

The operational framework of the Eurosystem: description and first assessment

In the first issues of the ECB Monthly Bulletin several articles were published explaining the monetary policy strategy which the Eurosystem pursues in order to fulfil its mandate of maintaining price stability in the euro area. This strategy consists of two pillars. The first pillar is a prominent role for money with a quantitative reference value for money growth and the second consists of a broadly based assessment of the outlook for price developments and the risks to price stability. The operational framework governs the implementation of the measures necessary to enact monetary policy decisions. The core elements of the operational framework of the Eurosystem are open market operations, standing facilities and a minimum reserve system. The main characteristics of the framework are described in this Article, together with an initial assessment of its implementation during the first three reserve maintenance periods since the start of Monetary Union, which together ran from 1 January to 23 April 1999.

The experience gained so far shows that the operational framework of the Eurosystem is an effective tool for steering money market interest rates, limiting their volatility and enabling the European Central Bank (ECB) to send appropriate monetary policy signals. The main refinancing operations have fulfilled the envisaged role of signalling the monetary policy stance, steering money market interest rates and providing the bulk of liquidity to the banking system. The longer-term refinancing operations have provided the banking system with an additional, stable liquidity flow with a maturity of three months. The standing facilities have effectively bound overnight market interest rates. The averaging provision of the minimum reserve system has helped to smooth the daily liquidity fluctuations, making the execution of fine-tuning operations unnecessary. These developments, together with low recourse to the standing facilities on most days, indicate that participants in the euro area money market have adapted well to the new environment.

I The main components of the operational framework

The role of the operational framework in the conduct of monetary policy

The operational framework can be defined as the set of instruments which a central bank uses to manage liquidity and steer interest rates prevailing in the money market. In this market it is possible for credit institutions running a liquidity surplus to exchange funds with institutions running a liquidity deficit at terms that range from one day (overnight) to normally one year. Overall, the euro area banking system has an aggregate liquidity deficit and is reliant on refinancing by the Eurosystem. In this environment the Eurosystem acts as a marginal supplier of liquidity and can thereby steer money market interest rates and transmit monetary policy impulses along the yield curve. This action should be seen in the context of the monetary policy strategy of the Eurosystem, including the reference value for money growth.

A crucial factor in the transmission of monetary policy impulses is the homogeneity of the conditions prevailing in the money market. For this reason, it is important for market participants to be in a position to conduct transactions with counterparties located across the entire euro area, so as to be able to exploit potential arbitrage opportunities and avoid any existing euro area rate differentials. Hence efficient and secure area-wide payment systems are essential for the smooth and effective conduct of the single monetary policy (see the description of the role of TARGET in Box 1).

All decisions related to the conduct of monetary policy are taken by the decision-making bodies of the ECB. However, the practical aspects, such as the execution of open market operations and the administration of the standing facilities and the minimum reserve system, are carried out in a decentralised manner by the national central banks.

Recourse to the instruments comprising the operational framework is evidenced in the consolidated balance sheet, which is published by the Eurosystem every week. The assets side of the balance sheet displays, among other items, the instruments through which the central bank provides liquidity to the banking system, whereas the liabilities side lists the instruments which drain liquidity from the system. Those balance sheet items that are beyond the direct control of monetary policy authorities, but which also influence the liquidity of the system, are usually referred to as autonomous factors (e.g. government deposits with the Eurosystem and banknotes in circulation). Their assessment is particularly important for a correct understanding of the use of the monetary policy instruments. Therefore, the weekly publication of the Eurosystem's consolidated balance sheet plays a relevant role in informing the public about monetary policy.

This section reviews the main characteristics of the instruments forming the operational framework of the Eurosystem. A detailed presentation of these instruments can be found in the ECB report entitled *The single monetary policy in Stage Three: General documentation on ESCB monetary policy instruments and procedures* (September 1998).

Open market operations

In the context of the monetary policy strategy, open market operations play an important role in steering interest rates and managing the provision of liquidity to the market. The Eurosystem provides the bulk of liquidity to the banking system through the *main refinancing operations*. These are open market operations conducted regularly by means of tenders, with a weekly frequency and a maturity of two weeks. Additional liquidity is provided through the *longer-term refinancing operations* that are conducted regularly by means of tenders, with a monthly frequency and a maturity of three months. For the sake of simplicity, these operations

will also be referred to as the *weekly tenders* and the *monthly tenders* respectively.

Both weekly and monthly tenders are executed through *standard tenders*. In the context of the operational framework of the Eurosystem, this term indicates those tenders executed within a period of 24 hours from their announcement to the communication of the results, in accordance with a schedule published in advance. All institutions fulfilling the counterparty eligibility criteria may participate in these operations. The Eurosystem may execute standard tenders in the form of either *fixed rate* or *variable rate auctions*. In the former, the interest rate is specified in advance by the Eurosystem and participating counterparties bid the amount of money they wish to transact at the fixed interest rate; in the latter, counterparties bid both the amount of money they wish to transact and the interest rate at which they wish to enter into the transaction. A further distinction applies to variable rate auctions. In auctions conducted through a *single rate procedure*, the marginal interest rate, i.e. the lowest accepted rate, is applied to all satisfied bids. By contrast, if a *multiple rate procedure* is adopted, the allotment interest rate applied to each individual bidder is the interest rate it offered in its bid.

The Eurosystem effectively retains the option of using either fixed rate or variable rate auctions in the case of weekly tenders, while it normally conducts all monthly tenders in the form of variable rate auctions. In addition, it normally pre-announces the intended volume of the operation for monthly tenders, but not for weekly tenders. This means that in a weekly tender the Eurosystem either explicitly sets the interest rate applicable (if it conducts a fixed rate auction) or else it can influence the interest rate by determining the volume of funds allotted to the bids submitted by credit institutions (if it conducts a variable rate auction). Hence weekly tenders are designed to play a pivotal role in steering interest rates. In a monthly tender, by contrast, the Eurosystem normally acts as a rate taker, as it accepts the rate resulting

from the variable rate auction, namely the rate at which the bids submitted by credit institutions cover the pre-announced allotment amount.

The Eurosystem may also carry out *fine-tuning operations* on an ad hoc basis to smooth interest rate movements, in particular if these are caused by unexpected liquidity fluctuations. Given their purpose, fine-tuning operations are conducted, when deemed necessary, through *quick tenders* (which take one hour from their announcement to the communication of the allotment results) or through *bilateral procedures*. A limited number of selected counterparties may participate in such operations. Furthermore, the Eurosystem may conduct *structural operations* to modify its net position vis-à-vis the banking system over a longer period. These operations can be conducted using reverse transactions, outright operations or the issuance of debt certificates.

Standing facilities

The Eurosystem also implements monetary policy by setting the interest rates on its standing facilities. These have the function of providing or absorbing liquidity with an overnight maturity. Counterparties may use the *marginal lending facility* to obtain overnight liquidity against eligible assets from the national central banks, whereas they may use the *deposit facility* to make overnight deposits with the national central banks. All institutions fulfilling the counterparty eligibility criteria may access the standing facilities. There is no limit on recourse to the standing facilities, although the ECB may impose restrictions or adapt the conditions connected to their use in particular circumstances. Moreover, in the case of the marginal lending facility, counterparties must post an adequate amount of collateral. The interest rates on the standing facilities normally provide a ceiling and a floor for the overnight market interest rate and may be used to signal the medium-term orientation of monetary policy.

Minimum reserve system

The Eurosystem imposes reserve requirements on credit institutions established in the euro area. These requirements have to be fulfilled on average over a one-month maintenance period (this is referred to as *averaging*), which runs from the 24th day of one month to the 23rd day of the following month. As a transitional measure, however, the first maintenance period of Monetary Union started on 1 January and ended on 23 February 1999.

A first key function of the minimum reserve system is to stabilise money market interest rates. The averaging provision allows credit institutions to smooth out daily liquidity fluctuations, since daily reserve surpluses (amounts of reserve holdings in excess of the reserve requirements) can be offset by daily reserve deficits throughout the same maintenance period. This implies that institutions can profit from lending in the market and run a reserve deficit whenever the overnight interest rate is above that expected to prevail for the remainder of the maintenance period, and to borrow and run a reserve surplus in the opposite case. In theory, at the level of the banking system this should ensure equality between the current level and the corresponding expected level of the overnight interest rate, since any difference between the two rates would offer a corresponding profit opportunity. Thus, the option to offset reserve surpluses by reserve deficits is often referred to as *intertemporal arbitrage*. This arbitrage stabilises the overnight interest rate during the maintenance period and makes it unnecessary for the central bank to intervene frequently in the money market. If such intervention were to be conducted with a high frequency and for different purposes, this could undermine the operational efficiency of monetary policy, as central bank signals could become blurred.

A second relevant function assigned to the minimum reserve system is the enlargement of the banking system's liquidity deficit. Although a

central bank can also operate in an environment of a liquidity surplus, practical experience has shown that the existence of a liquidity deficit enhances its ability to steer money market interest rates. The need for credit institutions to hold reserves with national central banks contributes to increasing the demand for central bank refinancing and is consistent with the prominent role assigned to regular liquidity-providing instruments in the operational framework of the Eurosystem.

Reserve requirements are determined after deducting a lump-sum allowance of €100,000

from the amount resulting from the application of a 2% reserve ratio to certain balance sheet items of credit institutions. Holdings of required reserves are remunerated at a level corresponding to the average rate of the weekly tenders over the maintenance period. This rate of remuneration should normally be close to money market interest rates and should thus substantially mitigate the burden which a minimum reserve system imposes on the private sector, as well as the effects it might have on the competitiveness of credit institutions located in the euro area.

Box I

Participation in and the settlement of monetary policy operations

Eligible counterparties

Counterparties to monetary policy operations of the Eurosystem (standing facilities and open market operations) must fulfil certain general eligibility criteria. In particular, only institutions subject to the minimum reserve system are eligible to be counterparties. The eligibility criteria are uniform throughout the euro area and are defined with a view to giving a broad range of institutions access to these operations, thus enhancing the equal treatment of institutions across the euro area and ensuring that certain operational and prudential requirements are fulfilled.

According to Article 19.1 of the Statute of the ESCB, all credit institutions located in the euro area (as defined in Article 1 of the First Banking Co-ordination Directive) are subject to reserve requirements. The ECB may, however, exempt institutions undergoing winding-up proceedings or reorganisation measures from their obligations under the minimum reserve system, as well as classes of other institutions, on a non-discriminatory basis, if the purposes of the minimum reserve system would not be met by imposing reserve requirements on those particular institutions. As at 23 April 1999 no credit institution was exempt from the reserve requirements.

The ECB makes available to the public on its Internet Web site (www.ecb.int) a monthly list of the euro area Monetary Financial Institutions (MFIs), which is updated on the last working day of every month. The definition of MFIs encompasses credit institutions as well as other financial institutions, the business of which is to receive deposits and/or close substitutes for deposits from the public and which, for their own account (at least in economic terms), grant credit and/or invest in securities. This list specifies which MFIs are credit institutions and thus subject to reserve requirements, as well as any exempt institutions. Counterparties may rely on this list in deciding whether their liabilities are owed to another institution which is itself subject to the reserve requirements, and therefore not subject to the 2% reserve ratio.

As at end-March 1999 the total number of MFIs was 10,833, of which 8,249 were credit institutions. Just over one-third of these institutions satisfied all the criteria for participation in monetary policy operations. Given that, on average, the number of credit institutions which participated in the weekly tenders was around 800, it follows that roughly one in three eligible counterparties effectively took advantage of the possibility to participate directly.

Eligible assets

All credit operations of the Eurosystem have to be based on adequate collateral. With the aim of ensuring both the equal treatment of counterparties and operational efficiency, certain harmonised criteria need to be met by collateral in order to be eligible. At the same time, due attention has to be paid to existing differences in financial structures across Member States. A distinction is therefore made, essentially for purposes internal to the Eurosystem, between two categories of assets eligible for monetary policy operations. "Tier one" consists of marketable debt instruments which fulfil uniform area-wide eligibility criteria specified by the ECB. "Tier two" consists of additional assets, both marketable and non-marketable, which are of particular importance for national financial markets and banking systems and for which eligibility criteria are established by the national central banks, subject to the minimum eligibility criteria established by the ECB. No distinction is made between the two tiers with regard to the quality of the assets or their eligibility for the various types of Eurosystem monetary policy operations (although, under normal circumstances, only tier one assets are intended for use in the execution of outright operations). Furthermore, counterparties may use all tier one and tier two assets on a cross-border basis (see below).

The ECB makes available to the public on its Internet Web site a list of euro area eligible assets, which comprises all tier one assets as well as all marketable tier two assets. This list is updated on a weekly basis. At the end of March 1999 marketable tier one and tier two assets worth approximately €5.2 trillion were available for monetary policy operations and payment systems purposes. Of this amount, the greatest proportion (over 97%) consisted of tier one collateral. As regards the composition of the collateral, 76% of the marketable collateral was made up of government paper; securities issued by credit institutions represented approximately 18% of the total amount, while corporate sector and central bank paper together accounted for the remainder (less than 6%). With regard to their type, 91% of the instruments were bonds or medium-term notes, short-term paper represented approximately 8%, while equity and other types of assets were negligible in amount (0.2% for each category).

TARGET: an area-wide payment system

A single monetary policy for the euro area requires that uniform interest rates prevail in the money market. In order to achieve this, credit institutions need to have both the incentive and the capability to manage their liquidity efficiently, and it must be possible to execute arbitrage operations easily and swiftly throughout the euro area. This, in turn, requires the existence of an integrated area-wide payment system to ensure that liquidity can be transferred from one participant to another in a safe and timely fashion.

To achieve this, an area-wide system for euro payments has been designed and developed. It is called TARGET (an acronym for "Trans-European Automated Real-time Gross settlement Express Transfer"). This system consists of 15 national real-time gross settlement systems plus the ECB payment mechanism, all of which are interlinked so as to provide a uniform platform for processing cross-border payments. It is intended mainly for the settlement of monetary policy operations and large-value interbank payments, but can also handle customer payments including smaller cross-border retail transactions. The ECB has published a brochure on its Web site explaining the functioning of the TARGET system in detail.

Cross-border use of eligible assets

One feature of the implementation of the single monetary policy is that it enables counterparties to submit eligible assets irrespective of their location in the euro area. For this purpose, the Eurosystem has developed a mechanism called the correspondent central banking model (CCBM) that enables assets eligible for monetary policy operations to be used on a cross-border basis. When using the mechanism, the counterparties may obtain funds from the national central bank of the Member State in which they are established by making use of assets located in another Member State. The ECB has published a brochure on its Web site explaining the way in which the CCBM functions.

2 Experience with the operational framework in the first few months of Monetary Union

Decisions on interest rates

On 22 December 1998 the Governing Council of the ECB set the interest rates to be applied to the monetary policy operations of the Eurosystem as from the first day of Monetary Union. The interest rate to be applied to the weekly tenders, which were to be offered in the form of fixed rate auctions, was set at 3.00%, a level deemed to be appropriate for the maintenance of price stability in the euro area and in line with key central bank rates prevailing in the participating Member States at the end of Stage Two. In addition, the interest rate on the marginal lending facility was set at 4.50% and that on the deposit facility at 2.00%. However, as a transitional measure, a narrow corridor was adopted for the standing facilities between 4 January (the first business day of Monetary Union) and 21 January 1999: the interest rate on the marginal lending facility was set at 3.25% and that on the deposit facility at 2.75%. This measure was aimed at facilitating the adaptation of market participants to the integrated euro money market during the first few weeks of Monetary Union (see Box 2). The Governing Council also decided that the first monthly

tender would be conducted in the form of a variable rate auction, using the single rate procedure, as this was considered to be simpler and better suited to help the adaptation process of the banking system.

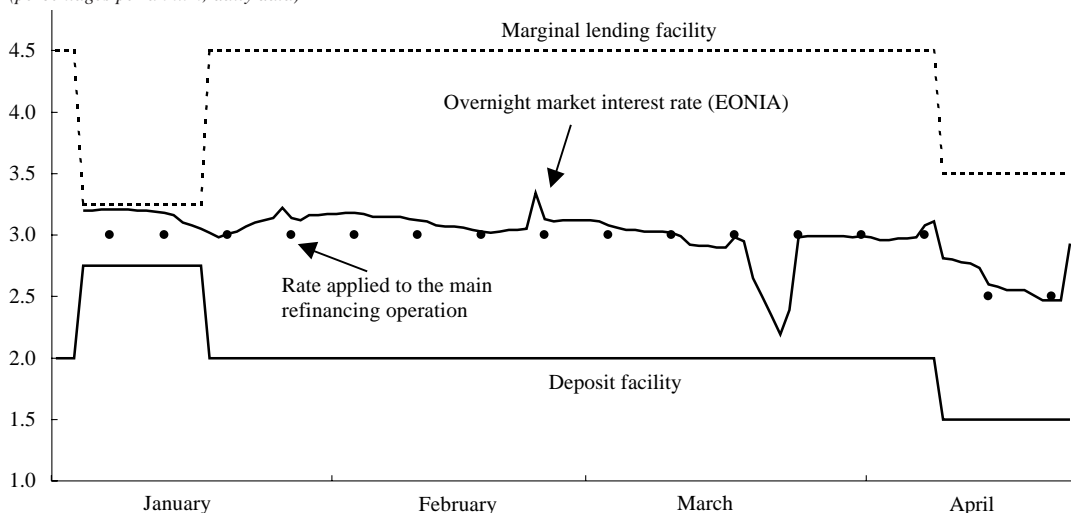
Confirming its earlier assessments, the Governing Council decided, at its subsequent meetings in January, February and March 1999, to keep the conditions at which the weekly tenders were offered unchanged, i.e. that fixed rate auctions would continue to be conducted at an interest rate of 3.00%, and the interest rates applied to the two standing facilities as from 22 January 1999 would remain at 2.00% and 4.50% respectively (see Chart 1).

On 8 April 1999 the Governing Council decided to set the interest rate on the weekly tenders of the ECB at 2.50% as from the operation to be settled on 14 April 1999. In addition, the interest rate on the marginal lending facility was lowered to 3.50% and that on the deposit facility to 1.50%, with effect from 9 April 1999. The decision to lower the interest rates was taken in a forward-looking perspective, focusing on the medium-term outlook for inflation and its

Chart 1

ECB interest rates and the overnight market interest rate (EONIA): 1 January to 23 April 1999

(percentages per annum; daily data)



Source: ECB.

Box 2

The transition from Stage Two to Stage Three of EMU

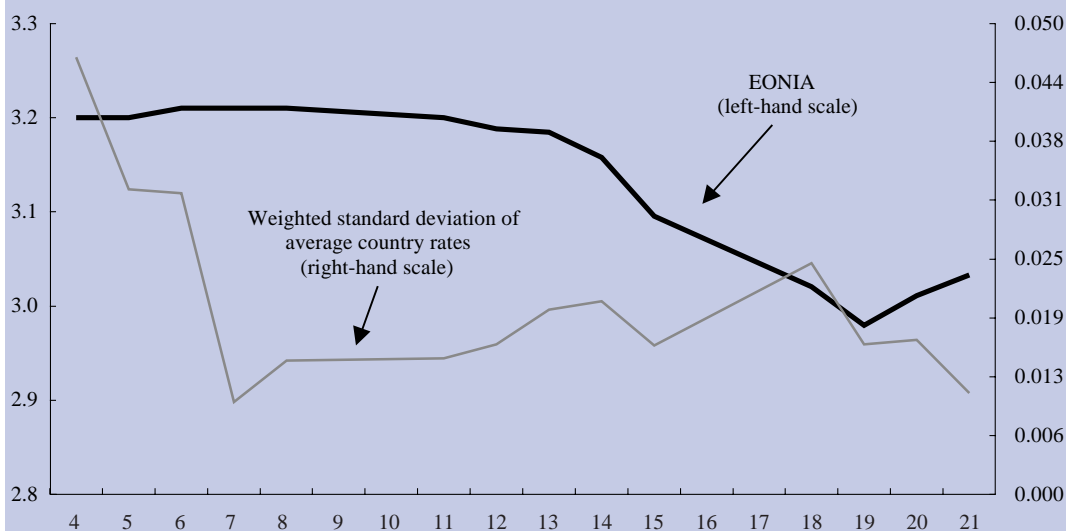
The temporary application of a narrow interest rate corridor

The decision to reduce the width of the “corridor” formed by the interest rates applied to the two standing facilities at 50 basis points (50 hundredths of a percentage point) for the period from 4 to 21 January 1999 took into account the fact that euro money market participants would require some time to familiarise themselves with the new environment.

Experience has shown that the decision was justified, and that an interim period of three weeks was adequate. Between 4 and 13 January 1999 the overnight interest rate, as measured by EONIA (euro overnight index average, i.e. the weighted average of the rates on unsecured overnight contracts reported by a panel of major institutions in the euro area), stood at around 3.2%, a level close to the then applicable interest rate of 3.25% on the marginal lending facility, but showed very limited day-to-day volatility. Furthermore, the dispersion among the interest rates reported by credit institutions included in the EONIA panel (as measured by the weighted standard deviation of the average country rates) was relatively high on 4, 5 and 6 January 1999, but stabilised at a lower level thereafter.

The overnight market interest rate (EONIA) and its dispersion: 4 to 21 January 1999

(interest rates as a percentage per annum; daily data)

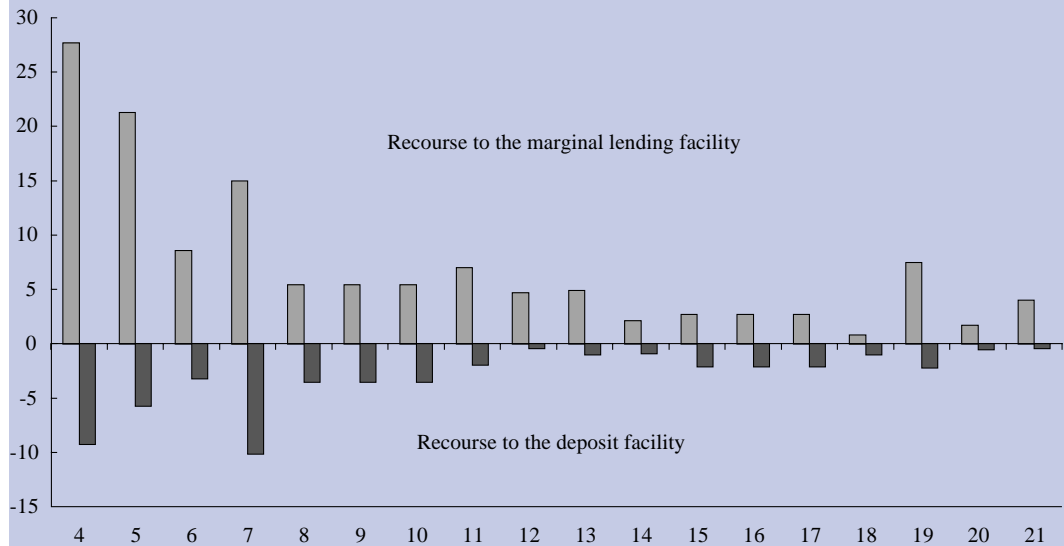


Source: ECB, elaboration based on data provided by credit institutions included in the EONIA panel.

In addition, recourse to both standing facilities was sizable during the first business week of Monetary Union, which suggests that credit institutions may have preferred to pay a premium to transact with the Eurosystem rather than entering into a transaction in the money market. However, recourse to the standing facilities already declined in the second week, stabilising at lower levels as from the third week. As a further temporary measure, the ECB decided to extend the final closing times of the TARGET system by one hour, from 6 p.m. to 7 p.m., from 11 to 29 January 1999 in order to contribute to smooth end-of-day settlement activity. (See the chart on the following page.)

Recourse to the standing facilities: 4 to 21 January 1999

(EUR billions; daily data)



Source: ECB.

The phasing-out of monetary policy operations initiated by national central banks in Stage Two

The credit to the euro area banking system granted by national central banks through open market operations in Stage Two and still outstanding at the start of Stage Three was equal to €182 billion, excluding outright operations and the issuance of debt certificates. These operations gradually matured during the first few weeks of January 1999. On average they provided the banking system with €53 billion per day in January 1999 and €31 billion per day over the course of the entire first maintenance period, which started on 1 January and ended on 23 February 1999.

The gradual substitution of the refinancing provided by the Eurosystem for that provided by individual national central banks was aimed at contributing to orderly conditions in the euro money market during its transition to Monetary Union. In particular, this meant that the Eurosystem did not need to intervene in the open market on the first three business days of 1999, namely before the planned settlement date of the first weekly tender. In addition, in a phase when there were still uncertainties with regard to the degree of integration of the euro money market, this made it possible for national banking systems to be granted an amount of liquidity in line with their refinancing needs at the start of Monetary Union.

compatibility with the Eurosystem's definition of price stability.

The results of tender auctions

Different patterns can be distinguished in the results of the 16 main refinancing operations conducted during the first three reserve maintenance periods of Monetary Union. In the first 10 operations, i.e. until the one settled on 10 March 1999, the number of counterparties was around 1,000 (see

Table 1). Moreover, the ratio between the total amount allotted and the total amount bid (the allotment ratio) declined steadily from around 15% in the first weekly tender to a level around 6-7%. The high participation and the low and decreasing allotment ratios were consistent with the significant positive spread between the money market interest rate and the 3.00% rate applied to the weekly tenders at that time, which made it profitable for credit institutions to borrow from the Eurosystem rather than from the market.

Table 1**Main refinancing operations: 1 January to 23 April 1999***(EUR billions; interest rates as a percentage per annum)*

Date of settlement of the operation	Total number of counterparties	Total amount of bids (a)	Total amount allotted (b)	$(b) \div (a) \times 100$	Interest rate applied %	Memorandum item: EONIA ¹⁾ %
7 Jan.	944	481.6	75.0	15.6	3.00	3.20
13 Jan.	1068	563.4	48.0	8.5	3.00	3.19
20 Jan.	966	593.4	59.0	9.9	3.00	2.98
27 Jan.	1038	689.5	69.0	10.0	3.00	3.22
3 Feb.	998	757.7	62.0	8.2	3.00	3.18
10 Feb.	1041	911.3	65.0	7.1	3.00	3.13
17 Feb.	914	896.1	62.0	6.9	3.00	3.04
24 Feb.	983	991.1	78.0	7.9	3.00	3.34
3 Mar.	965	1,100.8	67.0	6.1	3.00	3.11
10 Mar.	928	950.4	75.0	7.9	3.00	3.03
17 Mar.	665	335.2	44.0	13.1	3.00	2.90
24 Mar.	554	372.6	102.0	27.4	3.00	2.39
31 Mar.	403	118.7	39.0	32.9	3.00	2.98
7 Apr.	302	67.4	67.4	100.0	3.00	2.98
14 Apr.	841	781.7	67.0	8.6	2.50	2.73
21 Apr.	713	612.3	50.0	8.2	2.50	2.47
Average	833	639.0	64.3	10.1	2.94	2.99

*Source: ECB.**1) All EONIA rates refer to the day on which the bids were submitted.*

In the next three weekly tenders, by contrast, the number of bids declined steadily, reaching 403 on 31 March 1999. The allotment ratio, which had reached a minimum of 6.1% in the operation settled on 3 March 1999, initially increased to 13.1% on 17 March and then to 32.9% in the operation settled on 31 March 1999. The change in bidding behaviour was a consequence of the policy of providing ample liquidity that the Eurosystem enacted in the course of the second reserve maintenance period. Owing to this policy, the spread between the overnight market interest rate and the 3.00% rate applied to the weekly tenders declined and eventually changed sign. In addition, the expectation of a decision by the Governing Council to cut interest rates in the near future led to a further relevant change in bidding behaviour when, for the weekly tender settled on 7 April 1999, the total amount of bids was for the first time lower than the liquidity injection that had been foreseen by the ECB (see also the section on liquidity management). All bids in that operation were thus allotted in full. This bidding behaviour clearly signalled

counterparties anticipation of a lower cost of central bank refinancing in the following week. On the occasion of the following two tenders, offered at the fixed rate of 2.50%, the allotment ratio stabilised around a level of 8%.

All monthly tenders have been conducted in the form of variable rate auctions, in accordance with the general principle that the Eurosystem does not intend to send signals to the market through these operations and therefore normally acts as a rate taker. To phase in the amount of liquidity to be provided through monthly tenders, the first three of these operations, all of which were settled on 14 January 1999, were conducted with a maturity of 42, 70 and 105 days respectively (see Table 2). Each of the operations amounted to €15 billion, with the result that the volume of €45 billion was already achieved in the course of the first month of Monetary Union.

The single rate procedure was adopted for the monthly tenders settled on 14 January

Table 2**Longer-term refinancing operations: 1 January to 23 April 1999***(EUR billions; interest rates as a percentage per annum)*

Date of settlement of the operation (maturity in days)	Total number of counterparties	Total amount of bids (a)	Total amount allotted (b)	(b) ÷ (a) × 100	Interest rate applied		Memorandum item: money market rate ¹⁾ %
					marginal rate %	weighted rate %	
14 Jan. (42 days)	466	79.8	15.0	18.8	3.13	—	3.21
14 Jan. (70 days)	311	39.3	15.0	38.2	3.10	—	3.20
14 Jan. (105 days)	329	46.2	15.0	32.5	3.08	—	3.19
25 Feb. (91 days)	417	77.3	15.0	19.4	3.04	—	3.08
25 Mar. (98 days)	269	53.7	15.0	27.9	2.96	2.97	3.01
Average	358	59.3	15.0	25.3	3.06	2.97	3.14

Source: ECB.

1) One-month EURIBOR for the operation settled on 14 January 1999 and a maturity of 42 days; two-month EURIBOR for the operation settled on 14 January 1999 and a maturity of 70 days; three-month EURIBOR for the operation settled on 14 January 1999 and a maturity of 105 days and for the operations settled on 25 February and 25 March 1999. All rates refer to the day on which the bids were submitted.

and 25 February 1999. The multiple rate procedure was used instead, starting from the monthly tender settled on 25 March 1999, because its market orientation was assumed to be higher and it appeared that the euro area banking system had adapted well to the new environment.

The bidding behaviour of the banking system also showed a certain variability in the case of the monthly tenders. However, no clear patterns could be detected. The number of counterparties, which was just above 350 on average, fluctuated in a range between 269 and 466. The total amount bid fluctuated between €39 billion and €80 billion, while the total amount allotted remained constant at a level of €15 billion.

In the monthly tenders executed so far, the resulting marginal interest rate has been between 4 and 11 basis points lower than the reference market rate (the euro interbank offered rate, EURIBOR) at similar maturities. This margin may reflect market trading spreads as well as credit and other risk premia, the existence of which tends to

move money market interest rates to a level higher than that at which counterparties are willing to conduct transactions with the central bank.

Liquidity management

General framework

Liquidity management and the associated steering of money market interest rates are at the short end of the chain of transmission of monetary policy impulses. The technical aspects of liquidity management are influenced by the specific characteristics of the operational framework. In the case of the Eurosystem, the existence of a monthly maintenance period and the conduct of weekly tenders are two crucial features of liquidity management. The decisions on the volumes of weekly tenders are taken so as to ensure that these operations close the liquidity deficit of the banking system and thus effectively steer money market interest rates. This implies that an assessment of liquidity conditions over the entire maintenance period must be carried out, taking into consideration

various factors jointly: the reserve requirement, the aggregate current account holdings of the banking system as from the beginning of the reserve maintenance period, the refinancing undertaken through monthly tenders and other monetary policy operations, the information available to the Eurosystem on the likely pattern of the autonomous factors and, finally, the demand for reserves other than those relating to reserve requirements.

Two main aspects can be highlighted in the general framework for the liquidity management of the Eurosystem. First, the impact on liquidity conditions of a given allotment decision cannot be judged solely on the basis of the specific volume of the weekly tender or by comparing it with the corresponding maturing operation. Rather, it depends on the overall liquidity conditions. Second, the central bank acts under conditions of uncertainty: owing to unforeseen shocks, forecasts of different liquidity factors inevitably contain an element of error. Ex post, the liquidity profile deviates, sometimes significantly, from that projected when the decision on the weekly tender is taken. However, within the operational framework of the Eurosystem such deviations normally have little impact on the overnight interest rate, as the averaging provision included in the minimum reserve system allows unforeseen liquidity shocks to be absorbed before they can be corrected in the subsequent weekly tender. They may nevertheless contribute to a higher volatility of the overnight interest rate in the last days of the maintenance period, after the last weekly tender has taken place.

The conduct of liquidity management

In the first reserve maintenance period, which started on 1 January and ended on 23 February 1999, the provision of liquidity, as measured in terms of the accumulated reserve holdings from the beginning of the period, showed some moderate fluctuations around the level of the aggregate reserve

requirements of the banking system (see Chart 2). In the very first days of Stage Three these fluctuations were due to the elimination of the liquidity deficit accumulated as a consequence of the replacement of reserve requirements and monetary policy operations implemented by individual national central banks towards the end of Stage Two with the corresponding requirements and operations enacted by the Eurosystem. In the following days these fluctuations reflected movements in autonomous factors which had not been anticipated by the Eurosystem. Overall, the daily average of the accumulated reserve holdings fluctuated between €1 billion and +€4 billion of the aggregate reserve requirements, excluding the very first days of January 1999. EONIA which on average was equal to 3.13% in this maintenance period (i.e. 13 basis points above the rate applied to the weekly tenders at that time), fluctuated between 3.0% and 3.2% on most days, and reached a peak of 3.34% on 23 February 1999, the last day of the reserve maintenance period, reflecting a shortage of liquidity in the banking system in order to comply with reserve requirements.

In the second reserve maintenance period (from 24 February to 23 March 1999) the provision of liquidity was aimed at allowing counterparties to accumulate ample surplus reserve positions early in the maintenance period: such a liquidity policy is often referred to as frontloading. The daily average of the accumulated reserve holdings was between €0 and +€3 billion of the aggregate reserve requirements in the first calendar week; this difference increased to around +€7 billion in the days following the weekly tender settled on 3 March 1999. As a result of this liquidity policy, in the first 10 days of March 1999 EONIA gradually decreased towards the 3.00% rate applied to the weekly tenders. In the following week, from 11 to 18 March, EONIA stood at between 2.9% and 3.0%, to close at around 2.5% on the last three business days of the maintenance period. In the second maintenance period the average EONIA rate was equal to 2.94%.

A policy of mild liquidity frontloading was also adopted in the third reserve maintenance period (between 24 March and 23 April 1999). A level of EONIA close to and slightly lower than the 3.00% rate of the weekly tender occurred during the first part of this period, in a context of a moderate accumulation of reserve holdings, the daily average of which did not exceed reserve requirements by more than +€3 billion. This pattern, which prevailed until 6 April 1999, may have reflected market expectations of a lowering of the ECB interest rates prior to the end of the reserve maintenance period. In addition, in this period market participants may have discounted a systematic abundance of liquidity, which was not anticipated in the previous period. Against a background of heightened expectations of an interest rate decision by the Governing Council at its meeting on 8 April, the total amount of bids submitted for the tender settled on 7 April was, as noted above, relatively low. The immediate impact of this bidding behaviour was to produce fairly tight liquidity conditions until 14 April, the settlement date of the next weekly tender, with EONIA increasing to around 3.1% before the interest rate cut,

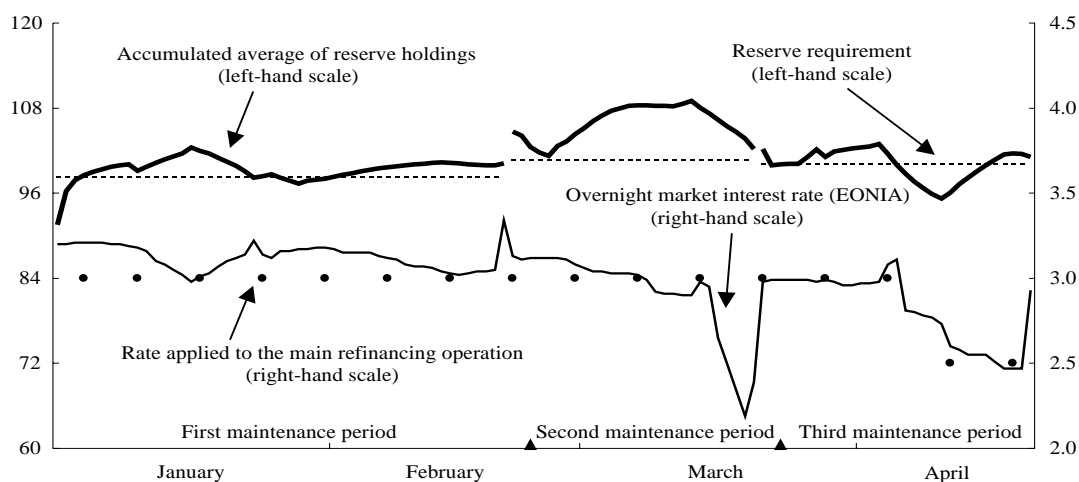
and adjusting only gradually to the new level of 2.50% thereafter. On the last day of the maintenance period, EONIA surged to 2.93%, reflecting a shortage of liquidity in the market. In the third maintenance period the average EONIA rate was equal to 2.82%.

As mentioned above, intertemporal arbitrage tends to equalise the current overnight interest rate with its expected level over the remainder of the maintenance period, and this level should be in line with the rate applied to the weekly tender. In practice, however, the overnight interest rate may deviate from the tender rate, irrespective of market expectations, owing to a number of factors. First, credit institutions are generally averse to risk. They may thus try to accelerate the fulfilment of their reserve requirements throughout the maintenance period, even if this implies borrowing at a relatively high level at the beginning of the maintenance period in the event that the central bank does not frontload liquidity. Second, credit institutions, even the largest ones, eventually face a constraint in their market activity owing to the credit lines set by their counterparties. This implies that they

Chart 2

The banking system's liquidity, the overnight market interest rate and the rate applied to the main refinancing operation: 1 January to 23 April 1999

(EUR billions; interest rates as a percentage per annum; daily data)



Source: ECB.

are generally unwilling to let their accumulated reserve position drift markedly from their reserve requirements, regardless of potential arbitrage profits. Finally, an additional factor may have been at work, especially in the first few weeks of Monetary Union, when credit institutions were adapting to the new environment, and in the period following an incident involving a national component of TARGET on 29 January 1999. In these conditions credit institutions may have been reluctant to operate in the money market, owing to uncertainties relating to the behaviour of their counterparties and to the settlement of the transactions. This may have hampered the circulation of funds in the banking system, leading to higher overnight interest rates.

Fine-tuning and structural operations

In the first few months of 1999 the Eurosystem did not find it necessary to conduct fine-tuning or structural operations. The decision not to conduct fine-tuning operations reflected the broadly smooth pattern of overnight interest rates, with only some moderate volatility occurring at the end of the maintenance periods (see Box 3). The latter finding is easy to explain in a monetary framework such as that of the Eurosystem, since at the end of the maintenance period credit institutions cannot further defer the fulfilment of their reserve requirements. However, any such volatility tends to disappear with the start of the new maintenance period and thus does not generally have a relevant impact on longer maturities along the yield curve.

These considerations also suggest that the minimum reserve system successfully fulfilled one of its functions, namely that of stabilising money market interest rates. This result was due to a sufficiently high level of reserve requirements as well as to the fact that credit institutions effectively used the averaging provision as from the first weeks of Monetary Union.

Structural operations were not needed, given the structural liquidity deficit position of the euro area banking system (i.e. its position vis-à-vis the Eurosystem net of monetary policy operations) at the end of Stage Two and the deficit enlargement induced by the reserve requirements of the Eurosystem. Indeed, as confirmed by experience gained during the first few months of Monetary Union, the deficit was large enough to make the banking system consistently dependent on the execution of liquidity-providing open market operations. The Eurosystem did not therefore find it necessary to enact additional measures to enlarge the liquidity deficit.

Discrepancies between current account holdings and reserve requirements

In theory, there should not be any difference between the daily average, over the maintenance period, of the holdings of credit institutions on current accounts with the Eurosystem and their reserve requirements. This is due to the fact that there is no remuneration of current account balances not contributing to the fulfilment of reserve requirements, while funds transferred to the deposit facility are remunerated at the deposit rate. In practice, however, a discrepancy between these two aggregates was recorded in each of the three reserve maintenance periods under review. Over the first period, the daily average of current account holdings was equal to €100.2 billion, €2.0 billion in excess of the reserve requirements of €98.2 billion. Over the second period this excess was €1.6 billion (the difference between €102.2 and €100.6 billion) and, finally, over the third period it was €1.0 billion (the difference between €101.1 and €100.1 billion).

As explained on pages 12 and 13 of the April issue of the ECB Monthly Bulletin, around half of the difference between the average current account holdings and the reserve requirements can be explained by a series of elements: (i) current account holdings of counterparties which effectively do not have

Box 3

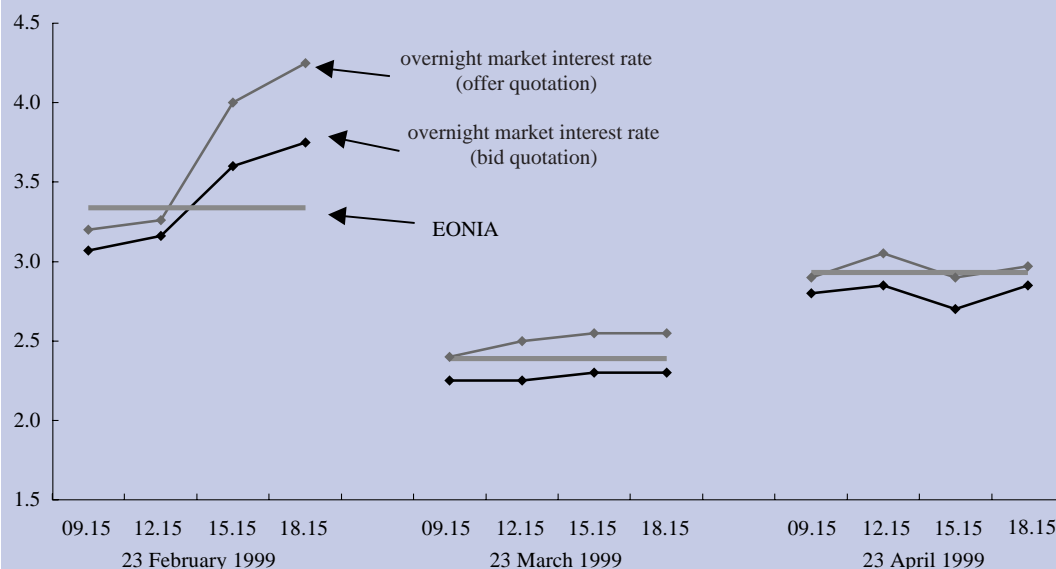
The behaviour of the money market on the last day of the maintenance period

On the last day of any maintenance period the averaging provision can no longer fulfil its stabilisation function vis-à-vis the overnight interest rate, which may therefore display an increased volatility. This may take two forms. First, the average level of the overnight interest rate on the last day of the maintenance period may differ considerably from that prevailing on the other days of the maintenance period. Second, in the course of the last day, the overnight interest rate gradually approaches the rate on the standing facility that is needed by the banking system as a whole to fulfil the reserve requirements. The former has already been described in the main text; it is interesting here to focus on the intraday form of volatility in order to assess how quickly information on the net liquidity needs of the banking system spreads in the euro money market on the last day of a maintenance period.

The chart below shows the bid and offer quotations of overnight market interest rates at various times on the last business day of the first three maintenance periods (23 February, 23 March and 23 April 1999 respectively), as well as EONIA for those days. The bid and offer quotations shown in the chart only represent proposed terms, i.e. they do not necessarily correspond to actual rates negotiated by counterparties.

Overnight market interest rates: EONIA and intraday bid and offer quotations on the last day of the maintenance period

(percentages per annum)



Source: ECB and Reuters.

At the end of the first reserve maintenance period the banking system proved, ex post, to be in a liquidity deficit position (on 23 February 1999 the net recourse to the marginal lending facility was €22.3 billion). However, in the course of the morning overnight interest rate quotations stood at around 3.1-3.2%. Only in the afternoon did they increase, to reach 4.25% at 6.15 p.m., suggesting that the money market had become aware rather late of the existence of a liquidity deficit. The circulation of information in the market appears therefore to have been relatively slow.

By contrast, on 23 March 1999, against the background of an overall liquidity surplus (at the end of the day the net recourse to the deposit facility was equal to €11.8 billion), market quotations stood relatively stable at around 2.3-2.5%. This pattern – which followed two business days on which the overnight interest rate had come close to the 2.00% deposit facility rate – signalled that the banking system as a whole had already become aware early in the morning of the liquidity surplus. Despite these liquidity conditions, on 23 March market quotations did not converge, however, to the 2.00% level. This may suggest that those credit institutions

which were running a liquidity surplus were unwilling to lend their funds in the money market, thus incurring transaction costs as well as credit and liquidity risks, unless they were offered a level of remuneration significantly higher than the rate paid on the deposit facility.

Finally, on 23 April 1999, the last day of the third reserve maintenance period, an overall liquidity deficit was recorded (at the end of the day the net recourse to the marginal lending facility was equal to €5.0 billion). This was already broadly apparent at the beginning of the day, with overnight interest rates standing at around 2.9% when the market opened, i.e. well above the 2.50% rate applied to the weekly tender. Prevailing rates then remained around this mark throughout the whole day without reaching the 3.50% rate of the marginal lending facility. This could signal that some uncertainty about the sign of the net liquidity imbalance of the banking system remained in the money market until the very last moment.

On all three occasions on the following business day (the first day of a new reserve maintenance period) the overnight interest rate returned to levels closer to the rate applied to the weekly tender.

to hold minimum reserves because their reserve requirement falls below the lump-sum allowance of €100,000; (ii) current account holdings of remote participants in the Euro Access Frankfurt (EAF) payment system; and (iii) current account holdings of counterparties which hold their reserves indirectly through another institution, but which still have a current account with the central bank for payment purposes. The remaining discrepancy can be attributed to excess reserves, i.e. balances that counterparties hold on their current accounts after they have fulfilled their reserve requirements.

At present, given the environment of low interest rates, the opportunity cost of

maintaining such balances on a current account overnight is modest. Individual credit institutions may therefore prefer not to transfer very small amounts of funds to the deposit facility. However, the aggregate impact of such a behaviour may well not be negligible, especially considering the large number of institutions currently subject to minimum reserves in the Eurosystem. In line with the pattern already observed in the course of the first three reserve maintenance periods of Monetary Union, the discrepancy between the current account holdings and the reserve requirements is expected to continue to decrease somewhat over time, although without disappearing completely.

3 Concluding remarks

Overall, the experience gained so far with the operational framework of the Eurosystem has been positive. The decision to facilitate the transition to Monetary Union by setting the width of the corridor of the interest rates applied to the standing facilities at 50 basis points for a limited number of days in January 1999 proved to be justified. By the end of this transitional period counterparties appeared to have acquired an adequate awareness of the functioning of the new environment. The main refinancing operations

have fulfilled the envisaged role of providing the bulk of liquidity to the banking system and steering short-term interest rates. Moreover, overnight interest rates have been bound by the rates applied to the standing facilities and reacted smoothly to the cut in the ECB interest rates on 8 April 1999. Finally, the averaging provision of the minimum reserve system has helped to smooth daily liquidity fluctuations, thus making the execution of fine-tuning operations unnecessary.