

Monetary policy and payment systems

Monetary policy and payment systems are closely intertwined. The central bank is dependent on efficient large-value payment systems of the banking industry in order to implement its interest rate and liquidity policies, which are focused on the money market. The efficiency of monetary policy can be affected by changes in cash and cashless payments by non-banks. Changes in the cash holding patterns of the public resulting from innovations in payment products or procedures, if unforeseen or abrupt, may considerably disrupt the design and the implementation of monetary policy. However, innovations in payment systems have not posed major difficulties to the Bundesbank's monetary policy in the past. No difficulties are expected in the foreseeable future, either.

Monetary policy and payment systems are closely intertwined. Besides the main task of safeguarding the currency, section 3 of the Bundesbank Act also stipulates that the Bundesbank "shall arrange for the execution of domestic and international payments." A corresponding regulation applies to the European Central Bank (ECB) in the context of European monetary union (EMU). In order to promote the convergence of the national money markets and to make possible a single monetary policy in the monetary union, the

*Central banks
and payment
systems*

European System of Central Banks (ESCB)¹ will establish the Europe-wide large-value payment system "TARGET"² linking the national real-time large-value payment systems via the central banks.

The central bank is dependent on a secure and efficient payment system.³ This is a prerequisite for the smooth transmission of monetary policy stimuli and the stability of the transmission process. Disruptions in payment systems can quickly have a negative impact on national and international financial markets and can be an impediment to the development of the real economy. Even the unforeseen default of a financial market participant may seriously impair payment systems. For that reason, the central banks in most countries are charged with oversight of payment systems and participate in the supervision of banks. The central banks of the EU countries agreed as early as April 1992 to exercise a cooperative oversight of payment systems in the EU⁴ in order to safeguard the latter's integrity.

Historically, oversight of payment systems has its origin in the central bank's role in providing the entire banking system with first-class, risk-free liquidity. According to the Banking Act, payments and clearing operations – giro business – are left solely to banks, since only they have direct access to the refinancing facilities of the central bank. Ultimately, the ability of the credit institutions to create giro money is dependent on the confidence of non-banks that they can convert it into central bank money at any time.

Interbank payments

The Bundesbank's interest rate and liquidity policy instruments are focused on the money market. A speedy, well-functioning deployment of these instruments presupposes an efficient large-value payment system which must be able to process large amounts in an extremely short time and distribute them throughout the banking industry without affecting competition. In order to be able to execute, say, a securities repurchase agreement on a same-day basis and achieve the objectives in the money market, the associated crediting and debiting of the banks' central bank accounts has to be undertaken very rapidly; the banks must also be able to conduct their liquidity-balancing measures in the money market immediately.

Since the banks only make final payments to each other using central bank money, they must hold working balances at the Bundesbank. However, their volume depends not only on the level of and the fluctuations in the payment volume but also on the shape of the monetary policy instruments, which in

*Monetary
policy
dependent
on efficient
large-value
payment
systems*

*Working
balances,
minimum
reserves and
lombard*

1 According to Article 105 of the EC Treaty, after the beginning of stage three of monetary union, the task of the European System of Central Banks is "to promote the smooth operation of payment systems". In this context, see also Articles 3 and 22 of the Protocol on the Statute of the European System of Central Banks and of the European Central Bank.

2 Trans-European Automated Real-time Gross settlement Express Transfer.

3 See Deutsche Bundesbank, Recent trends in the Deutsche Bundesbank's cashless payments, Monthly Report, August 1994, pages 45–61.

4 See Decision by the Council of EC Central Bank Governors of April 1992, Recommendation 1 of the Report on "Issues of common concern to EC central banks in the field of payment systems" (Principles for the cooperative oversight of Payment Systems in EC countries).

Germany especially include minimum reserves and lombard borrowing. Sufficiently high minimum reserves eliminate the need for additional "working balances". Since the reserve balances exceed the working balances and the minimum reserve requirement does not have to be met daily but only as a monthly average, they give the banks a larger liquidity cushion with which they are also able to handle unforeseeably large volumes in payment transactions.

Such a system creates a certain distance between the banks and the central bank and has a stabilising effect on the money market. Even a minimum reserve system, however, cannot always ensure that sufficient balances are always available. In order to be able to execute payments in these cases also, practically all banks involved in cashless payments may use giro overdrafts which are covered by lombard collateral. In general, these credits are covered again either on the same day or on the next day. Whereas intraday credits are interest-free – not taking into account possible opportunity costs entailed by pledging collateral – overnight credits carry the lombard interest rate. These facilities make the execution of cashless payments much easier. However, the use of intraday and overnight credits may increase the liquidity of the banking system and its ability to create credit. This does not involve significant problems, though, for the control of liquidity and the money supply in the context of the monetary management system in Germany.

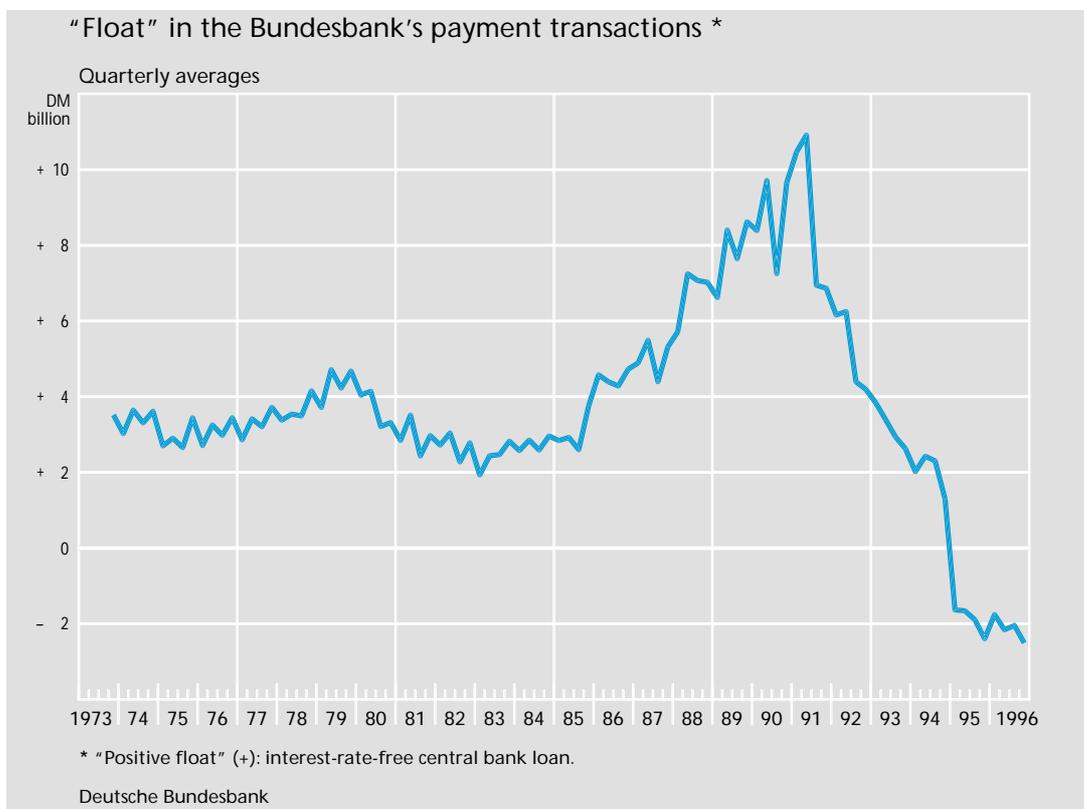
By contrast, the items in course of settlement once had greater liquidity policy significance

in the Bundesbank's payment transactions. This so-called float is a result of crediting and debiting of a transaction not taking place on the same day. For a long time, the fact that particularly collection items were not credited and debited on the same day when collected via the giro network of the central bank led to a high interest-rate-free float credit of the Bundesbank in favour of the banking industry and – until mid-1991 – also of the public cash offices ("positive float"). Moreover, very strong float fluctuations during the month which were predictable only to a limited extent made it difficult to estimate short-term liquidity requirements of the banks and thus also the proper amount of funds to be provided by the Bundesbank. The highest monthly average "positive float credit" occurred in March 1991, at around DM 12 billion, and the highest one-day value was DM 26 billion in May 1991. This "positive" float was turned into a "negative" float (see chart on page 36), particularly by synchronising the value date and the transmission time of collection items, and by a series of institutional arrangements – vis-à-vis the public cash offices since 1991, vis-à-vis the banking industry since 1994. At the same time, the daily fluctuations were reduced, and thus also the risks regarding estimates of the liquidity requirements of the credit institutions.

The susceptibility of the payment system to disturbances has risen over the past few years because of the increased volumes and the accelerated pace of transactions which new technology has made possible. In 1996, an average volume of some DM 780 billion was moved in cashless payments via the Bundes-

Reduction of the "positive float"

Transition to gross payment systems



bank's systems every business day. Against this background, there is a growing tendency to use gross settlement systems (RTGS: Real-time Gross Settlement), which involve the legally final ongoing execution of payments on a cover basis, instead of net settlement systems, which involve multi-lateral settlement (mostly as late as at the time of cut-off), for making large-value payments. The legal finality of payments reduces the risk that the insolvency of a market participant because of uncovered balances exposes other institutions or even the entire system to liquidity problems (systemic risk); however, more intraday liquidity is necessary here.

In the *Eiliger Zahlungsverkehr* (express electronic intercity and local credit transfer system) and EAF 2 (electronic clearing in Frankfurt),

Germany already has a gross settlement system and a net settlement system with many gross elements in use.⁵ Over the medium term, an interest rate for intraday credit and/or a liquid market for intraday money could emerge as a result of the increased use of gross settlement systems if, as in other countries, the central bank ceases to grant free intraday overdrafts or demands fulfilment of a minimum reserve requirement during the day.

As previously mentioned, the gross large-value payment system TARGET will be introduced in stage three of European monetary union in order to facilitate the implementation of the single monetary policy. Besides, it

*The ESCB's
TARGET system*

⁵ See Deutsche Bundesbank, *The Frankfurt Electronic Clearing System (EAF 2)*, Monthly Report, January 1996, pages 16–18.

contributes to the development of efficient payment mechanisms in the entire single market. TARGET will link the national RTGS systems to each other. In order to avoid liquidity bottlenecks or "gridlock situations", the national central banks in the euro area will provide overdraft possibilities on the basis of collateral, especially intraday liquidity.

In this connection, there is controversy over whether the central banks of countries not participating in EMU will be allowed to act under the same conditions as central banks taking part in EMU. The result of the latter solution would be that central banks outside the euro area would be able to resort to refinancing loans in euro granted by the ESCB in order to execute payments in a foreign currency. These are mostly intraday credits. There is agreement that suitable measures should be taken to preclude a "spillover" of intraday credits into overnight credits; from the Bundesbank's perspective, this will probably be very difficult.

Intraday liquidity for "out" central banks problematic

Even the granting of intraday credits to "out" central banks would set a precedent; no central bank has previously allowed another central bank to participate in its own creation of money. Granting credit to the central bank of a country outside of EMU would disturb the ECB's monetary policy – even if the volume and the duration were limited. All forms of lending increase liquidity, influence the conditions in the financial markets and are therefore relevant to monetary policy. In spite of all precautions, intraday credits can still spill over into overnight credits and thus alter the central bank money stock as well as affect the

money market management. The risk of a more volatile day-to-day money market rate and of sending the wrong interest rate signals would increase. The monetary policy sovereignty of the ECB would be particularly endangered if, in the event of speculative pressure, non-EMU central banks could support their currencies by taking recourse to interest-free and unlimited intraday credits from the ECB. Furthermore, intraday credits are likely to promote the growth of euro holdings outside the euro area and thus currency substitution between the euro and other currencies. This could have a negative impact on the information content of the monetary aggregates, their controllability and stability.

If "out" central banks and their affiliated credit institutions had access to euro credits, this would constitute an unjustifiable preference over the countries participating in EMU. The central banks of the participating countries pursue a single monetary policy, must enforce minimum reserve requirements (as the case may be), and are subject to particular requirements regarding the acceptance of collateral for overdrafts by commercial banks. To that extent, a central bank not subject to these requirements could even offer its affiliated institutions more favourable conditions.

Payments by non-banks

In retail payments, the Bundesbank's giro system secures the execution of payments among the giro systems of the banking industry. This is not immediately related to the implementation of monetary policy. The reasons

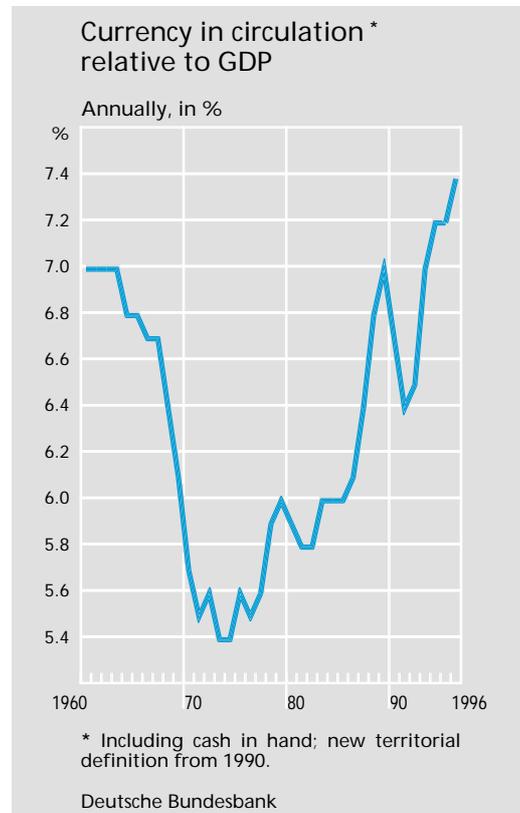
Non-bank payments also relevant for monetary policy

behind the Bundesbank's relatively far-reaching involvement in interbank retail payments are more historical in nature. However, by promoting automation, acceleration and rationalisation, the Bundesbank has helped increase the efficiency of payment systems, and has thus also contributed to innovations for circumvention purposes only having taken place to a limited extent.

However, non-bank payments are relevant to monetary policy to the extent that the security, viability and integrity of the execution of cashless payments are important regarding confidence in the currency. Furthermore, changes in payment systems, which have resulted in the past, and continue to result, from rapid technological progress also have a bearing on monetary policy. New instruments and technologies raise numerous questions concerning monetary policy. They affect the substitutive ties between the different types of money and the dependence of the banks on refinancing by the central bank, their effects on the demand for money and changes in the transmission process of monetary policy. In the view of the central bank, the decisive factor is whether this will jeopardise its strategy, the effectiveness of its instruments and in the end also the ultimate objective of its policy – price stability.

Instruments and innovations

Besides cash, the traditional instruments for payments by non-banks in Germany are cheques, credit transfers and direct debits. Cash payments have undergone a relative decline in significance with the introduction



of cashless wage and salary payments at the beginning of the sixties. The currency ratio (currency in circulation relative to GDP) declined from 7.0% to 5.4% between 1960 and 1974. Since then, despite the increasing spread of cashless payment instruments and the trend toward rationalisation of cash holdings, it has once again picked up, even surpassing the previous levels in 1996 at 7.4%. On an international comparison, the supply of cash in Deutsche Mark is rather high. One reason for this is surely to be found in the volume of German banknotes held abroad, which in the mid-1990s was estimated to be 30% to 40% of the entire amount of Deutsche Mark in circulation⁶ and which distorts

⁶ See Deutsche Bundesbank, The circulation of Deutsche Mark abroad, Monthly Report, July 1995, pages 65–71.

the ratio of currency in circulation to GDP. But domestically, too, cash seems to have lost none of its popularity among consumers as a cheap and effective means of payment. As an average of 1996, currency in circulation – including the banks' cash balances – amounted to just under DM 262 billion.

*Automated
teller machines*

The sharp increase in the number of automated teller machines (ATMs) has probably had little effect on cash holdings. Their number has more than trebled between 1990 and 1996 (from 11,300 to 37,600); in 1996, there were some 460 ATMs available per one million residents (around 140 in 1990). On the one hand, owing to the fact that they provide fast and comfortable access to cash, ATMs promote the use of cash; on the other hand, they facilitate the holding of lower (average) cash amounts – which is borne out by studies in other countries. Risks entailed by cash holding can be reduced by more frequent withdrawals of smaller amounts. In this connection, however, the cost burden of cash withdrawals from machines or at bank tellers is a significant factor.

Ultimately, the Bundesbank's monopoly over the issuing of banknotes still unequivocally forms the basis for the entire supply of money and thus, together with the minimum reserves required of the banks, the centre-piece of monetary policy.

*Cashless
payments*

Besides the eurocheque with the eurocheque card used as a guarantee card, the most important innovations of the past 20 to 30 years in the field of cashless payments particularly include the various forms of card-

Significance of currency in circulation * in selected countries

in %; 1995 figures

Country	Currency in circulation in relation to	
	Money stock M1	Gross domestic product
Germany	29.1	6.9
Austria	34.9	6.1
Belgium	27.2	5.3
Denmark	–	3.1
Finland	7.0	2.3
France	14.0	3.3
Greece	50.1	7.2
Ireland	36.4	4.8
Italy	16.3	5.5
Luxembourg	15.5	3.2
Netherlands	22.1	6.0
Portugal	19.8	5.5
Sweden	1 10.5	4.2
Spain	25.4	10.8
United Kingdom	2 4.6	2.9
Canada	42.8	3.4
Japan	29.2	10.4
Switzerland	18.0	7.7
United States	33.0	5.2

Sources: Payment Systems in the European Union, 1995 figures, European Monetary Institute, Frankfurt, 1997, p. 167. For Japan, Canada, Switzerland, the United States and Sweden: BIS, Statistics on Payment Systems in the Group of Ten Countries, figures for 1995, Basle, December 1996, p. 113. — * Not including cash holdings of the credit institutions. — 1 Money stock M3. — 2 Money stock M2.

Deutsche Bundesbank

based payments. Combinations and intermediate forms in which a card can perform different functions are possible. Since the end of 1996, "electronic money" has begun to be issued on stored-value cards or prepaid cards, and electronic money is expected to be issued in computer networks ("network money").⁷

⁷ "Electronic money" includes money stored in stored-value cards and network money (payment units in computer networks). These are defined as electronic credit balances in movable or immovable storage (stored-value or "money card" or a multi-purpose prepaid card or hard disk of a networked PC) which immediately serve as a means of payment to fulfil payment obligations by transferring the credit balance to another storage device. Thus, instruments which ultimately only represent access to an account and/or to means of payment, such as sight deposits, are not included, even if this access takes place electronically (e.g. the DebitCard/EFTPOS procedure, home banking, etc.). Not included either are electronic payment transactions (e.g. data telecommunication in the context of the electronic counter and the electronic retail payment systems of the Bundesbank, Electronic clearing in Frankfurt, etc.).

Automated teller machines, terminals and payment cards ^{pe}

Item	1991	1992	1993	1994	1995	1996
	Number in thousand					
Automated teller machines	13.8	19.0	25.0	29.4	35.7	37.6
EFTPOS terminals ¹	34.7	51.8	28.0	62.5	70.0	105.4
	Number in million					
Payment cards issued						
Debit cards ²	27.4	31.9	35.9	37.1	62.6	67.0
Credit cards	6.1	7.4	8.9	10.2	11.7	13.5
Trade cards	1.5	3.0	.	4.5	4.8	4.9

Source: Surveys by the Bundesbank; Payment systems in the European Union, European Monetary Institute, Frankfurt 1997, p. 26. — ¹ Until 1992, including non-bank systems. From 1993 only "electronic cash" and "POZ" procedures (POZ: point of sale without payment guarantee). — ² Eurocheque cards which can be used as debit cards if they are equipped with a personal identification number (PIN). 1995 and 1996, including cards issued by banks to customers.

Deutsche Bundesbank

Electronically provided access to bank products via home banking or direct banking (PC, telephone, fax, etc.) also constitutes an important innovation.

Credit cards

Credit cards are issued by banks and/or special card organisations and trading firms. They permit the purchase of goods and services within agreed limits according to the "pay later" principle, which means that they involve taking out a loan. The market for credit cards has grown sharply in Germany over the past few years. At the end of 1996, there were 13.5 million cards in circulation, or around 0.17 credit cards per inhabitant (in the US, approximately 1.67 cards in 1995, in the United Kingdom, approximately 0.53 cards in 1995). In 1996, the average amount per transaction was DM 170 (some 290 mil-

lion transactions, total volume for 1996 just over DM 49 billion). The use of credit cards will probably replace both cash and sight deposits, though the trend regarding the latter is counteracted by the favourable interest rates on special credit card accounts which are granted in some cases. The significance of the credit card as a cashless payment instrument, and thus its relevance to monetary policy, is still relatively low in Germany, despite its strong growth.

Debit cards ("pay now"), in the form of eurocheque cards and other bank cards (containing a PIN⁸) which can be used for EFTPOS⁹ or POZ¹⁰ payments, have gained greater importance in terms of numbers in Germany than credit cards. At the end of 1996, some 67 million debit cards had been issued (including other cards issued by banks to customers); there were around 172 million transactions involving a total amount of around DM 22 billion, which corresponds to an average amount of just under DM 130. The number of terminals has trebled between 1991 and 1996 to some 105,400. The transaction fees to be paid by merchants in the so-called "electronic cash" procedure, at 0.3% (or at least DM 0.15) are lower than in the case of a credit card purchase. In trade, EC-cards are becoming increasingly widespread in the so-called POZ procedure, by means of which a direct debit is generated without a credit guarantee and without a PIN – but with the

*Debit cards/
EFTPOS*

⁸ PIN: personal identification number.

⁹ Electronic Fund Transfer at Point of Sale.

¹⁰ Point of sale without payment guarantee.

signature of the customer.¹¹ The costs of an on-line authorisation are avoided here; the payment risk is borne by the merchants.

The fact that starting in 1996 eurocheque cards are being equipped with a chip makes it possible to authorise EFTPOS payments off-line instead of on-line, thus accelerating the payment procedure. This could make "electronic cash" more attractive and lead to increased cash substitution in future. Initial reviews have indicated, in addition, that debit cards, which offer merchants and consumers a relatively cost-effective alternative, might be able to displace to some degree other cashless payment instruments like cheques and credit cards.

Electronic money...

Compared with all the most recently observed innovations in payment systems, electronic money¹² on so-called prepaid cards or stored-value cards ("pay in advance") which has now been placed on the market is supremely suited to replacing cash. It is specially designed for small amounts; as in the case of cash, payment is effected by passing on a certain value which in this case consists of electronically processable units of money. Loading will probably be made primarily in cashless form, but should not affect the holding of sight deposits, as this ultimately equals withdrawing cash from an account, electronic money thus practically replacing cash.

... on prepaid cards

Especially in the field of vending machines, increasing opportunities to use prepaid cards are beginning to appear. However, electronic money – like other surrogates – can imitate the particular qualities of cash only to a limit-

Overview of the use of credit and debit cards in Germany

Year	Credit card transactions		Debit card transactions ¹	
	Number in million	DM billion	Number in million	DM billion
1987	38.0	8.0	0.4	0.1
1988	46.0	11.0	0.6	0.1
1989	81.8	15.8	0.8	0.1
1990	118.2	22.4	3.5	0.2
1991	150.1	28.2	20.2	1.8
1992	186.0	33.8	28.0	1.9
1993	224.4	42.1	69.1	6.2
1994	246.5	46.4	104.0	10.8
1995	266.7	45.1	149.4	20.5
1996	289.9	49.2	172.0	21.9

Source: Surveys by the Bundesbank. — 1 1987–1990 as well as 1996 only "electronic cash". In 1991 and 1992 "electronic cash" and other debit card procedures. 1993–1995 "electronic cash" and "POZ procedures" (POZ: point of sale without payment guarantee).

Deutsche Bundesbank

ed extent. For example, this is the case regarding the final discharge of liability by effecting cash payments, the obligation to accept cash as legal tender, its multi-purpose use, the direct passing on to third parties without a bank acting as an intermediary, and the anonymity of cash. The cash substitution expected of electronic money, however, is likely to be intensified by its probably somewhat greater velocity of circulation, brought

¹¹ Signature indicates consent to the credit institution to announce signer's ownership of the account in case of a possible improper direct debit return to the trading enterprise in order to pursue its claims.

¹² Electronic money has been examined in detail regarding monetary policy, payment systems and banking supervision by the central banks in the EU and the Group of Ten. See "Report to the Council of the European Monetary Institute on Prepaid Cards by the Working Group on EU Payment Systems", Frankfurt 1994; BIS: "Implications for Central Banks of the Development of Electronic Money", Basle, October 1996.

about by (at least at the beginning) lower loading amounts, shorter periods of holding value units on the cards, and (since the procedure is completely paperless) a relatively rapid return to the issuer.

From the present perspective, the spread and use of electronic money on cards appears to be developing at a moderate pace. On the one hand, the currently rather low number of suitable terminals in use, the costs, the limited possibilities for use vis-à-vis third parties and the security and risk considerations, are all likely to be having a restraining effect. On the other hand, having electronic money bear interest in order to increase its acceptance and use would reduce the beneficial effect that the issuer would derive from the interest-bearing investment of the "permanent average balance" of the "loading amount" of the electronic money. As part of stage three of EMU, electronic money in stored-value cards and denominated in euro, which could then be used freely within the euro area even before the notes are exchanged in retail trade, might receive additional impetus.

*Electronic
money as
network money*

Unlike stored-value card money, "electronic network money" in the form of units of payment in computer networks, which is currently almost insignificant in Germany, is likely to serve primarily for payments to recipients over medium and long distances; it will thus be more likely to be used for the transfer of sight deposits. Over the medium term, a linking of prepaid cards and network money cannot be ruled out. Besides the aspect of safety, the registering and control of

the issuers and users – who may well reside abroad –, and thus the cross-border use, are significant, from a monetary policy standpoint. Cause for concern is also provided by other aspects such as tax evasion or money laundering. For monetary policy reasons, among other things, it will be necessary in future, too, to have a close international co-operation between all authorities involved.

Besides card-assisted payment transactions, home banking or direct banking represents an important innovation in payment systems. The technical advance has reduced the amount of time needed as well as the transaction costs for "electronic" access to banking services (home banking or direct banking using PC and Btx data link or Internet, telephone, fax machine) and made it possible to shift faster among investment vehicles of various degrees of liquidity and interest rates. At the same time, the selection of liquidity reservoirs bearing attractive interest rates has gone up (sight deposits above a certain minimum amount or on a credit card account, pure money market funds as well as special forms of savings, in some circumstances). In the field of enterprises, there is an increasing trend towards so-called "cash management". In some quarters, there is even a discussion going on about the use of securitised assets as a means of payment – such as shares of money market or bond-based funds – or of "government securities as money".

Home banking

Effects on monetary policy

The creation of money by the banks is always accompanied by an increase in currency cir-

*Implementation
of monetary
policy*

circulation and in the minimum reserves to be maintained at the Bundesbank. It therefore requires money which the credit institutions cannot create themselves but which must be acquired from the central bank. The Bundesbank's monopoly on central bank money represents the centrepiece and the hub of its monetary policy in the money market. From the present perspective, it is not jeopardised by innovations in payment systems. To that extent, the Bundesbank has so far been able to remain at ease regarding such innovations. Insofar as these innovations reduce the amount of currency in circulation, the quantitative links between the banking system and the Bundesbank will be loosened but not cut completely. The central bank will remain in a position to set the monetary conditions in the money market in such a way that this corresponds to its objectives. However, cash substitution abridges the balance sheet of the central bank, causing its profit from money creation (seigniorage) to decline. The possibilities of compensating expansionary liquidity shocks and inflows of foreign exchange by reducing refinancing credits to banks also decline.

*Low amount
of cash
substitution*

The circulation of currency has been relatively untouched by the previous innovations in payment systems. As far as the banknotes are concerned, at least, this will probably not change even with the spread of electronic money and debit card payments. Rather, pre-paid cards are suitable as a substitute for small cash denominations and not for the large cash denominations (which are dominant in terms of the amounts). As a result, therefore, a slow, limited substitution of cash

should be assumed for the future, too. The fact that innovations in payment systems sometimes have "cannibalistic" effects will also play a role; they displace not only cash, but also conventional instruments of cashless payments and earlier innovations.

Even in the event of increased cash substitution, minimum reserves still serve as a determining factor in central bank money requirements. To the extent that currency is replaced by deposits subject to reserve requirements, it would even provide for a certain compensation in the demand for central bank money. Regarding electronic money, the argument of partial compensation is only valid if this is issued by banks, and a special minimum or cover reserve for electronic money is introduced. Since danger on this side cannot be ruled out over the long term, it seems appropriate to secure the possibilities of having monetary policy influence by a sort of cover obligation. For that reason, too, minimum reserves should be an instrument available to the future European Central Bank. Furthermore, it seems advisable to keep open the option of central banks issuing their own electronic money in the future. This would be something to consider, for example, if the minimum reserve basis were undermined to a certain degree by innovations or if the use of the minimum reserve instrument ran into boundaries set by competition policy.

The majority of the central banks in the EU and in the major industrial countries have jointly called for restricting the issuing of electronic money to credit institutions (subject to banking supervision). This would also pro-

*Minimum
reserves*

*Credit
institutions as
issuers of
electronic
money*

mote the efficiency of monetary policy to the extent that it would facilitate the statistical recording of electronic money as well as its involvement in the monetary aggregates. This would no longer be ensured if non-banks were able to issue electronic money. Above all, that would mean the creation of "money" by non-banks. This would pose the danger of the responsibility of the central bank for the payment system and the financial system being extended to non-banks, without there being at the same time the necessary management and supervisory possibilities.

Furthermore, the virtual restriction of the issuing of electronic money to banks provides the necessary safeguarding of the integrity of payment systems and the protection of the owners of electronic money on stored-value cards or in computer networks. Since the legal classification of the issue of electronic money as deposit business and/or giro business – and thus as banking business – is relatively difficult in Germany, "prepaid card business" and "network money business" should be considered banking business in the upcoming Sixth Act Amending the Banking Act (section 1 subsection 1 (11) and (12) of the draft Banking Act). In the case of limited use and spread, relief from some legal requirements of the Banking Act is possible.

New instruments in payment systems affect not only the implementation but also the design of monetary policy. Like other innovations in the financial sector, they raise the question of whether and how they change the indicator qualities of the traditional mon-

etary aggregates. This particularly affects those central banks which – like the Bundesbank – pursue a monetary target. But also for central banks pursuing another strategy – such as direct inflation targeting – the money stock is generally an important information variable.

To the extent that innovations in payments only replace cash by sight deposits, they are initially "neutral regarding the money stock"; i.e. they do not require a change in the definitions of the money stock. Since the velocity of circulation of sight deposits is likely to be higher than that of cash, this substitution can nevertheless be accompanied by a change in the information content of monetary aggregates. Their velocity of circulation will probably show a tendency towards an increase. As long as this rise takes place gradually and not in a leap, it will not cause the central bank any major difficulties. The central bank can take it into consideration in the form of a corresponding reduction, for example, when deriving monetary targets.

It is doubtful whether the indicator quality of monetary aggregates has changed substantially in Germany over the longer term, owing to innovations in payment systems. Particularly the indicator quality of the money stock M3, which also includes short-term savings deposits and shorter-term time deposits, in addition to currency in circulation and sight deposits, has probably not been substantially affected. As is generally known, their velocity of circulation is declining, since here, the store-of-value motive has apparently gained in significance, compared with the transac-

*Information
content of
monetary
aggregates*

tion motive, as regards the holding of money. There is no sign that the decline in the velocity of circulation in the money stock M3 has been slowed down recently by innovations in payment transactions. This may owe something to the fact that the associated rationalisation of cash holdings often means that funds from non-interest-bearing or low-interest money components are shifted to higher-interest investment forms whose velocity of circulation is lower. The overall effect is then difficult to assess. Since, at all events, only a partial substitution of currency in circulation and sight deposits is to be expected, this does not, in principle, call into question a policy oriented towards a widely defined money stock.

*Electronic
money
incorporated
into M3*

This is not likely to change fundamentally with the introduction and spread of electronic money, especially since much argues in favour of a gradual increase in its use. However, electronic money possesses a new quality in that it does not create more efficient access to traditional forms of money, as other innovations, but instead represents a new form of money. It is therefore important to supplement the monetary aggregates with electronic money. Since January 1997, the Bundesbank has incorporated the "prepaid card loading amount" into the money stock M1 – and thus also M3. As far as this is a substitute for cash and sight deposits, M3 will not change initially. Its longer-term development will particularly depend on the extent to which electronic money will help rationalise the transaction funds and how the released funds will be invested in other money components or outside the money stock. Its prop-

erties depend largely on whether the new components' behaviour differs from that of the substituted currency and deposits.

Along with the increasing possibilities for substitution, the trend in the money stock might tend to become more volatile. Fluctuations in the velocity of circulation of the money stock certainly have many reasons; they are linked not only to technical changes in payments but also to cyclical and interest rate trends. In the narrowly defined money stock M1, the influence of interest rates has always predominated. For a long time, it has fluctuated very sharply in line with the interest rate cycle. Over time, though, the fluctuations have not increased; this does not point to an increased influence of the "payment system component". By contrast, in the money stock M3, the volatility has clearly risen in the 1990s. However, in this context, it was also the interest rate component, or the "asset acquisition behaviour" of investors which was in the foreground. This interest rate influence is also likely to dominate the shorter-term trend of M3 in the future.

*More volatile
trend in the
money stock*

Innovations in the payment system can also have an impact on the interest rate elasticity of the demand for money. In principle, rising money market interest rates – interest rate elasticity being negative – put brakes on the growth of the money stock, since the opportunity costs of holding non-interest bearing or low-interest assets rise (as, traditionally, do means of payment). In the event of an increasing specific interest rate of the very liquid assets, the interest rate elasticity, and thus the controllability of a money aggregate,

*Interest rate
elasticity of
demand for
money*

decrease. The trend towards increasing interest on cash holdings is certainly more focused on the general innovation process in the financial markets than on specific payment techniques. They have strengthened this trend more than they have triggered it. This trend is likely to gain in significance especially if electronic money were to bear interest. But even then, this would have only a slight effect on the controllability of the broadly defined money stock M3.

*Conclusion
regarding
monetary
policy*

Altogether, the Bundesbank has so far been able to rest at ease when looking at the more recent trends in the payment system. These trends do not call into question the Bundesbank's monopoly on central bank money or

the demand for central bank money for the time being; thus, the basis of monetary policy has been preserved. Monetary targeting has also not run into serious difficulties because of innovations in payment systems. The displacement effect thus caused regarding cash and sight deposits has been slight. The trend to be expected in the foreseeable future is also likely to have little effect on the underlying monetary relationships. Still, unforeseeable developments cannot be ruled out entirely. Owing to these reasons, therefore, the Bundesbank considers it advisable to take account not only of the money stock but also of the entire monetary policy environment in its policies.