

Monetary policy instruments and procedures in Germany: evolution, deployment and effects

Peter Schmid and Henner Asche

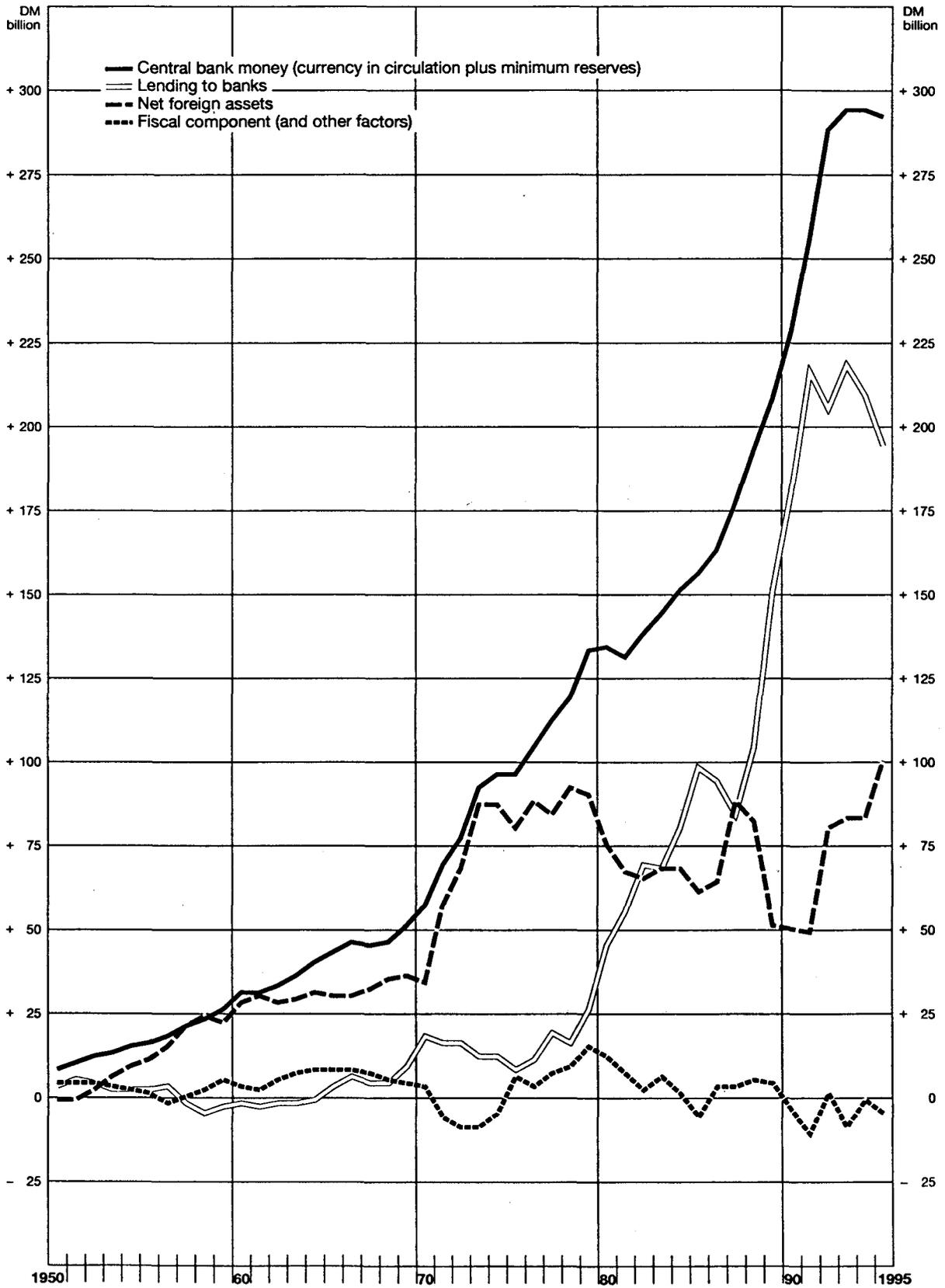
Introduction

Since the end of the Second World War money market policy in Germany has developed along comparatively steady lines. The set of monetary policy instruments with which the legislature provided the Bundesbank put the emphasis on bilateral refinancing relationships with the individual credit institutions in discount and lombard operations. It also, however, opened up the options of minimum reserve policy and open market policy. The statutory provisions left the Bundesbank sufficient scope for the actual application and further development of its instruments. It was even possible to come up with completely new instruments (for example, securities repurchase agreements, foreign exchange swaps) without amending the legal framework. Furthermore, the consistency of monetary policy was fostered by the progressive liberalisation of financial transactions (which had largely been completed by the end of the sixties) and by the special structural features and operating procedures of the German financial markets, particularly their high degree of competition and the prevailing long-termism.

Not even changes in the international monetary system entailed any radical changes in monetary policy practice. After the transition to floating exchange rates, the Bundesbank did alter its monetary policy strategy; with the abolition of obligatory intervention and the regaining of control over central bank money creation, it switched to monetary targeting in 1975. However, the transition to this "intermediate targeting strategy" had no direct consequences for the deployment of the monetary policy instruments. The switch to more flexible management of the money market, based increasingly on reversible open market operations, occurred gradually against the background of the growing interlinking of Germany as a financial centre with the international financial markets and the enhanced mobility of the investors of money and capital. The trend towards the globalisation of the financial markets, which particularly affects the Deutsche mark as the second most important international investment and reserve currency, called for a faster and phased response to changes in the global interest rate pattern and to expectations about future interest and exchange rate movements. Since 1985 the Bundesbank has been managing the money market predominantly by the revolving conclusion of open market transactions in securities under repurchase agreements (Chart 1). Since then there have been no more major innovations in the Bundesbank's arsenal of instruments. There have, however, been changes in the weighting and adjustments to the deployment of individual instruments so as to cope with the changing underlying conditions by recourse to these instruments.

The following sections initially outline the orientation and structure of the Bundesbank's monetary policy instruments. Subsequently, the principal changes in the use of these instruments during the past decade are described. There then follows a discussion of the "performance" of the current instruments at the money market level and in the downstream financial markets. In addition, the Bundesbank's current information policy and the use of market information in the Bundesbank's monetary policy practice are described.

Chart 1
Creation of central bank money: 1950-95
 Annual averages



1. Orientation and structure of the monetary policy instruments

The Bundesbank's intervention options focus on instruments which influence the interest rate and the availability of funds in the money market in the direction of its monetary objectives, but leave the process of competition in the financial sector of the economy unaffected as far as possible. They are aimed indirectly at the banks' credit supply stance and at the demand for money and credit in the economy. To this end, the Bundesbank applies both interest rate and liquidity policy instruments; however, it is unable to limit the credit creation process in quantitative terms (credit ceilings) or to fix market interest rates administratively.¹

The traditional interest rate policy instruments include the fixing of the discount rate and lombard rate, at which the Bundesbank, respectively, buys bills of exchange from banks (for not more than three months) and grants them, in general, very short-dated loans against the collateral of securities (Table 1). The Bundesbank Act does not lay down any upper or lower limits for these interest rates, but discount credit has always been the cheapest and lombard loans the most expensive source of refinancing, with the result that both are assigned the function of "key interest rates". Whereas the comparatively low discount rate contains an element of subsidy, the size of which depends on the difference between that rate and the other central bank and market interest rates, the lombard rate is above the short-term market interest rates and has, rather, the character of a marginal lending rate. Moreover, during the past decade the repo rate has assumed the status of a third "key interest rate", which is managed by the Bundesbank within the interest rate corridor marked out by the discount and lombard rates, and which determines the course of the day-to-day money rate (Chart 2).

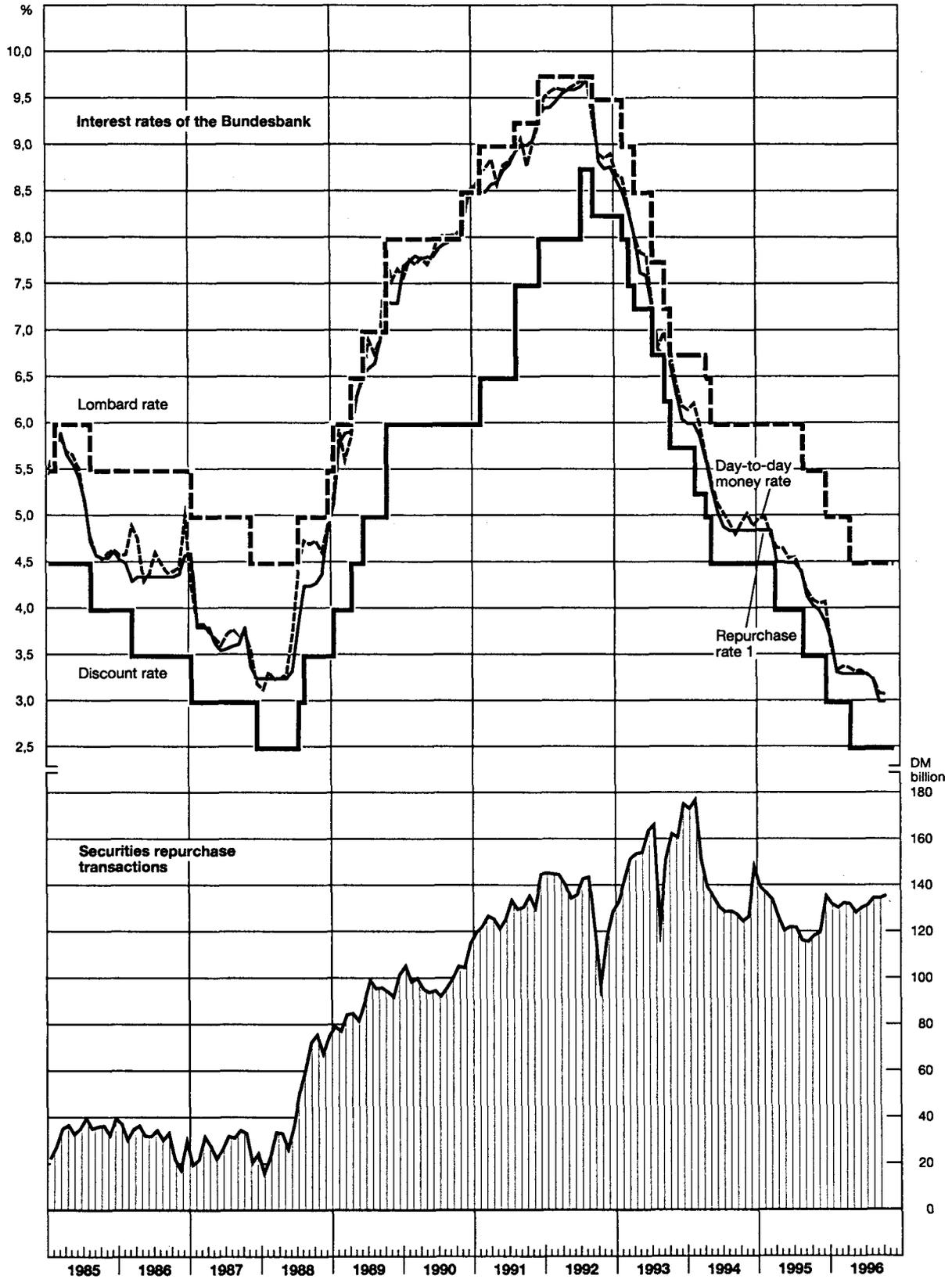
Table 1
Instruments of monetary policy in Germany

Longer-run adjustments	Fine-tuning measures
<i>Interest rate policy</i>	
Discount rate	Repo rate
Lombard rate	Treasury bill selling rate*
<i>Bank liquidity</i>	
Minimum reserves	Short-term liquidity Treasury bill sales
Rediscount quotas	Foreign exchange repurchase agreements
Outright operations in long-term bonds	Foreign exchange swaps
Issue and redemption of Bundesbank "liquidity paper"	Quick tenders
	Deposit policy (up to 1994)
Securities repurchase agreements (repos)	

* Selling rate set for bill-type short-term Bundesbank "liquidity paper" acts as a floor for the day-to-day money rate.

¹ For a detailed description of the Bundesbank's current instruments, see Deutsche Bundesbank (1995b).

Chart 2
Operating variables in the money market



1 Average monthly interest rate for securities repurchase transactions with one-month maturities and, from October 1992, with two-week maturities; uniform allotment rate (fixed-rate tenders) or marginal allotment rate (variable-rate tenders).

Besides changes in minimum reserve requirements, the traditional instruments of liquidity policy in Germany include the possibility of limiting qualitative and quantitative access to discount credit and lombard loans. Today open market policy, in the form of securities repurchase transactions, constitutes the most important liquidity policy operational parameter. Open market policy in the widest sense also includes foreign exchange swap and repurchase transactions, as well as shifts of Federal balances into the money market (up to 1994), which have been used only sporadically, if at all.

The traditional instruments have tended to be used for longer-term adjustment purposes: they either set longer-term benchmarks for price formation in the financial markets, or serve to meet the banks' central bank money requirements over the longer term or to contain their liquidity scope. By contrast, open market policy fine-tuning measures serve mainly to offset temporary fluctuations in bank liquidity and to steer money market rates as unobtrusively as possible in the desired direction. The Bundesbank's repo transactions cannot be classified unambiguously under these headings; they are of a dual nature, as they serve both permanent refinancing and the fine-tuning of bank liquidity.

2. Changes in operating procedures over the last decade

In the past few years, the Bundesbank has increasingly taken account of market economy principles, and particularly of the criterion of competitive neutrality, in shaping its instruments. In the light of regulatory considerations, but also against the backdrop of the growing globalisation of the financial markets, it has reduced differentiating and discriminating regulations and given greater weight to instruments consistent with market conditions. This is illustrated particularly clearly by the restructuring of the minimum reserves and the change in the significance of rediscount policy, as well as by the improvement and refinement of the open market policy instruments (see also Table 2).

Table 2
Bundesbank balance sheet structure*
In percentages

Assets		Liabilities	
June 1985			
Net foreign assets	34.3	Banknotes	58.4
Lending to government	1.4	Required reserve deposits	28.2
Discount lending	38.2	Deposits of domestic non-banks (incl. government deposits)	3.1
Marginal lending	0.3		
Repos	21.1	Balancing item	10.3
Securities held outright	2.2	Total	100.0
Float	2.5		
Total	100.0		
June 1996			
Net foreign assets	35.5	Banknotes	81.5
Discount lending	21.1	Required reserve deposits	13.0
Marginal lending	0.1	Deposits of domestic non-banks (incl. government deposits)	0.2
Repos	43.3	Float	0.7
		Balancing item	4.6
Total	100.0	Total	100.0

* Calculated on the basis of daily averages of the months.

2.1 Restructuring of the minimum reserves

The monetary policy substance of the minimum reserves has changed over time, without the Bundesbank's basic attitude to this instrument having altered. Today, however, the monetary policy significance of the minimum reserves is seen less in their function as an "inhibitor of money creation" than in their function of ensuring a lasting demand for central bank money, a stable demand for central bank balances and of acting as a liquidity buffer in the money market. In order to ensure the efficiency of monetary policy, i.e. the central bank's interest rate leadership in the money market, the banking system must be kept sufficiently dependent on central bank refinancing. As a glance at the structure of the Bundesbank's balance sheet shows, at present this does not necessitate any minimum reserve requirements owing to the large amount of banknotes in circulation, but the future trend of currency in circulation is difficult to assess against the background of the increased advance of cashless payment media. The minimum reserve instrument enables the Bundesbank to adjust the size of the lasting demand for central bank money by varying the reserve ratios. As an instrument of economic management to offset fairly sharp fluctuations in liquidity, the Bundesbank last used the minimum reserves at the beginning of 1987 to absorb heavy foreign exchange inflows. For this purpose it now has a more flexible alternative available, in the shape of securities repurchase transactions.

Today the minimum reserves are used solely for regulatory purposes, as they mark out the framework for the deployment of the remaining monetary policy instruments. At the same time, they were restructured in three steps between 1993 and 1995, with the aim of reducing the incentives to circumvent them and of adjusting the instrument to liberalised and globalised financial markets. The Euro-markets, in particular, where the banks do not incur any minimum reserve costs, offer an interest rate advantage that is relevant to investment decisions. This competitive disadvantage of the financial centre in Germany fostered cash-holding outside Germany and impaired the informative value of the domestic monetary aggregates. Against this background the reserve regulations were simplified,² and the reserve ratios for the individual categories of deposit were largely brought into line with one another and lowered considerably (see Chart 3).³ This led to considerable cost relief for the banks.⁴ The Bundesbank extended the restructuring of the minimum reserves over a fairly long period in order to preserve the stability of the demand for central bank money, and not to jeopardise the cushioning function of the minimum reserves in the money market.

These are maintained as long as the reserve requirements exceed the working balances held on a voluntary basis by a sufficiently wide margin. This could always be assumed, since the banks' working balances (the exact amount of which cannot be measured) have likewise decreased sharply in the recent past. On the one hand, the credit institutions have increased their central bank liquidity holdings; on the other, the volatility of bank liquidity, and thus the necessity to hold precautionary balances, have been reduced by several institutional and technical changes. These included the abolition of the deposit requirement for the Federal Government at the beginning of 1994⁵ (decided in connection with the entry into force of the second stage of European economic and monetary union) and the changes in the Bundesbank's payment operations with the aim of exploiting the technical

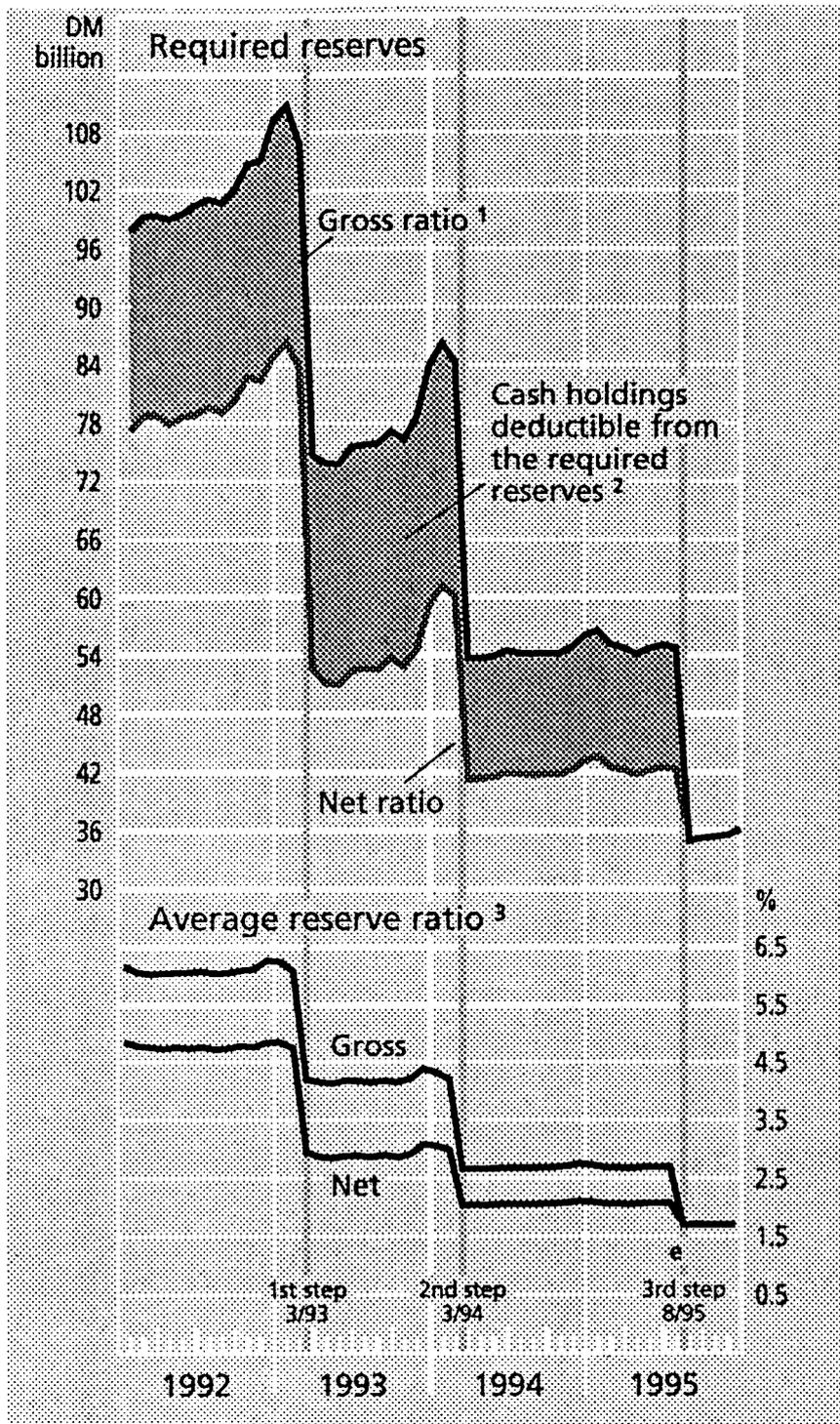
² The progressive reserve stages for sight liabilities were abolished (for time and savings deposits as early as 1986), as were the differentiation of reserve ratios for liabilities to, respectively, residents and non-residents, as well as the deductibility of the credit institutions' cash holdings from minimum reserve requirements.

³ For the measures in detail, see Deutsche Bundesbank (1994b) and (1995a).

⁴ When assessing the cost of the minimum reserves, the subsidised refinancing via rediscount credit must be taken into account, along with the fact that the minimum reserve balances can also be used as working balances.

⁵ For details, see Deutsche Bundesbank (1994a).

Chart 3
Restructuring of the minimum reserves
 Monthly figures



¹ Required reserves before the deduction of cash holdings. ² Until February 1994 limited to 50% of the required reserves, from March 1994 to July 1995 limited to 25%; from August 1995 no longer deductible. ³ Gross or net ratio in relation to the liabilities subject to reserve requirements. ^e July-August 1995 position estimated on the basis of the figures for June.

Source: Deutsche Bundesbank.

options for reducing the maturity-related float.⁶ At the end of 1994, the large-value cheque collection procedure was implemented in the Bundesbank system, and in July 1995 it was extended.⁷ In the upshot, the difference between credit institutions' reserve balances and their working balances narrowed distinctly. The pattern of compliance with reserve requirements in the course of the month has changed significantly for that reason, and because of the smaller fluctuations in bank liquidity (see Chart 4). Until the beginning of the nineties, quite considerable "advance compliance" with the minimum reserve requirements was typical of the pattern, and such compliance dwindled rapidly with liquidity withdrawals on the tax payment dates, settling down at the usual marginal compliance with the reserve requirements towards the end of the month. Nowadays, in contrast, the inflows and outflows of public funds are no longer reflected in pronounced fluctuations in the banks' central bank balances, but cancel out in the money market, with the result that the central bank balances fluctuate more closely around the required reserves. The aforementioned innovations in the Bundesbank's payment operations, which reduced the level and margin of fluctuation of the float, operated in the same direction. The (net) required reserves have decreased from around DM 47 billion in 1985 via almost DM 87 billion at the beginning of 1993 and to currently DM 37½ billion, and the amplitudes of central bank balances in the course of a month have declined from peaks of around DM 30 billion in 1992 to about DM 5 to 8 billion at present.

The Bundesbank has adjusted its money market management to this new compliance pattern aimed at by the banks, which is as uniform as possible. If it wishes to keep the money market in balance, it tries to gauge its provision of funds in such a way that the difference between the daily central bank balances of credit institutions and the required reserves remains as low and as free from fluctuations as possible during the entire month. In order to put this area of tolerance into operation, the Bundesbank has developed, on the basis of past experience, what is known as a reserve management band. Overshootings of the band indicate an easing of interest rate conditions in the day-to-day money market, while undershootings provoke tensions. The amount of the required reserves is not known at the beginning of a month. The necessary estimate is initially based, in principle, on normative sorts of assumptions, which are derived from a rate of monetary expansion compatible with the current monetary target. (The change in currency in circulation is forecast in the same way at the beginning of a month.) In this way, the liquidity provision in the money market is quantitatively linked with the monetary target. The estimate is not updated until the second half of the month, in keeping with the inflow of information on the actual trend, and then loses its purely normative character.

⁶ According to Section 3 of the Bundesbank Act, the Bundesbank has to arrange for the execution of domestic and international payments. It fulfils this duty by making available to the credit institutions of the various bank categories (which each maintain their own giro networks) a payment system not affecting competition. By means of its own terms and conditions, its terms for debits and credits and its prices, it influences the extent to which the credit institutions use the Bundesbank network. Against the background of the close interrelationship between the implementation of monetary policy and the settlement of payments through the central banks, the Bundesbank fosters in particular large-value payment transactions, for the use of the monetary policy instruments presupposes an efficient and safe large-value payment system through which liquid funds can be made available to the money market and possibly turned over several times a day. Of paramount importance are the express electronic intercity and local credit transfer system (gross settlement procedure) and the electronic clearing in Frankfurt am Main (which combines elements of a gross settlement system with elements of a liquidity-saving net settlement system).

⁷ For details of the trends in the bundesbank's cashless payments since the middle of the eighties, see Deutsche Bundesbank (1994d). With the large-value cheque collection procedure, the introduction of large-value cheques into supraregional collections has been accelerated; the collection period now corresponds to the Bundesbank's terms for credits. As early as 1991 the Bundesbank had taken comprehensive measures to reduce, in particular, the positive float in payments with public cash offices.

Chart 4
 Pattern of minimum reserve compliance

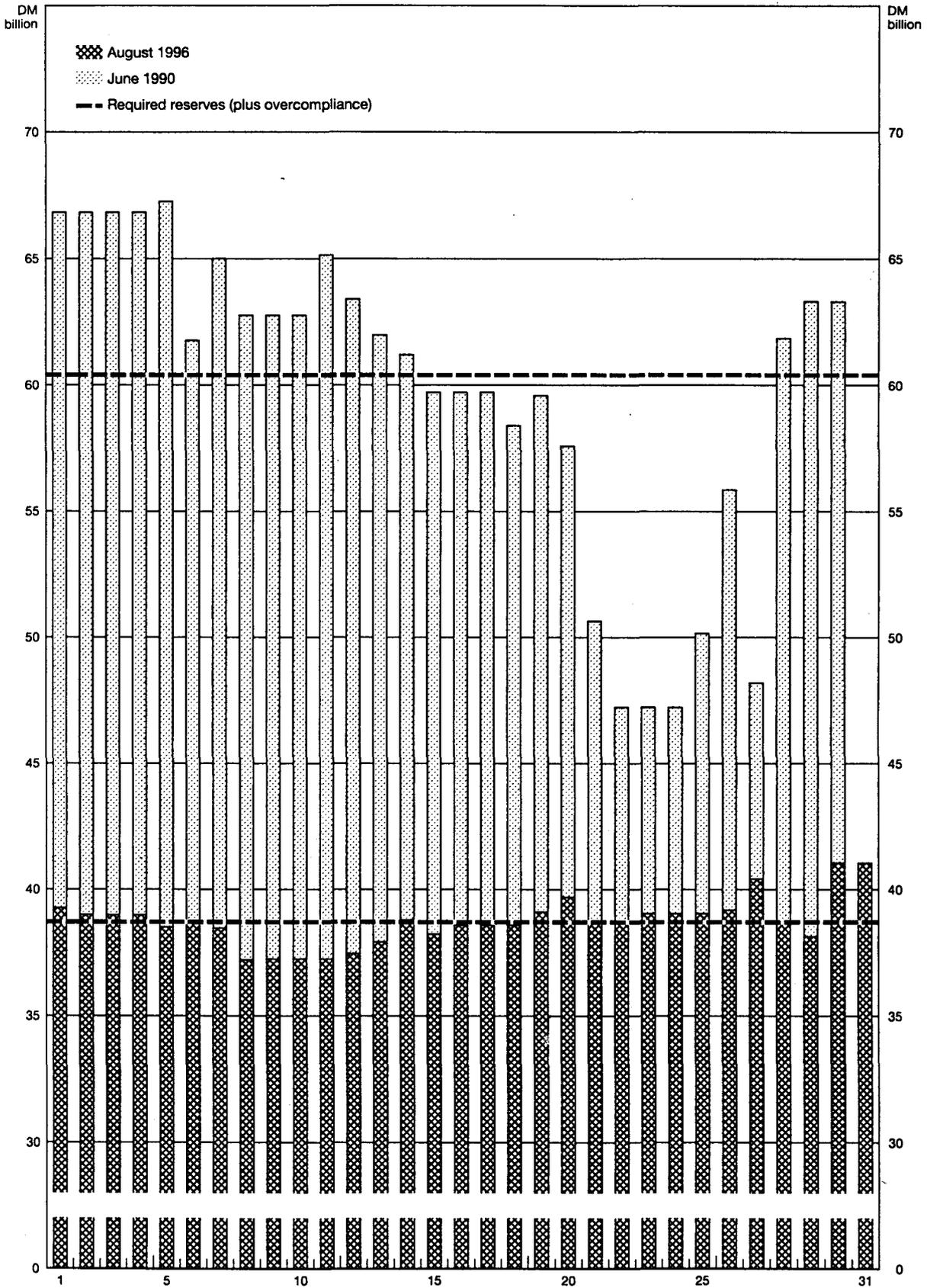
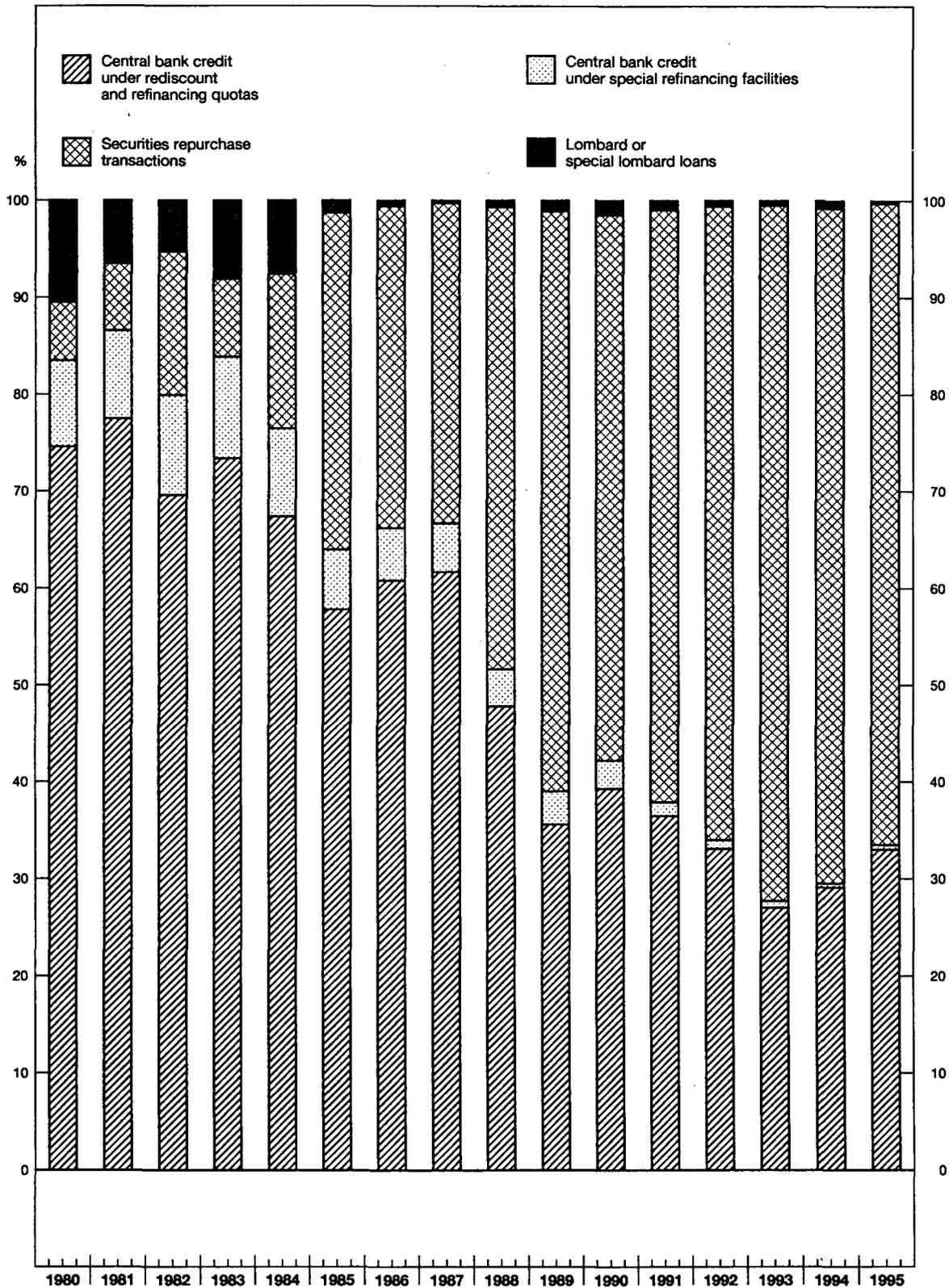


Chart 5
Pattern of credit institutions' borrowing from the Bundesbank*
 Percentage share of total funding (based on monthly average amounts)



* Excluding open market operations in trade bills under repurchase agreements, foreign exchange swap and repurchase transactions, shifts of Federal balances under section 17 of the Bundesbank Act and quick tenders.

2.2 Dwindling significance of rediscount policy

The Bundesbank still sees the purchase of trade bills as being a reasonable means of providing longer-term central bank money, since this is a flexible basic refinancing facility of the banking system and the economy. Nevertheless, the quantitative significance of rediscount credit has decreased substantially. The subsidy character of the discount rate calls for a quota system for the rediscount volume; the fixing of quotas for individual banks means that infringements of the principle of competitive neutrality can hardly be avoided. In the past few years the Bundesbank has therefore successively reduced the "special refinancing facilities" which existed alongside the normal rediscount quotas (of DM 65½ billion), and which were intended to cater for special financing needs (from about DM 7 billion in 1985 to barely DM 1 billion in 1996). Such monetary policy regulations, which tended to have a selective effect, served to promote exports, small and medium-sized firms and trade between the Federal Republic of Germany and the German Democratic Republic.

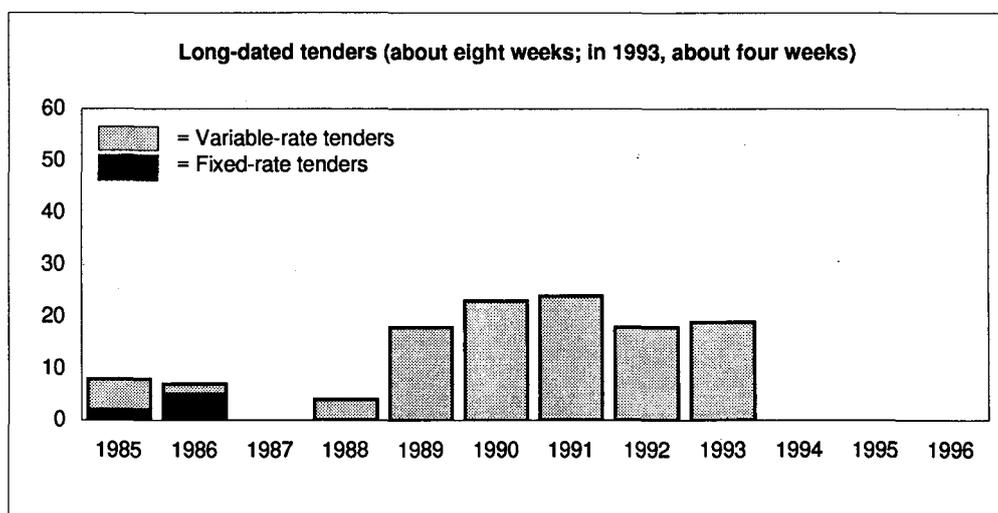
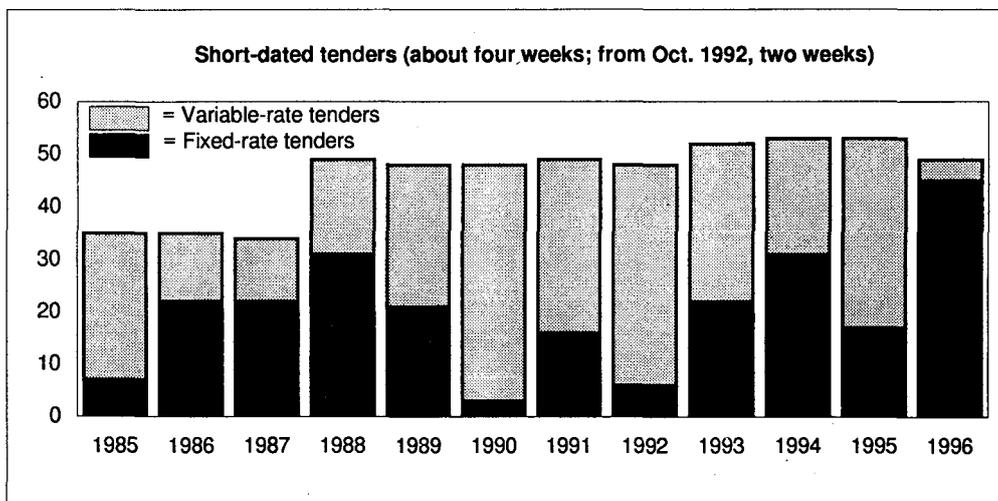
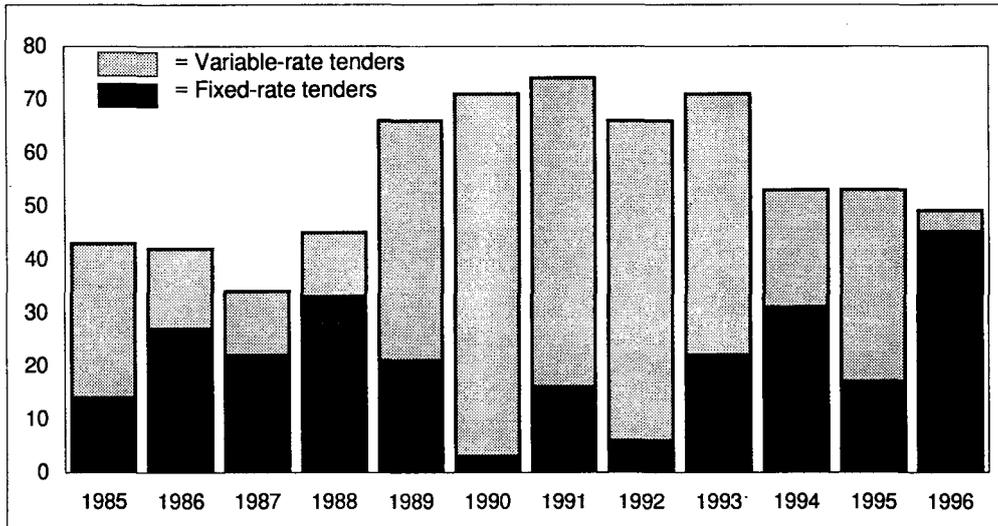
The share of bill-based lending in credit institutions' overall refinancing at the Bundesbank has been reduced almost continuously from two-thirds to one-third during the past decade (see Chart 5). Bill rediscounting has thus only performed the function of basic refinancing for some time now. It increased in significance for a time at the beginning of the nineties, in connection with intra-German monetary union. In the middle of the present decade its share again rose slightly, when the sizeable release of funds in the wake of the restructuring of the minimum reserves was only offset by a reduction in repos. The absolute size of the total amount of normal rediscount quotas has hardly changed since 1992, and is currently back at the level of the end of 1989. Rediscount policy is no longer being used as an instrument for managing liquidity.

2.3 Extension of open market policy

Forgoing the use of minimum reserve and rediscount policy for economic management implied a shift of emphasis in favour of open market policy; meanwhile, it has become the key determinant of the banks' overall refinancing.

Open market policy in Germany is conducted almost entirely through the instrument of securities repurchase transactions, i.e. purchases of securities for a limited period. The traditional form of open market policy, namely the definitive purchase and sale of long-term securities (permissible by law only for the purpose of regulating the money market) has always been pursued by the Bundesbank only sporadically, among other things in order not to arouse the wrong impression that interest rate movements in the bond market are a reflection of its operations in that market (see Table 2). Open market operations in money market paper are likewise of only rudimentary significance. One reason for this is that, virtually up to the present, there has been only a rather narrow market in Germany for private and public money market paper, in which the central bank could act by means of its traditional open market policy. The development of such a market was hindered both by the traditional bilateral refinancing operations of the banks with the Bundesbank and by the minimum reserve system, as well as by the aversion to short-termism in financial relations, and the predominance of the universal banking system. The money market paper currently being used by the Bundesbank comes into being at the initiative of the Bundesbank itself. It is entitled to circulate Federal Treasury bills in the form of liquidity paper (since 1992, up to a maximum amount of DM 50 billion). However, it may sell liquidity paper, if necessary, only at short term – for three days as a rule – to mop up temporary excess liquidity in the money market. (Such paper is also sold to non-residents on a small scale.) In addition, such paper was tendered in the open market for a while (from spring 1993 to the autumn of 1994) in the form of Bundesbank Treasury liquidity discount paper (Bulis) with maturities of several months. On the one hand, these auctions served to offset, in liquidity terms, the heavy minimum reserve reduction at the time; on the other, the Bundesbank tried to influence the cash holdings of domestic non-banks directly. Since the latter attempt did not succeed – the Bulis were bought primarily by non-residents – the Buli auctions were discontinued.

Chart 6
Securities repurchase transactions of the Bundesbank*



* 1996: January-November.

Given the ruling conditions of the financial system, it seemed appropriate to the Bundesbank to take advantage of German banks' large holdings of fixed-income securities to engage in open market policy in the form of repurchase transactions (repos). In the past decade repos have not only expanded sharply in terms of volume, their technical design has also been refined. In August 1988 the frequency of repos was increased from three per month (since February 1985) to four; since December 1993 one repo has been offered every week. From July 1989 to October 1992 repos were almost always offered with two different maturities (for one month and for two months); subsequently, against the background of the EMS crisis, the maturities of the transactions were reduced to two and four weeks; as a result (other things being equal), the settlement volume per repo, and thus the Bundesbank's liquidity policy scope, increased distinctly. Since the end of 1993 only two-week repurchase transactions have been offered. In November 1988 the Bundesbank supplemented its range of instruments by adding the so-called "quick tender", by means of which the money market can be managed flexibly from day to day outside the regular repo pattern. The Bundesbank offers repos in the shape of fixed-rate tenders and variable-rate tenders. In the autumn of 1988 it changed the variable-rate tender from the Dutch-style to the US-style auction, and refrained from specifying a minimum bidding rate. In this way, market tendencies gained greater influence over interest rate formation. Moreover, since banks have been able, since the end of 1992, to submit bids for full 0.01 percentage points (instead of 0.05 percentage points, as previously), coordinated bidding behaviour on the part of credit institutions is made more difficult, and the signal effects of interest rate changes tend to be mitigated.

The variable-rate tender is often regarded as conforming better with market conditions since it enables banks to influence interest rate formation. In practice, however, the Bundesbank has frequently resorted to the fixed-rate tender when it wished to steady interest rate movements or to provide the market with clear interest rate signals. Historically, the fixed-rate tender predominated in the period of falling interest rates from 1985 to 1988, whereas variable-rate tenders were mostly offered in the subsequent period of rising interest rates until 1992. The ensuing period of easing interest rates was accompanied by the more frequent use of fixed-rate tenders (see Chart 6). The high price volatilities in the financial markets were a major factor in this. In such periods the Bundesbank tends to guide the market by pursuing an interest rate policy of "steady as she goes" (see Section 3.2 below).

3. Performance of the instruments

Monetary policy in Germany is based on comparatively stable financial market structures and transmission mechanisms in the financial sector, which can be traced back not least to the steady evolution of this sector and the great weight of universal banks in the German financial markets. The large number of banks with direct access to central bank credit⁸ and the relatively keen competition among banks foster the rapid transfer of monetary policy stimuli via changes in market interest rates. The longer end of the term structure is increasingly being affected by expectations in the global financial markets; the desired steadying of longer-term expectations is, in turn, highly dependent on the degree of consistency of the monetary policy measures. Inconsistency, and also lack of transparency, trigger sanctions on the part of the markets, which cannot be countered by instrumental operations alone.

Against this background, the performance of the Bundesbank's instruments must be measured in terms of the extent to which they succeed in achieving the operational targets set at the money market level (i.e. the control of bank liquidity and of short-term money market rates) and in

⁸ Of the approximately 3,500 credit institutions in Germany, over 2,500 have an autonomous rediscount quota and hold securities in operational safe custody accounts with the Bundesbank to collateralise lombard loans and to participate in repos.

influencing conditions in the downstream financial markets – which help to determine the monetary expansion process – in line with the target. Basically, the operational targets should not be defined too narrowly, so that compliance with them can be guaranteed with the existing set of instruments, duly adjusted to cope with any possible shocks, and their flexible deployment – even in an environment which is tending to be more volatile as a result of the internationalisation of the financial markets.⁹

3.1 Management of the day-to-day money rate

The level of the day-to-day money rate, i.e. the market price of credit institutions' reserve balances, is geared to the repo rate and its margin of fluctuation is limited by the interest rate corridor set by the Bundesbank, with its ceiling fixed by the lombard rate and its floor (if appropriate) by the price of short-term Treasury bills (liquidity paper; not a standing facility). The volatility of the day-to-day money rate within the interest rate band depends on:

- the volatility of the market factors determining bank liquidity (currency in circulation, foreign exchange movements, float);
- the interest rate elasticity of the demand for central bank balances; and
- the liquidity-adjusting operations of the Bundesbank.

Other things being equal, the changes in the past few years described in Section 2 have tended to help to reduce the volatility of the day-to-day money rate: upon the exemption of public cash offices from deposit requirements in 1994, the most volatile determinant of liquidity up to then, ceased to be operative. The innovations in the Bundesbank's payment system have reduced the amplitude of the float in the course of a month from up to DM 20 billion at the end of 1990 (equal to 30% of the net required reserves) to currently not more than DM 4 billion (equal to 10% of the required reserves). At the same time, the demand for central bank money during the month – except in the last few trading days of the reserve compliance period – remained responsive enough to interest rate changes to absorb liquidity shocks almost unobtrusively; in other words, the averaging provisions of the minimum reserves remained effective, despite the sizeable reductions in the reserve ratios. Finally, the fine-tuning instruments satisfied the requirement of being able to manage the provision of the banking system with liquidity in line with the target. Even in extreme situations (the intra-German monetary union in 1990, the EMS crises in 1992 and 1993, profit distributions by the Bundesbank) they proved to be efficient.¹⁰

As a rule, however (i.e. in periods without exceptional burdens), the major part of the daily liquidity shocks is absorbed by the minimum reserve balances alone; that is to say, without intervention by the Bundesbank.¹¹ Open market operations, here primarily the repos, which are offered once a week, mainly have the task of keeping the reserve balances within a narrow range around the required reserves. Very short-term assistance operations (quick tenders, foreign exchange swaps, Treasury bill sales)¹² are therefore very rarely required, and are chiefly deployed towards the end of the compliance period. In the recent past hardly any recourse to them has been necessary.

A glance at the movement of the day-to-day money rate shows that during the past decade, its fluctuations (as measured in terms of the relative change from the previous day) have

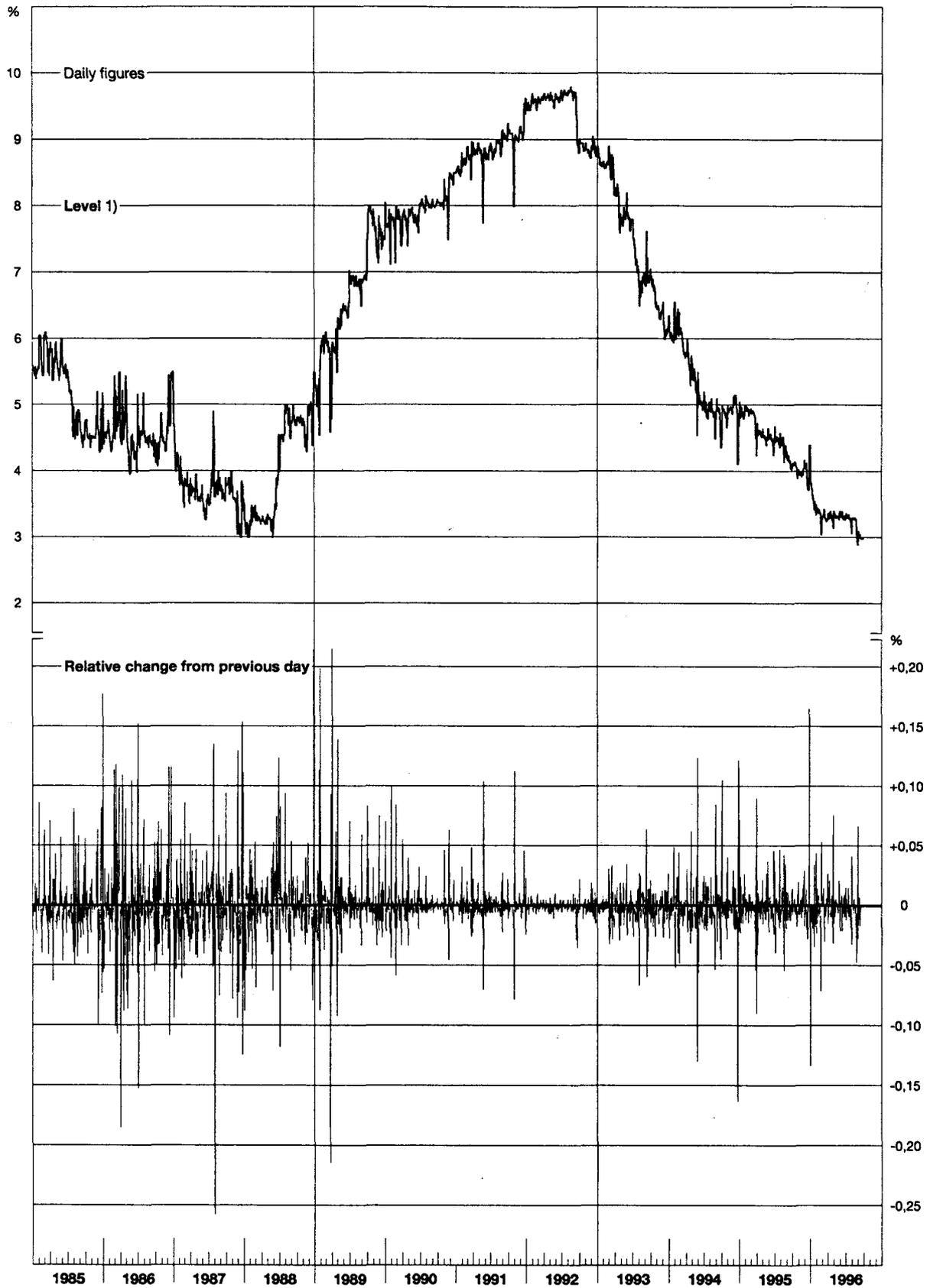
⁹ See also Bisignano (1996).

¹⁰ See Deutsche Bundesbank (1994c).

¹¹ For Germany this is again confirmed by a recent international comparison, according to which an estimated two-thirds of the daily shocks is absorbed by the minimum reserves. Escrivá and Fagan (1996).

¹² The very short-term fine-tuning instrument most used over many years, i.e. the day-to-day shifting of Federal funds into the money market, has not been available to the Bundesbank since 1994.

Chart 7
Day-to-day money rate
Level and relative change from previous day



1) Adjusted for changes at the end-of-month.

Table 3
Statistical measures of money market volatility*
 In percentages and percentage points

	Average volatility (% p.a.)	Maximum volatility (% p.a.)	Maximum relative rise (% from previous day)	Maximum relative decline (% from previous day)	Maximum absolute rise (% points from previous day)	Maximum absolute decline (% points from previous day)
Day-to-day money rate						
Start-1985 to end-1989.....	42.68					
Start-1990 to August 1996	20.03					
Period of falling interest rates, 1985 to 1988.....	43.76	96.55	17.70	-25.70	0.84	-1.06
Period of rising interest rates, 1988 to 1992.....	23.92	90.94	21.50	-21.40	1.15	-1.10
Period of falling interest rates since 1992	23.53	73.42	16.50	-16.30	0.67	-0.73
Interest rate for three-month funds						
Start-1985 to end-1989.....	10.92					
Start-1990 to August 1996	5.44					
Period of falling interest rates, 1985 to 1988.....	10.62	52.81	11.80	-7.70	0.50	-0.33
Period of rising interest rates, 1988 to 1992.....	6.64	24.20	5.80	-3.80	2.50	-0.37
Period of falling interest rates since 1992	6.51	24.34	2.90	-5.60	0.12	-0.22
For comparison: yield on public bonds outstanding						
Start-1985 to end-1989.....	6.96					
Start-1990 to August 1996	7.77					
Period of falling interest rates, 1985 to 1988.....	7.37	24.91	3.10	-3.90	0.20	-0.27
Period of rising interest rates, 1988 to 1992.....	5.15	13.59	2.70	-2.40	0.23	-0.20
Period of falling interest rates since 1992	9.82	24.35	5.30	-2.80	0.33	-0.20

* Volatility calculated as annualised standard deviation of relative daily changes of interest rates and yields within a month.

tended to diminish (Chart 7¹³). The very small fluctuations at the beginning of the nineties are due to the fact that at the time the day-to-day money rate was running close to the lombard rate, and that the possibility of fluctuations – at least upward fluctuations – was therefore technically very limited; since the autumn of 1992, by contrast, the day-to-day money rate has been moving around the middle of the

¹³ The time series for the day-to-day money rate has been adjusted at this point for frictional fluctuations on the last trading day of the month. The last day of the compliance period is often characterised by imponderables. As a rule, the Bundesbank takes no action; rate fluctuations on the last day of the month are not assigned any function by market participants.

interest rate corridor. Moreover, historical volatilities (measured in terms of the annualised standard deviation of the relative change) show that, since the end of the eighties, the average fluctuation has been independent of the interest rate trend. In periods of rising day-to-day money rates, it is no different from that in periods of falling interest rates (Table 3).

An optimum volatility in the day-to-day money market is not theoretically quantifiable. On the one hand, the day-to-day money rate should be allowed to "breathe" in order to be able to indicate correctly the supply and demand conditions in the market for central bank balances (for that reason the interest rate corridor should not be set too narrowly); on the other, functionless and erratic fluctuations in the rate, which may trigger undesirable expectations in the market and provoke intervention by the central bank merely for the sake of taking action should be avoided. Hence, the Bundesbank is not endeavouring to prevent volatility completely. Accordingly, its intervention frequency in the money market is not guided by what is technically possible, but is limited to the measure that is necessary in monetary policy terms. This means that volatility in the day-to-day money market should be manageable to the extent that the Bundesbank is in a position at any time to make an interest rate policy change of direction, or to make the desired interest rate trend in the money market recognisable without newly approving the interest rate corridor or announcing a modified fixed-rate tender rate in advance.

In addition, the Bundesbank can gauge its liquidity provision in such a way that the actual course of compliance with the reserve requirements deviates from the uniform monthly pattern aimed at by the banks. The movement of the day-to-day money rate initiated by such a front-loaded or back-loaded central bank money provision or compliance with the reserve requirements is reflected in a corresponding change in the banks' bidding behaviour if the variable-rate tender is used. Over the short term, the Bundesbank may in the process become somewhat dependent on the credit institutions. Especially if interest rate expectations are very homogeneous, the banks' demand curve may be very flat, with the result that the Bundesbank is hardly able to influence the variable-rate tender rate on the day of the auction by means of its operating parameter, i.e. by varying the volume. However, in this case it may set the amount of the purchase in such a way that in the following week the supply and demand conditions in the money market largely force the banks to bid in the manner desired. The Bundesbank uses this procedure of comparatively unobtrusive interest rate management fairly frequently, and thus endows the resetting of the interest rate corridor, which normally follows, with something of a confirmatory character. Even so, it has to be said that even a traditional change in key interest rates prepared in this way may trigger market price reactions.¹⁴

Recourse to the liquidity channel can, however, only be successful if, firstly, the Bundesbank foresees market-determined liquidity shocks with sufficient reliability and, secondly, the banks' behaviour is not determined by pronounced expectations of interest rate changes. In the latter case, as also in periods of enhanced instability of the financial markets, the Bundesbank therefore opts for the fixed-rate tender to give the market guidance. Interest rate expectations may soon push the variable-rate tender rate against the limits of the interest rate corridor – regardless of the banks' current provision with liquidity by the Bundesbank. In periods of rising interest rates, the repurchase rate soon moves close to the lombard rate and the Bundesbank risks falling into the lombard trap; i.e. in expectation of continuously rising interest rates, the credit institutions make heavy use of the lombard window so as to comply with their reserve requirements in advance. The lombard rate assumes the function of the operational key interest rate, and the repo instrument becomes ineffective. If, in periods of falling interest rates, the repo rate approaches the discount rate, the discount trap opens up. The banks reduce their borrowing at the discount window because they no longer wish to borrow for three months at current terms. The liquidity needs to be met through open market operations can no longer be forecast with sufficient accuracy, and sharp fluctuations in the day-to-day money rate can hardly be prevented. Exceptional reactions on account of expectations of changing interest rates cannot be ruled out completely in the case of fixed-rate tenders either. At the end of January 1994, for example, the banks no longer generated any demand for the liquidity they actually needed ("bidder

¹⁴ See Hardy (1996).

strike") since they felt that the fixed-rate tender rate set by the Bundesbank was too high, and speculated on a later provision of funds at a lower price.

Despite these qualifications, money market management through securities repurchase transactions has proven its worth. Although repurchase transactions are no substitute for day-to-day money, the repurchase rate has assumed the interest rate leadership in the day-to-day money market. This applies both on average over a fairly long period and in a very short-term day-to-day perspective. Market rates respond direct to the announcement of a changed repo rate. In the case of fixed-rate tenders announced in advance, the market responds already in advance of the actual tender date; on the allotment day itself the additional information consists only in the volume allotted. In the case of variable-rate tenders, by contrast, the market response becomes apparent directly on or around the allotment date. Even when the frequency of intervention was low, major fluctuations in the day-to-day money rate could be prevented thanks to the cushioning function of the minimum reserves. The Bundesbank has become much more flexible in its interest rate policy. Where repurchase rates are concerned, variations can be confined to small steps, and major errors can be avoided when decisions must be taken in uncertain circumstances. As a rule, the Bundesbank therefore "feels its way" towards the desired interest rate conditions in the money market in small steps, by trial and error. Short-term open market policy measures often play a leading role in the process. Subsequent changes in the traditional key interest rates – the discount and lombard rates – therefore often have only a confirmatory character. This applies both to periods in which the Bundesbank wishes to pursue a more rigorous policy in the money market and to periods in which the Bundesbank is exploring the domestic and external scope for monetary relaxation.

3.2 Influence on short and longer-term market interest rates

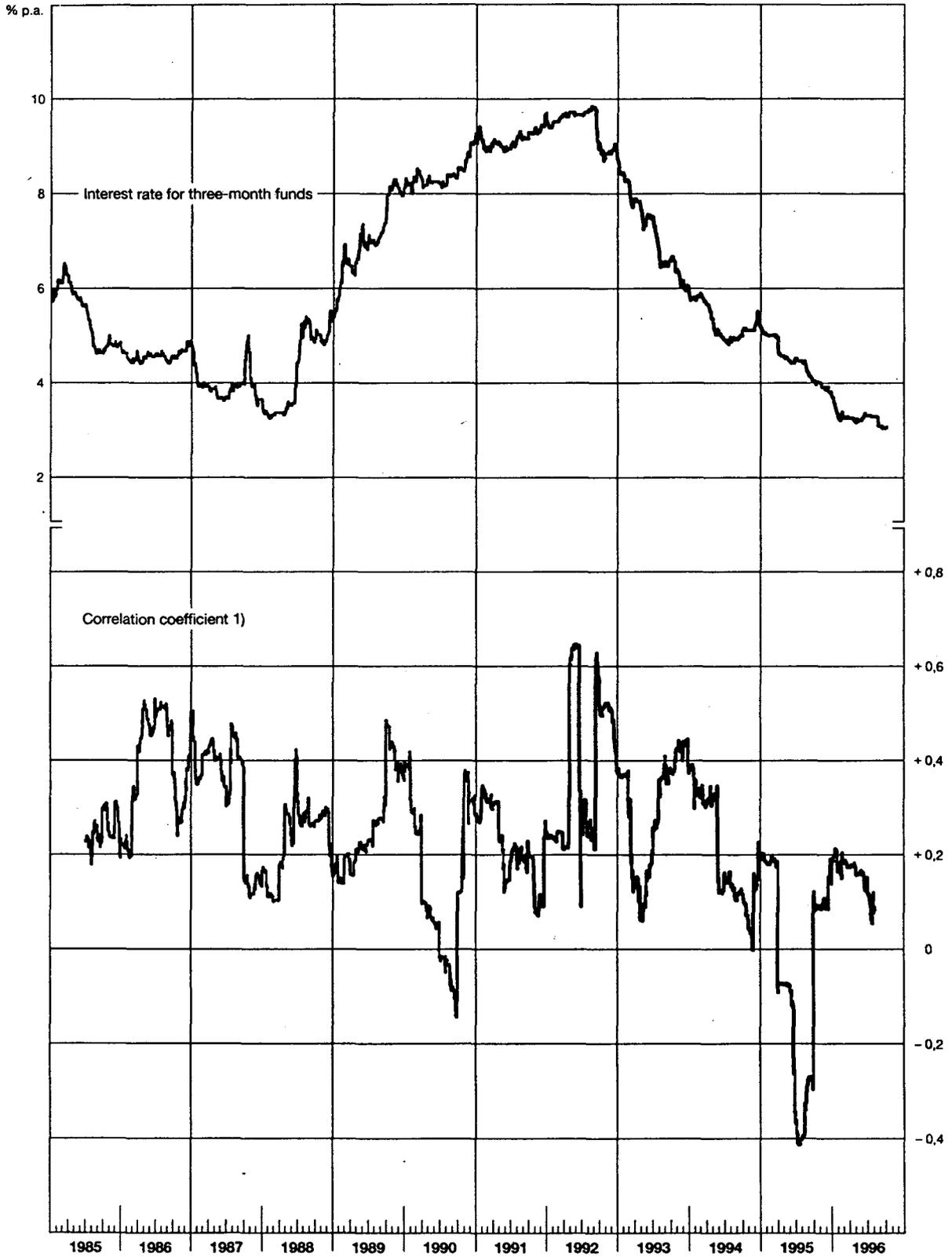
The Bundesbank has the option of selectively pursuing a term structure policy in the money market, i.e. of implementing its ideas on the future trend in money market rates in the market, by varying the maturities of its repo transactions. Because of the risks involved and because there was no necessity, it has taken advantage of this operational option only to a limited degree (see Chart 6). The combination of two fixed-rate tenders with differing maturities, i.e. the variant of a term structure policy in the strict sense, was abandoned by the Bundesbank as early as 1986. It requires the central bank to have precise ideas about the desired movement of money market rates, in conformity with the monetary target, over a fairly long period, and to be able consistently to coordinate two operational target variables. It is, moreover, not necessarily desirable to narrow one's own interest rate policy leeway by indicating specific longer-term interest rate targets. Since 1986 the Bundesbank has therefore offered its longer-term repos exclusively in the form of variable-rate tenders. But even if two variable-rate tenders are combined, elements of the central banks' interest rate leadership (in the longer-term money market) are retained to the extent that the fixing of the allotment rate may still be interpreted as an interest rate policy decision. In the past three years the Bundesbank has entirely dispensed with the combination of tenders with different maturities. Its longer-term interest rate policy intentions can just as well be signalled by varying its interest rate corridor; moreover, tender combinations are not necessary in order to steady interest rate movements in the money markets – as will be shown below.

It is clear that very short-term market interest rates follow official Bundesbank interest rates¹⁵ (Chart 8), but it should be mentioned here that the comparatively steady management of the day-to-day money rate alone is accompanied, by international standards, by a likewise fairly small volatility of short-term money market rates (Charts 7-9). In addition, it transpires that historical volatility in the money market – for example, that of the interest rate for three-month funds – has tended to decline, if anything, since the end of the eighties (Table 3).¹⁶ Moreover, since the beginning

¹⁵ For a detailed description of this, see Deutsche Bundesbank (1996b).

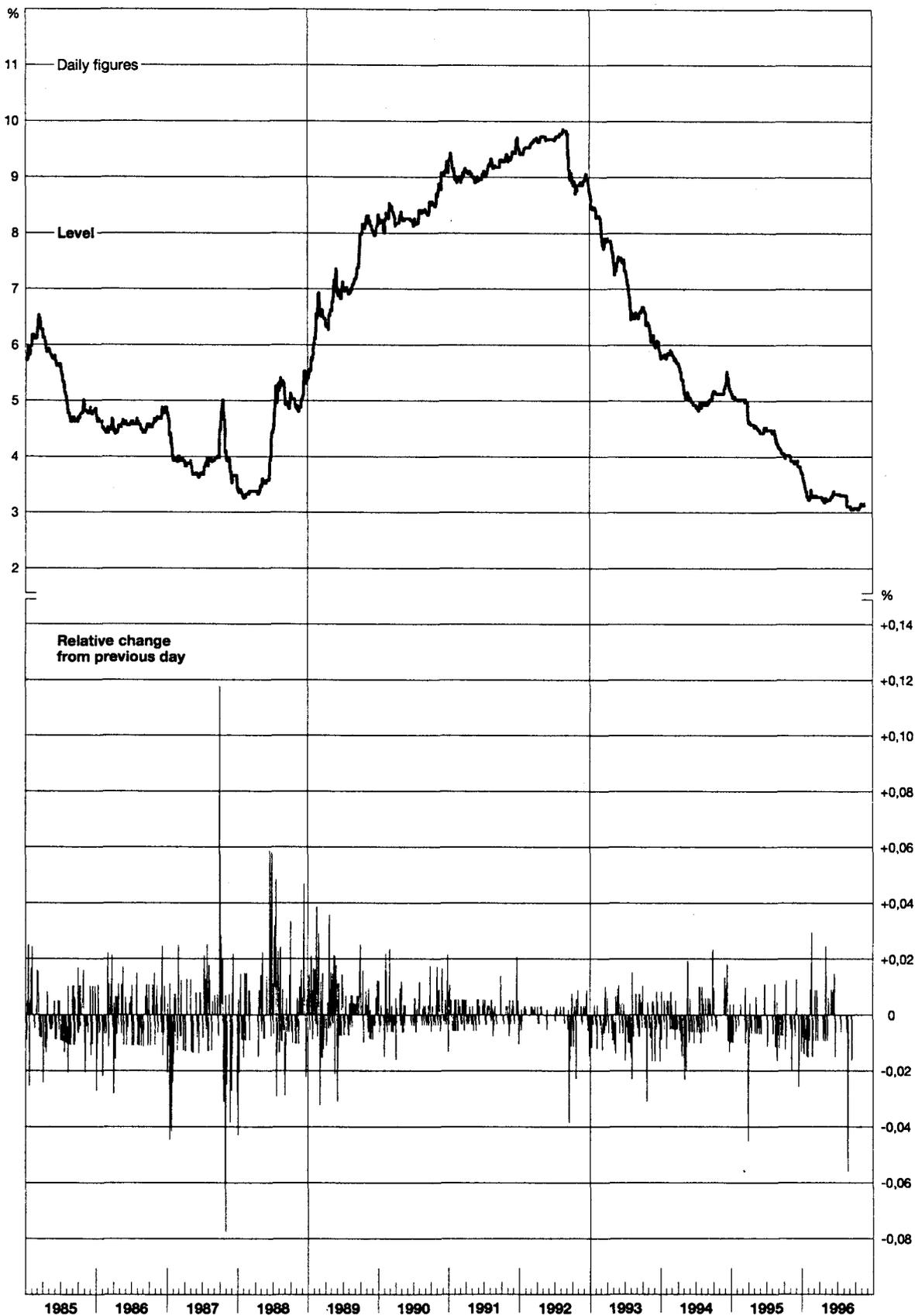
¹⁶ For the trend in volatilities in the German financial markets since 1980, see also Deutsche Bundesbank (1996a).

Chart 8
**Moving correlation of the percentage change
in the day-to-day money and three-month funds rate**
Daily figures



1) Moving correlation of 180 days.

Chart 9
Three-month funds rate
Level and relative change from previous day



of the nineties it has hardly been possible to distinguish between periods of lesser and greater price variability in this market segment. In the period of rising interest rates at the beginning of this decade, such variability was hardly different from that in the subsequent period of falling interest rates. Major swings occur at best in extreme situations, such as the EMS crisis in 1992, and in the environment of international speculation on falling interest rates, such as in the spring of 1995 (Chart 10). This suggests that the Bundesbank has succeeded in setting the monetary underlying conditions – at least over the shorter term – in a sufficiently transparent and credible way, and thus in stabilising the expectations of financial market players about future monetary policy. The movements of bank interest rates in shorter-term deposit and lending business with non-bank customers were correspondingly steady. The fiercer competition in the banks' liability-side business is likely to have contributed to the fact that nowadays the money market conditions set by the Bundesbank tend to affect short-term deposit rates more than they used to. In the case of short-term lending rates, by contrast, the impact may have slackened somewhat. This probably owes something to the fact that the direct link of lending rates to the discount rate is much less significant than previously. Furthermore, the signal effect of repo rate changes is smaller than that of discount rate changes.

The influence which the Bundesbank's monetary policy can exert on longer-term DM interest rates via the control of domestic money market rates is limited; *a priori* not even the sign of the link is always clear. Observable long-term nominal interest rates are determined by three components: the real interest rate, the risk premium and inflation expectations. There are doubts about the extent to which monetary policy can influence the real interest rate at all. Leadership in the capital market that dominates the real interest rate therefore cannot and is not to be achieved by means of the monetary policy instruments. The Bundesbank confines itself to keeping the inflation component low by pursuing a convincing anti-inflation policy and to announcing its intentions reliably and in conformity with its targets in order to minimise the risk premium.

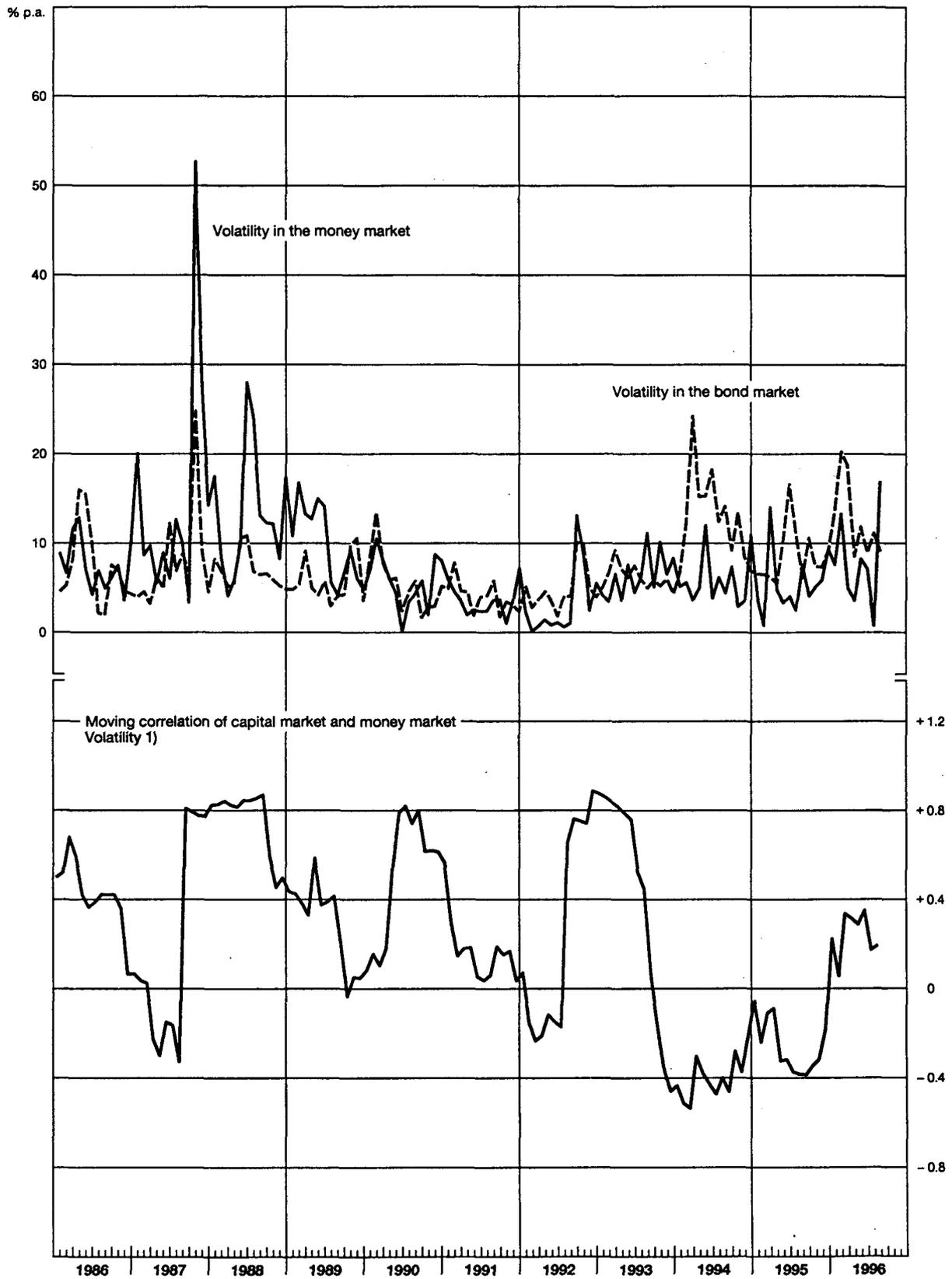
Price movements in the financial markets are increasingly being determined by changes in expectations which reflect either longer-term growth and inflation prospects or only very short-term market forecasts. The growing presence in the German financial markets of internationally operating investors who, moreover, often pursue more short-term strategies has the result that price changes occurring abroad increasingly affect the domestic markets. This is clearly reflected in the growing transfer of short-term price movements from the US to the German bond market. In addition, taken by themselves, new trading techniques and the extension and refinement of trading in derivatives have helped to accelerate the pace of response to changes in expectations and their impact. In the upshot, the potential volatility of the DM capital market is likely to have increased, as is also the danger of exaggerated price movements which may distort relative price patterns.¹⁷

The Bundesbank must be anxious to prevent excessive volatility in the capital market (and in other financial markets). Although the Bundesbank's policy is not guided primarily by the price indicators of the longer-term financial markets, their high volatility may impair the stability of the monetary policy transmission process, which is required for a monetary targeting strategy. It would certainly be of no avail to seek to counter price fluctuations selectively by deploying monetary policy instruments; for one thing, the unambiguous identification of undesirable price movements is hardly possible; for another, monetary policy should not run the risk of becoming the cause of financial market unrest itself. Instead, the Bundesbank is endeavouring, as a precautionary measure, to limit financial market volatility which is strongly marked by expectations by keeping expectation uncertainties low. The low volatility discernible in the DM money markets should spread to the downstream markets. In point of fact, a national comparison shows a positive correlation between the volatility of both maturity categories.¹⁸ (This perception is not an unambiguous statement on the causality, however; a transfer of uncertain expectations in the capital market to the money market is likewise feasible.) In Germany the link between volatility in the money market and volatility in the

¹⁷ See Domanski and Neuhaus (1996).

¹⁸ See Borio and McCauley (1996).

Chart 10
Volatility in the money market and in the bond market*
 Monthly figures



* Volatility calculated as the annualised standard deviation of the relative daily yield and interest rate changes within a month.
 1 Moving correlation of 12 months.

bond market is small (Chart 10). This warrants the conclusion that the sharp fluctuations in volatility in the bond market (spring 1994 and 1996) were scarcely provoked by the Bundesbank's policy, but were rooted primarily in the international environment.

Experience for Germany shows that the containment of uncertain expectations can be achieved by maintaining stable underlying conditions, to which monetary policy can make a major contribution by pursuing a transparent and credible strategy. In addition, the Bundesbank has attempted, particularly in the last few years, to stabilise market expectations by pursuing a "steady-as-she-goes" monetary policy, and to counter volatility in the financial markets. For that purpose it stuck to the fixed-rate tender at unchanged interest rates for long periods and, moreover, announced the terms in advance. In such periods a changeover to variable-rate tenders might easily have given rise to misunderstandings about the stance of interest rate policy. On the one hand, the Bundesbank has no full control over the allotment rate in this case. On the other, the markets often assign even to fairly small deviations from the previous tender rate, which are irrelevant in monetary policy terms, an importance which is not appropriate to the situation. To this extent, the expectations that the Bundesbank would be able to act more unobtrusively by means of securities repurchase transactions have only partly come true.

4. Information provided and used by the Bundesbank

The responsiveness of the financial markets to expectations, i.e. their sensitivity to new information, has in general increased noticeably. In order to guide market expectations, the Bundesbank cannot rely solely on the deployment of its "substantive" monetary policy instruments; an effective information policy is likewise required. The Bank's statements and measures influence the expectations of market participants and thus the impact of its monetary policy. On the other hand, the Bundesbank requires a very broad range of information, *inter alia* on market expectations, which is used not only to monitor the effects – as described in the preceding section – but is also useful ahead of monetary policy action. Basically, this means that, on the one hand, the Bundesbank gives guidance to the financial markets and, on the other, it uses their movements as an information input. The success of its policy depends crucially on the extent to which agreement is reached, or disagreements become known, between the central bank and the market regarding the assessment of overall market conditions; in the event of disagreements and ignorance, misinterpretations of monetary policy measures are easily possible.

The Bundesbank is pursuing an intensive information policy. In its regular publications and in frequent public statements it analyses current monetary policy conditions from its point of view and, against this background and with its potential-oriented monetary targeting strategy as a guideline, it elucidates the deployment of its instruments in detail. There should therefore be no misunderstandings about the basic philosophy of German monetary policy – its mandate, its strategy and its orientation. The Bundesbank's medium-term inflation assumption and its intermediate target are well known. Deviations from the monetary target must be justified. Accountability and transparency are therefore undoubtedly important factors of the Bundesbank's policy.

Transparency and accountability should not result in day-to-day monetary policy becoming completely calculable, however. The Bundesbank is therefore endeavouring to take due account of possible market reactions to its activities without becoming a slave to market views or individual indicators. For example, it recently supplemented its information input by adding expectation indicators deriving from financial market prices, i.e. the prices of derivatives and particularly of options. These are indicators both of the future level of interest rates/prices and of their spread. The latter, in particular (ascertained in the form of implicit volatilities), is gaining increasing importance as a measure of uncertain expectations. However, it can be used only with qualifications as a forecast value of future volatilities. It often correctly indicates the sign of the change in volatility, but rarely predicts the actual size of the change. In the context of its monetary policy strategy, the

Bundesbank assigns to expectation indicators only the significance of additional information and monitoring variables, but does not give them an autonomous function as monetary policy benchmark or operational variables. For monetary policy, this poses the risk of being towed along by expectations and becoming susceptible to speculative movements. Finally, this approach could be interpreted as a change in the monetary policy regime, and alter the process of forming expectations and the behaviour of the market; this would destabilise the underlying monetary relationships and possibly necessitate a departure from the medium-term orientation of monetary policy.

The Bundesbank's information policy is in line with this. For example, no minutes or votes of the meetings of the Central Bank Council are published. This would adversely affect the free exchange of opinions within the Central Bank Council. Nor are there any longer-term directives on the management of the money market in Germany, such as those in the United States. Furthermore, the Bundesbank exercises restraint with respect to forward-looking statements. For instance, it does not publish any forecasts which it makes by means of its econometric model or partial econometric conditional equations, e.g. for monetary growth. It refrains from publishing forward-looking money market and liquidity analyses, and confines the announcement of its regular open market operations to the type of tender (in the case of fixed-rate tenders, also the repo rate) and the maturity, while the planned amount to be purchased is not published. The announcement is made either on the day of the auction or in advance after Central Bank Council meetings. The restrictive provision of forecasts protects monetary policy from tying its own future actions to statements made under conditions of uncertainty. The Bundesbank thus creates room for manoeuvre which enables it flexibly to shape the operational implementation of its monetary targeting policy in a volatile environment.

It is not automatic responses which are required here, but a careful assessment of all relevant facts. This includes decisions which come as a surprise to the markets. An ancillary condition is, however, that the stability of the financial markets should not be jeopardised. Price adjustments and market fluctuations should not occur in a shock-like manner. A balance must be found in order to maintain the leading role of monetary policy and to do what is necessary in monetary policy terms, while preventing major market disturbances.

Conclusions

The deployment of the Bundesbank's policy instruments has changed since the beginning of the eighties. Central bank balances are provided not so much in the context of bilateral refinancing operations with individual banks as through securities repurchase transactions. The minimum reserves are not so much an instrument to manage bank liquidity as a cushion in the money market. This means that the Bundesbank has become much more flexible in its money market policy. On the other hand, money market policy continues to be marked by a low intervention frequency. Nevertheless, developments in the money market are relatively steady. Although repos are no substitute for day-to-day money, the repo rate has assumed a leading function in the day-to-day money market. Interest rate changes in the money market work through to shorter-term bank interest rates relatively rapidly. However, the scope for exerting an influence in the capital market has decreased owing to its growing responsiveness to expectations and its increasing short-termism. These factors argue in favour of a credible and transparent monetary policy strategy which gives guidance to the markets. In addition, the Bundesbank has attempted to counter the volatility of the financial markets by a "steady-as-she-goes" monetary policy. For this purpose it has repeatedly stuck to fixed-rate tenders at unchanged interest rates for a long time. Over and above this, the Bundesbank is pursuing an intensive information policy in order to document the appropriateness of monetary policy and to stabilise the financial markets. The transparency and accountability of monetary policy cannot lead, however, to day-to-day monetary policy operations becoming completely calculable. They would then be altogether in the wake of the markets. Here a balance must be found which leaves monetary policy its leading role, but avoids major market disturbances.

References

- Bisignano, J. (1996): "Varieties of Monetary Policy Operating Procedures: Balancing Monetary Objectives with Market Efficiency". *BIS Working paper*, No. 35, July.
- Borio, C.E.V. and R.N. McCauley (1996): "The Economics of Recent Bond Yield Volatility". *BIS Economic Papers*, No. 45, July, pp. 50-59.
- Deutsche Bundesbank (1994a): "The second stage of European economic and monetary union". *Monthly Report*, January.
- Deutsche Bundesbank (1994b): "The restructuring and lowering of the minimum reserves". *Monthly Report*, February.
- Deutsche Bundesbank (1994c): "Money market management by the Deutsche Bundesbank". *Monthly Report*, May.
- Deutsche Bundesbank (1994d): "Recent trends in the Deutsche Bundesbank's cashless payments". *Monthly Report*, August.
- Deutsche Bundesbank (1995a): "Review of the monetary target and restructuring of the minimum reserve regulations". *Monthly Report*, July.
- Deutsche Bundesbank (1995b): "The monetary policy of the Bundesbank".
- Deutsche Bundesbank (1996a): "Financial market volatility and its implications for monetary policy". *Monthly Report*, April.
- Deutsche Bundesbank (1996b): "The response of money market rates and short-term bank interest rates to changes in central bank rates". *Monthly Report*, October.
- Domanski, D. and H. Neuhaus (1996): "Bond market volatility in Germany: evidence, causes and identification". *BIS Conference Papers*, Vol. 1, March, pp. 113-128.
- Escrivá, J.L. and G.P. Fagan (1996): "Empirical Assessment of Monetary Policy Instruments and Procedures in EU Countries". *European Monetary Institute, Staff Paper*, No. 2, May.
- Hardy, D.C. (1996): "Market Reaction to Changes in German Official Interest Rates". Economic Research Group of the Deutsche Bundesbank, *Discussion Paper*, 4/96.