. Measured by the standard deviation of daily changes in bond yields over each month, volatility rose to record levels only in the United Kingdom and Belgium, with near record levels being registered in Germany and the Netherlands. The volatility of other G-10 bond yields and that of stock prices and exchange rates generally remained close to or below average, with the exceptions of the yen/dollar exchange rate in February and stock prices in some of the smaller European countries. It is noteworthy that both actual volatility and implied volatility based on options on futures remained close to normal levels in the United States.

31. Trading volumes increased sharply, especially in European futures markets, where most of the initial selling by institutional investors gravitated. At the beginning of March 1994 the combined nominal gross turnover in DM bond-based futures traded on LIFFE and the Deutsche Terminbörse was about ten times the turnover in the underlying instruments on the German stock exchanges. Trading in the MATIF Notional contract also rose to a record level at the beginning of March, with a peak of 440,000 contracts; the number of contracts exchanged daily in February was 61 per cent larger than in January and the figure for March was even higher. Turnover in LIFFE long gilt futures picked up sharply in February and March, whereas the increase in turnover in 10-year Treasury note futures on the Chicago Board of Trade was much less pronounced.

32. In spite of these strains, markets functioned satisfactorily. Prices continued to be quoted even when turbulence was greatest, although spreads

widened significantly. In France, trading on MATIF was briefly suspended in accordance with the rules of the market on the morning of March 3, when the price variation of the Notional contract exceeded the 250 basis-point daily limit; the related margin calls created no problems and the resumption of trading helped to stabilize the market after a short period of price falls. Although stretched, payment and settlement systems coped well with the surge in trading volumes. No obvious problem emerged in connection with risk management systems, information systems or back office procedures.

33. Although considerable losses were incurred by some hedge funds and other financial firms, only a handful of them were forced out of the market. As concerns banks, the evidence appears reassuring. During February and early March losses do not appear to have been significant. Widespread bank lending to hedge funds was reported, though banks generally do not aggregate their exposures, i.e. they do not treat hedge funds as a separate sector. Individual bank exposures were not large and were almost always fully collateralized -- which had not always been the case in the past; there is little evidence that margin calls were missed and banks did not suffer credit losses. Banks reported that their systems and controls had been able to keep pace with very rapid developments, although not all were able to mark to market frequently intraday. Some doubts were raised as to whether all participants were fully aware of the exposure risks in connection with settlement delays and uncertainties in the more exotic markets.

VII. Assessment by the Deputies

34. The major factor underlying the selling pressure that erupted in international bond markets in the first quarter of 1994 seems to have been a substantial and widespread revision of expectations about economic performances and policies in the major countries. In the preceding months a wide range of market participants had taken sizable positions on the assumption that the price trends that had prevailed in bond markets through 1993 would continue and that the dollar would strengthen against the yen and the Deutschemark. This scenario was scotched by a variety of unexpected and apparently unrelated events, described in section III.

35. In the light of subsequent developments the bond rally of 1993 appears to have been based on excessively optimistic assumptions and may have underrated the importance of factors such as rising budget deficits in many European countries and the resulting upward pressure on interest rates. The fact that this year's rise in bond yields was less pronounced in countries with an established reputation for price stability was seen by some Deputies as implying that there had been a correction to a previous excess. On the other hand, several Deputies stressed that the present level of bond yields was rather high in several countries, especially in Europe, where inflationary pressure did not appear to be a major concern in view of the modest pace of the recovery and the fact that production costs were being held down. Whether or not there was an overshoot or the correction of a previous overshoot, the Deputies agreed that the events of 1994 were a

reminder that market sentiment can change very quickly and, as was noted in the 1993 Report of the G-10 with reference to the rapid unwinding of EMS "convergence trades" in the second half of 1992, that periods of confidence can be followed suddenly by massive retrenchment.

36. Although the driving force behind the increase in bond yields was a change in expectations, some technical factors tended to amplify price movements, at least in the short run. Leveraged purchases of bonds helped bring yields down to their 1993 lows, but made such bondholders vulnerable to a fall in prices. When prices did begin to decline, several bond markets lacked the liquidity needed to prevent sales from having a substantial effect on prices. When financial losses and price volatility rose in bond markets, risk management systems led firms to reduce their risk exposures by trimming their positions, thereby causing further pressure on prices. While this behavior is desirable from a prudential perspective, it can prolong trends and increase volatility at times of stress. There is also some evidence that stop-loss limits assigned to individual traders within financial institutions were triggered, thereby tending to amplify the downward pressure on prices.

37. The strength of the selling pressures that suddenly emerged in February and March suggests that large numbers of different types of participant were attempting to "get out" of their positions simultaneously. It is therefore difficult to single out any single firm, or type of firm, as having been "responsible" for the timing, speed and volatility of market developments. Hedge funds have been particularly visible, but they are still

small compared with the total volume of funds available for investment in international capital markets.

38. Early evidence is inconclusive as to whether the surge in the use of leveraged instruments contributed to price movements. It is possible that volatility would have been even greater in the absence of futures markets offering liquidity outlets to institutions trying to lower their risk profiles. What may differentiate the recent period is not so much leverage per se as the number of large institutional participants with short-term horizons on the same side of the market. It is noteworthy that no significant trend can be discerned in the volatilities of bond yields, exchange rates or stock prices in the G-10 countries in recent years. This suggests that neither the emergence of new instruments and institutions nor the increase in market size has significantly altered the dynamics of prices in such markets.

39. In spite of the strains produced by the surge in volumes and the rapidity of price falls, bond markets functioned well throughout the episode. No operational problems appear to have arisen with settlement systems, risk management systems or back-office procedures. Some non-bank institutions incurred large losses, but only in a handful of cases did these threaten their viability. As for banks, losses during February or early March do not appear to have been significant. Widespread bank lending to hedge funds was reported, but individual exposures do not appear to have been large and banks did not suffer credit losses.

40. Nevertheless, the episode under review underscores the fact that the increasing complexity, globalization and operational speed of international financial markets requires ongoing attention to the broad range of prudential issues that were outlined in last year's Report of the G-10. In this respect the Deputies noted the progress made since last year in various international fora, especially as regards market risk capital-adequacy standards and transparency in the markets for derivative products. Steps are also being taken by national authorities as part of their normal supervisory work to ensure that banks continuously monitor the risks stemming from exposure to highly leveraged financial firms and from their own trading activities in derivatives. Deputies expressed the view that the Group should follow the work being done in the competent bodies and discuss its implications, especially for monetary policy.

41. From a macroeconomic perspective the recent rise in bond yields may prove not to be a cause for serious concern in countries where recovery is under way or already well established. It may nonetheless pose a problem for the authorities of countries where recovery is still very weak and inflation is low and declining. In several European countries financial markets appear to have reacted to the prospect of worsening budget deficits following the marked deterioration of the last two or three years, which cannot be entirely attributed to the recession. This consideration underscores the need for determined action in the field of budgetary policies; unless such action is taken, the ability of monetary policy to lower long-term rates will be seriously constrained.

42. A related issue is whether the rise in bond yields should be interpreted as at least partly reflecting an upward revision of financial market participants' inflation expectations, even in countries where economic activity is still weak. To the extent that this is the case, a similar revision of expectations in the real sector of the economy can be feared, with repercussions for wage and price formation. The evidence suggests that this has not occurred so far in these countries. Indeed, a further decline in inflation is expected and, if anything, inflation expectations have been revised downward in the last few months, as reflected in very moderate wage agreements. Since the second half of March bond yields have tended to stabilize or decline in most European countries, whereas they have continued to rise in the United States. While it is too early to judge whether this is the beginning of a new trend, the process could be enhanced by European authorities acting to reduce fiscal deficits and continuing their cautious easing of monetary conditions.

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