

Changes to the Eurosystem's operational framework for monetary policy

In January 2003 the Governing Council of the ECB decided on two changes to the Eurosystem's framework for monetary policy implementation. First, the timing of reserve maintenance periods would be adjusted so that the periods always start on the settlement day of the main refinancing operation (MRO) following the Governing Council meeting at which the monthly assessment of the monetary policy stance is pre-scheduled. Changes in standing facility rates would be aligned with the start of the new reserve maintenance period. Second, the maturity of the MROs would be shortened from two weeks to one week. Owing to technical and legal lead times, the agreed changes will be effective from March 2004.

Together, these two changes aim to stabilise the conditions in which bidding in the MROs takes place by neutralising the impact of interest rate change speculation within a maintenance period. Thus, in periods characterised by expectations of interest rate reductions, the agreed changes will strongly reduce the likelihood of underbidding. Furthermore, in periods of expectations of an interest rate increase, the changes should prevent very short-term market rates and the MRO tender rates from increasing significantly above the minimum bid rate in the case of variable rate tenders, thereby removing any potential source of noise in the signalling of the monetary policy stance. In addition, they should prevent excessive overbidding from occurring in the case of fixed rate tenders due to expectations of rising interest rates.

This article explains the reasons for these changes and reviews a number of more technical issues concerning the implementation of the changes.

I Introduction

On 23 January 2003 the Governing Council of the ECB decided on some changes to the Eurosystem's operational framework for monetary policy. The changes, which will be effective from March 2004, are expected to improve further the efficiency of the framework and, in particular, to contribute towards stabilising the conditions in which credit institutions bid in the Eurosystem's MROs. The main objective of the measures is to prevent the impact of interest rate change speculation during a maintenance period from affecting very short-term money market conditions. Thereby, the agreed changes will be an important factor in reducing the occasional volatility of short-term money market interest rates experienced in the past.

The changes are as follows:

- The timing of reserve maintenance periods will be adjusted so that these periods always start on the settlement day of the MRO following the Governing Council meeting at which the monthly assessment of the monetary policy stance is pre-scheduled. Currently, reserve maintenance

periods start on the 24th calendar day of one month and end on the 23rd calendar day of the subsequent month, irrespective of the Governing Council's meeting schedule. As a complement to this redefinition of the reserve maintenance period, changes in standing facility rates will, as a rule, be implemented on the first day of the new maintenance period. Currently, changes in standing facility rates are effective from the day after the meeting of the Governing Council.

- The maturity of the MROs will be shortened from two weeks to one week. Together with the above-mentioned changes, this implies that MROs will no longer straddle reserve maintenance periods.

Prior to the decision to implement the above changes, a public consultation was conducted to gather the views of European credit institutions and banking associations both on the measures proposed and on an additional proposal to suspend the longer-

term refinancing operations (LTROs). The public consultation was carried out in October and November 2002, and around 60 credit institutions and associations transmitted their views to the ECB.¹ While the opinions submitted generally supported the two aforementioned measures, they did not back the suspension of the LTROs. This contributed to the Governing Council's decision not to suspend the LTROs.

This article aims to explain further the motivation for the agreed changes to the operational framework for monetary policy.

2 Episodes of unbalanced bidding in the current framework and the underlying factors

Generally, the framework for monetary policy implementation can be assessed positively. The volatility of short-term money market rates has, on average, been low in the euro area, both in comparison with European national money markets prior to January 1999 and by international standards. This low degree of volatility has been fostered by the use of averaging provisions by the Eurosystem's minimum reserve system, with little need for the ECB to conduct fine-tuning operations. Moreover, credit institutions have had only limited recourse to the standing facilities, which indicates that the money market has been working efficiently. The small and fairly stable spread between the ECB's main refinancing rate and the short-term money market rates has also demonstrated the ECB's ability to closely steer short-term interest rates in line with its intentions. Finally, the ECB's operational framework has been robust when faced with a series of exceptional challenges (e.g. the transition to the year 2000 and the terrorist attacks of 11 September 2001) and has shown a very high degree of flexibility to deal with unforeseen circumstances.

The Eurosystem's framework for monetary policy implementation has only been subject to a few occasions of minor tension. Typically,

Section 2 describes the factors underlying credit institutions' bidding behaviour within the present framework and how unstable bidding has on occasions led to excessive volatility in short-term money market rates and created a source of noise in the implementation of monetary policy. Section 3 examines how the changes to the framework are envisaged to contribute to the stabilisation of the conditions in which bidding in MROs takes place and reviews a number of more technical issues concerning the implementation of the changes.

such strains emerged when high expectations of changes in the key ECB interest rates translated into instability in bidding by credit institutions taking part in the Eurosystem's MROs. Two types of instability were experienced, namely "underbidding" and "overbidding". More precisely, underbidding refers to the submission by credit institutions of aggregate bids which fall short of the amount needed to allow for a smooth fulfilment of reserve requirements in the period until the next MRO is conducted. This has occurred a total of nine times since 1999. Overbidding refers to the phenomenon of credit institutions submitting high and even continuously increasing bids to MROs (which were conducted as fixed rate tenders from January 1999 to May 2000), such that the ratio between allotment and bid amount falls to very low levels. This section addresses the factors underlying such unbalanced bidding behaviour and reviews some of the relevant episodes.

¹ For more detailed information on this public consultation and for the decision of the Governing Council, see the public consultation document entitled "Summary of comments received on the measures proposed to improve the operational framework for monetary policy" and the ECB press release "Measures to improve the efficiency of the operational framework for monetary policy", both dated 23 January 2003, on the ECB's website (www.ecb.int).

Unbalanced bidding and the underlying factors

The ECB's MROs play a pivotal role in steering interest rates, managing the liquidity situation in the market and signalling the stance of monetary policy. Currently, the minimum bid rate in the variable rate tender plays the key role of signalling the monetary policy stance, a role which was previously performed by the rate in fixed rate tenders.² The bidding behaviour of credit institutions in MROs is driven by two main factors: the spread between the two-week money market rate and the pre-announced minimum bid rate in the variable rate tender (the fixed tender rate prior to June 2000), and credit institutions' liquidity needs.³ Indeed, bidding encompasses two components, a quantity component (the bid amount) and a price component (the interest rate), both of which depend on the tender regime used for MROs. Normally, bidding should be such that an arbitrage equilibrium between obtaining liquidity directly from the central bank and obtaining it from the money market prevails. In the case of high expectations of a decline in key ECB rates, the minimum bid rate would be binding and credit institutions would tend to adjust the amount of bids downwards, instead of adjusting bid rates. Conversely, expectations of rising interest rates may lead to very large bids in fixed rate tenders.

In addition to the key monetary policy signalling role of the minimum bid rate (or fixed rate), three other elements of the monetary policy framework are instrumental in understanding how the current framework affects short-term interest rates and credit institutions' bidding behaviour in MROs: (i) the reserve requirement system with an averaging provision and a maintenance period starting on the 24th calendar day of each month and ending on the 23rd calendar day of the subsequent month; (ii) the possibility of changes in the key ECB rates during the reserve maintenance period; and (iii) the two-week maturity of the weekly MROs.

Considering these features one by one, the following can be regarded as key. First, the

reserve requirement system with monthly averaging provisions means that holding reserves on a specific day of the maintenance period is, in principle, a substitute for holding reserves on any other day of the relevant maintenance period. Thus, the monthly averaging mechanism provides credit institutions with some flexibility for managing their daily reserves within the maintenance period. Second, the current definition of reserve maintenance periods, however, also implies that changes in the key ECB interest rate may occur in the course of a maintenance period. Indeed, the assessment by the Governing Council of the monetary policy stance normally occurs at the first of its two meetings of the month, which is typically on the first or second Thursday of the month,⁴ and therefore does not coincide with the start of the maintenance period. Rate change expectations within the prevailing reserve maintenance period imply that overnight interest rates may deviate from the rates used by the ECB to signal its monetary policy stance (minimum bid rate or fixed tender rate), even if neutral liquidity conditions are expected for the end of the reserve maintenance period. Indeed, overnight interest rates depend not only on the expected accumulated liquidity conditions over the relevant maintenance period, as mentioned above, but also on the expected level of the key ECB rates. Third, the two-week maturity of the weekly MROs implies that at least the last MRO of each reserve maintenance period overlaps with the subsequent period. Therefore, it cannot be excluded that expectations of a rate change to take place in the subsequent reserve maintenance period could also destabilise bidding at the end of the prevailing maintenance period (the Box below presents a detailed discussion of the interaction between the key ECB rates, the liquidity conditions of the banking

² For the switch from fixed rate tenders to variable rate tenders with a minimum bid rate, see the ECB press releases "Monetary policy decisions" of 8 June 2000 and "Switch to variable rate tenders in main refinancing operations: some technical details" of 16 June 2000. For further details, see the article entitled "The switch to variable rate tenders in the main refinancing operations" in the July 2000 issue of the ECB's Monthly Bulletin.

³ See the article entitled "Bidding behaviour of counterparties in the Eurosystem's regular open market operations" in the October 2001 issue of the ECB's Monthly Bulletin.

⁴ On 8 November 2001 the Governing Council announced that it would, as a rule, assess the stance of the ECB's monetary policy and change rates only at its first meeting of each month.

Box

The interbank unsecured overnight rate in the euro area

Any substantial spread between the fixed or minimum bid tender rate and market rates of comparable maturity has a major influence on the bidding behaviour of credit institutions. It is therefore important to examine the factors that drive short-term money market rates away from the main refinancing rate in order to understand the nature of unbalanced bidding behaviour. The overnight interest rate, as the shortest maturity and hence the starting point of the yield curve, also plays a fundamental role in determining, for example, the two-week rate which is most relevant for bidding in MROs. This box aims to describe how the Eurosystem's operational framework and, in particular, the key ECB interest rates and liquidity management affect the overnight rate. For the purpose of clarifying the theoretical argument, three standard assumptions are made about the money market in the euro area:

1. Market participants are risk neutral. Furthermore, they are indifferent concerning the days in a reserve maintenance period on which they actually hold their required reserves.
2. The level of reserve requirements and the provision of liquidity by the central bank are such that, before the last day of the reserve maintenance period, credit institutions are neither confronted with the likelihood of going overdrawn, i.e. of having to take recourse to the marginal lending facility, nor with the likelihood that they fulfil their required reserves for the relevant reserve maintenance period ahead of time.
3. There are no transaction costs and the costs related to the use of collateral are negligible.

While these assumptions are not fully satisfied in practice, the analysis below shows that they seem to point to fairly reasonable results in the case of the euro area.

Together with the averaging provision of the Eurosystem's reserve system, the above assumptions imply that credit institutions consider reserve holdings on different days within a reserve maintenance period to be perfect substitutes for fulfilling their reserve requirements. Therefore, the price on reserves, i.e. the overnight rate (r_t), should, on any day, be the same as the expected overnight rate on any future day within the same reserve maintenance period, including the last day (T) of the reserve maintenance period. If this is not the case, credit institutions would have the opportunity to perform inter-temporal arbitrage. Indeed, if the overnight rate on a particular day is higher (or lower) than the level expected for day T, credit institutions would sell (or acquire) funds in the overnight market, thereby making an expected profit corresponding to the difference between the prevailing and the expected future overnight rate.

In turn, the overnight rate expected for day T reflects market participants' expectations about the liquidity conditions (and thus the "marginal value of holding liquidity") on that day. If, on day T, there is an accumulated liquidity surplus, i.e. if the market is "loose" in the sense that more reserves are available than credit institutions need to fulfil their reserve requirements, interest rates will drop towards the rate of the deposit facility and the marginal value of liquidity will be the rate of the deposit facility (r_T^D). Conversely, if the market is "tight", such that a liquidity deficit necessitates recourse to the marginal lending facility, interest rates will tend to rise towards the rate of the marginal lending facility, and the marginal value of liquidity will be the rate of the marginal lending facility (r_T^M). In sum, under the above assumptions, r_t depends on the expected rates applied to the standing facilities on day T, and on the expected accumulated liquidity conditions over the relevant reserve maintenance period, whereby the latter determines the probability that the marginal value of liquidity on day T will be either the rate of the deposit facility (P^{loose}) or the rate of the marginal lending facility (P^{tight}):

$$\text{Equation 1: } r_t = E_t(r_T) = E_t(r_T^M) \cdot P^{tight} + E_t(r_T^D) \cdot P^{loose}$$

where E_t is an expectations operator. Bearing in mind that, since April 1999, the width of the corridor set by the standing facilities of the Eurosystem has been two percentage points and symmetric around the main

refinancing rate (r_T^{mro}), i.e. the fixed or the minimum bid rate in the MROs, equation 1 can be rewritten as follows:

$$\text{Equation 2: } r_t = E_t(r_T) = E_t(r_T^{mro} + 1) \cdot P^{tight} + E_t(r_T^{mro} - 1) \cdot P^{loose} = E_t(r_T^{mro}) + P^{tight} - P^{loose}$$

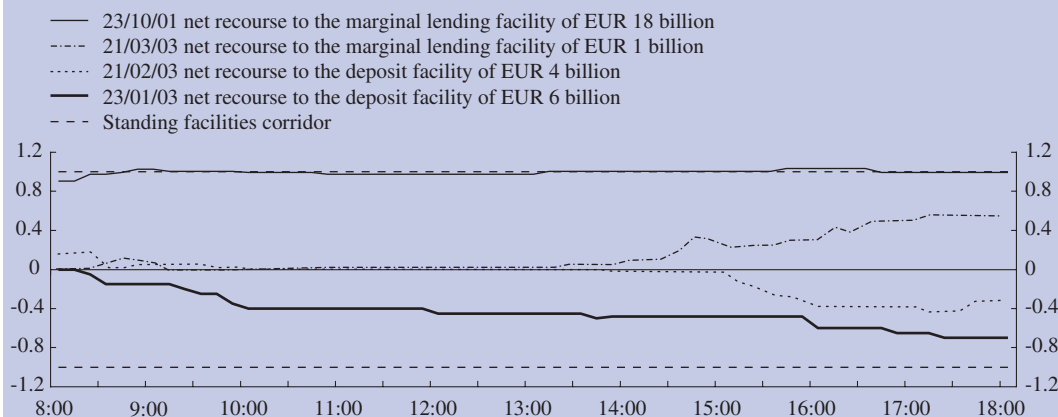
This illustrates that the overnight rate should always reflect the expected level of the main refinancing rate at the end of the reserve maintenance period, plus the difference between the perceived probability that the maintenance period will end on the tight or on the loose side. Specifically, if the accumulated liquidity conditions are perceived as being neutral, in the sense that both probabilities are equal to 0.5, and if at the same time the key ECB rates are expected to remain unchanged until the end of the prevailing reserve maintenance period, the overnight spread, i.e. r_t minus r_T^{mro} , should be zero.

While market expectations of liquidity conditions cannot directly be steered, it can be assumed that in normal conditions market participants have generally expected the ECB to offset any accumulated liquidity imbalances in the last MRO of the reserve maintenance period. However, after the last MRO, market participants have generally not expected the ECB to offset any liquidity imbalance. This has implied that perceptions in the market about non-neutral accumulated liquidity conditions have normally only prevailed after the last MRO of the reserve maintenance period – especially on the last day – or after a case of underbidding. Accordingly, the overnight spread has usually been more volatile during these periods than it has been from the start of the reserve maintenance period until the last MRO allotment (or until an episode of underbidding). Therefore, in order to assess the relevance of the expectations about the liquidity conditions, the intra-day evolution of the level of the spread between the overnight rate and the main refinancing rate (i.e. the overnight spread) on the last day of the reserve maintenance period is considered.

On the last day of the reserve maintenance period, interest rate change expectations for the relevant reserve maintenance period no longer prevail and the liquidity conditions can no longer be affected through the regular open market operations. From Chart A, it follows that the overnight rate typically approaches, at least to some extent, the rate of one of the two standing facilities towards the end of the last day of the reserve maintenance period, when the market realises, with increasing confidence, that the accumulated liquidity conditions are either tight or loose. Generally, the larger the accumulated liquidity imbalance (i.e. net recourse to one of the standing facilities), the sooner the market will recognise the liquidity conditions prevailing and

Chart A: Spread between the overnight rate and the ECB main refinancing rate on the last day of four selected maintenance periods¹⁾

(x-axis: timestamp; y-axis: the overnight spread in percentage points)



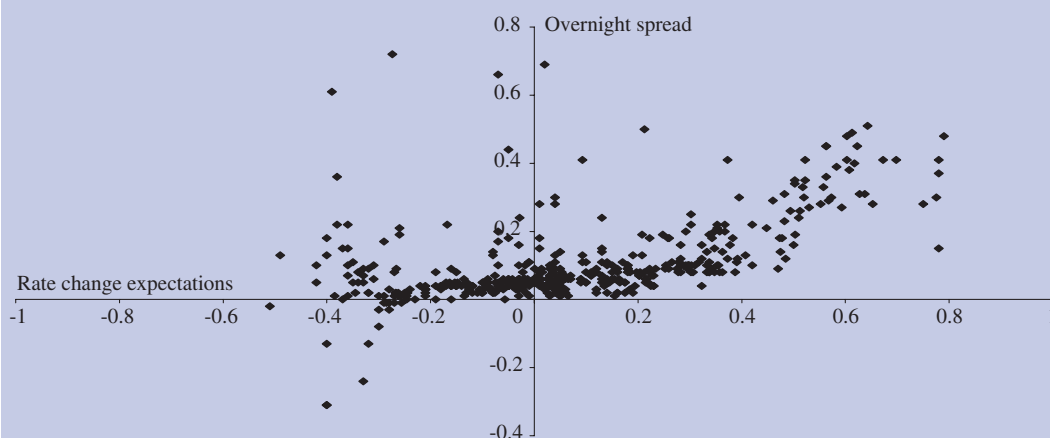
Sources: ECB and Reuters.

1) The four reserve maintenance periods were selected on the basis of the liquidity conditions prevailing on the last day of the period, as quantified by the net recourse to the standing facilities on that day. For the two selected maintenance periods which ended on a Friday (21 February and 21 March 2003), the accumulated net recourse from Friday to Sunday is reported.

therefore the sooner the overnight rate will move. For instance, on 23 October 2001, when there was a relatively large recourse of €18 billion to the marginal lending facility, the overnight rate was already close to the rate on the marginal lending facility before the last day of the maintenance period. By contrast, on 21 March 2003, when the accumulated deficit amounted to only €1 billion, the rate moved only late during the day.

As noted above, the overnight rate should also depend on expectations about the key ECB rates. While these cannot be directly observed, one can equate the prevailing interest rate expectations to the forward rates. In Chart B the spread between the one-month forward rate starting in one month and the main refinancing rate is used for quantifying interest rate change expectations.

Chart B: Relationship between rate change expectations¹⁾ and the overnight spread²⁾ – April 1999 to June 2003³⁾
(percentage points)



Sources: ECB and Reuters.

1) Spread between the one-month forward rate starting in one month and the ECB main refinancing rate.

2) Spread between the EONIA and the ECB main refinancing rate.

3) Only including those days on which at least one meeting of the Governing Council with a prescheduled press conference took place later in the same reserve maintenance period.

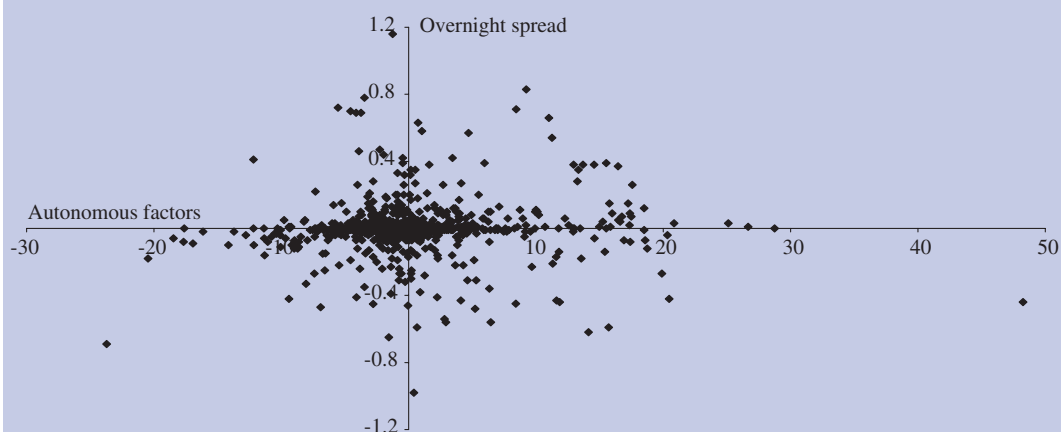
Chart B confirms that there is indeed a correlation between rate change expectations and the overnight spread. However, such a correlation is mainly observed for expectations of interest rate increases, i.e. when there is a positive forward spread, as can be seen in the upper right quadrant of Chart B. The rather vague correlation between expectations of interest rate decreases and the overnight spread (which is visible from the left half of Chart B) is likely to be related to the risk that underbidding may occur and result in tight liquidity conditions. The upward pressure on the spread resulting from the latter appears, in most circumstances, to have counterbalanced the downward pressure resulting from expectations of an interest rate reduction.

Finally, it is also of interest to study whether liquidity conditions before the end of the maintenance period affect the overnight rate. If the three assumptions given above are not too restrictive for the euro area, daily fluctuations of the autonomous liquidity factors prior to the last MRO in a maintenance period should not lead to significant movements in the overnight rate. Indeed, if such co-movements were to be observed, it would indicate that market participants require a premium for replacing current with future reserve holdings (and vice versa). However, it follows from Chart C that increases (and decreases) in the daily liquidity caused by changes in the autonomous factors have so far not led to systematic increases (or decreases) in the overnight spread, suggesting that the assumptions may be reasonable for the euro area. This does not mean that there is no limit in practice to the extent to which market participants are willing to replace current with future reserve holdings. For instance, if very large reserve deficits accumulate over several days, such as after the underbidding

episode in March 2003, this may, independently of the expectations about the accumulated liquidity conditions at the end of the maintenance period, lead to increases of the overnight spread.

Chart C: Daily changes of autonomous factors and daily changes of the overnight spread¹⁾ – April 1999 to June 2003

(x-axis: EUR billions; y-axis: percentage points)



Sources: ECB and Reuters.

1) Daily changes of the spread between the EONIA and the ECB main refinancing rate (in percentage points).

In conclusion, this box has shown that there are two main factors influencing the level of the overnight rate, namely expected liquidity conditions at the end of the maintenance period and expectations of future monetary policy changes. At the same time, in the past, daily fluctuations in liquidity prior to the last MRO in a maintenance period have not had significant influence on the overnight rate.

system, and short-term market rates within the current framework).

The combination of the three features described above and the presence of the minimum bid rate (or fixed tender rate) make the expectations of a change in the key ECB interest rates occurring within one or even two maintenance periods particularly relevant for credit institutions when these prepare their bids. Indeed, expectations of an interest rate change within the same reserve maintenance period have normally given rise to spreads (positive or negative) between the ECB's main refinancing rate and the corresponding money market rates, thereby providing credit institutions with arbitrage opportunities or disincentive to participate in the MROs. Consequently, credit institutions have, at times, submitted very low bids (underbidding) or high bids (overbidding, which has only occurred in the fixed rate tenders) in MROs.

Underbidding has generally occurred when short-term money market rates were below the minimum bid rate in the MRO, triggering an insufficient amount of bids immediately prior to the Governing Council meeting at which the monetary policy stance was discussed. This underbidding subsequently resulted in tight liquidity conditions and probably also affected market uncertainty of liquidity conditions for the remainder of the maintenance period (see Box). Short-term interest rates have tended to be driven up by the shortfall of liquidity and volatility in very short-term overnight interest rates has risen. Moreover, in situations where the key ECB rates were reduced, the temporary upward movement of the overnight rate associated with underbidding created a source of noise, at least temporarily, in the signalling of the monetary policy stance.

By contrast, overbidding in fixed rate tenders has generally occurred when, due to

expectations of an increase in interest rates, the short-term money market rates stood at a level clearly above the fixed tender rate, as was often the case in the second half of 1999 and the first half of 2000. In response, in June 2000 the ECB switched from fixed rate tender MROs to variable rate tenders with a minimum bid rate. Since this changeover, no further cases of overbidding have occurred.

Episodes of unbalanced bidding

The Eurosystem has experienced nine episodes of underbidding since January 1999. In all but one episode, the underbidding occurred in an environment of high expectations of an imminent reduction in the key ECB rates, of which there were eventually five. On several occasions underbidding in one MRO was followed by allotments in the remaining MROs of the reserve maintenance period, which did not allow credit institutions to compensate fully for the under-fulfilment of reserve requirements during the week after the underbidding occurred. Credit institutions faced the risk of running short of liquidity at the end of the maintenance period and had to take recourse to the marginal lending facility. All cases triggered significant temporary volatility in the short-term money market rates as indicated by the chart below, which addresses the six most recent episodes of underbidding and highlights their specific features (see also Table I for all episodes of underbidding).

The underbidding episode of 9 October 2001 took place in an environment of expectations of a reduction of the key ECB interest rates, as indicated by the level of the one-month forward rate starting in one month, which had fallen below the minimum bid rate level (see Panel (a) of the chart). As the liquidity deficit that consequently accumulated in the following week was only partially offset by the relatively high allotment in the subsequent MRO, credit institutions had to take substantial recourse to the marginal lending facility in order to fulfil their reserve requirements. Until the end of the

maintenance period, the overnight rate was driven substantially upward towards the marginal lending facility rate.

In the episode of 6 November 2001, despite the underbidding, the credit institutions did not have to resort to the marginal lending facility in order to fulfil their reserve requirements, mainly due to the allotment amounts in the remainder of the maintenance period and other liquidity factors. The overnight rate, which had edged upwards on the day of the announcement of the underbid MRO (T-2 in Panel (b) of the chart), returned to the minimum bid rate level a few days later. By contrast, in the episode of 3 March 2003, very large reserve deficits accumulated after the announcement of underbidding of €42 billion. The overnight rate remained above the former minimum bid rate, even after the expected decrease in interest rates had materialised (see Panel (e) of the chart). In order to facilitate liquidity management without generating a considerable difference between the sizes of the two outstanding MROs, the ECB decided the following week to conduct an additional MRO with a maturity of one week in parallel to the regular MRO. As a result, liquidity conditions were perceived as satisfactory and credit institutions only had to take a small net recourse to the marginal lending facility.

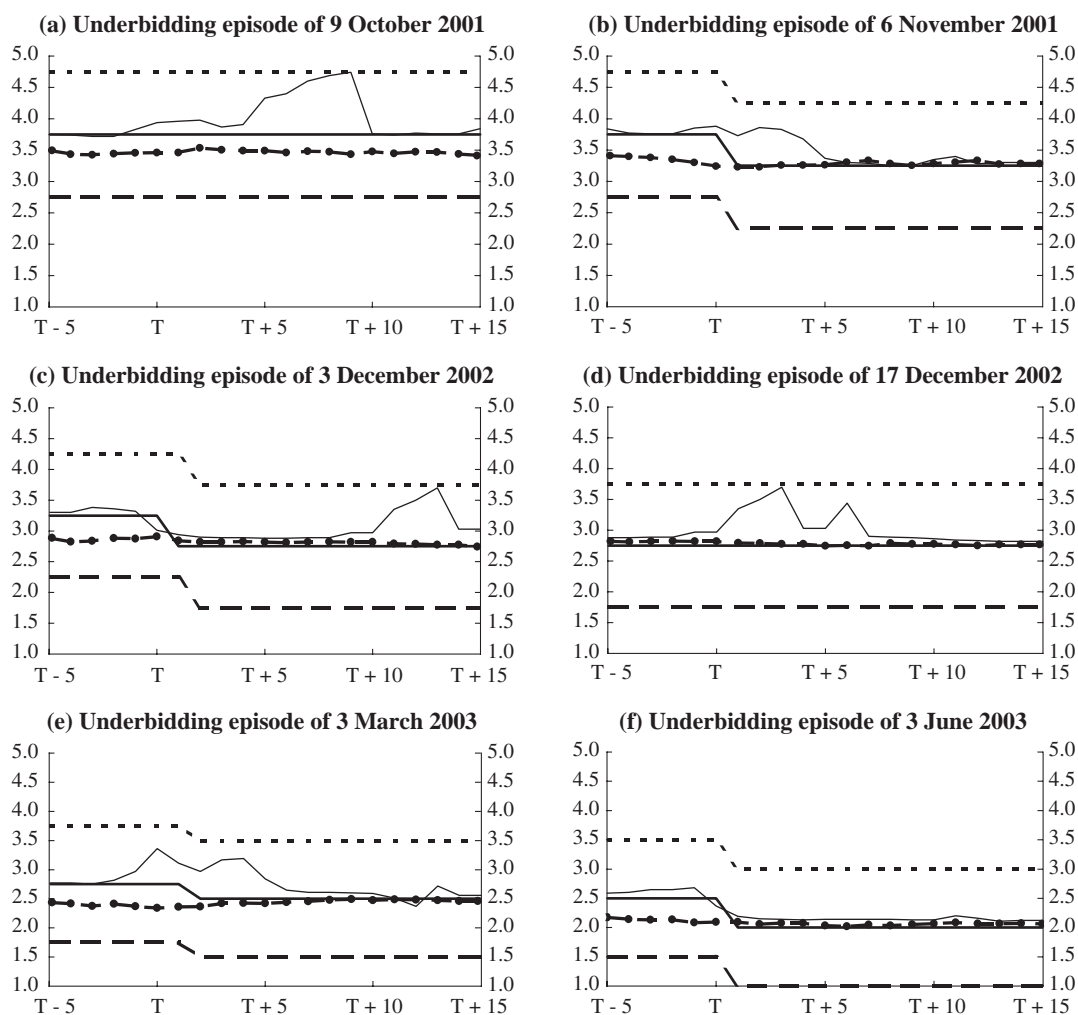
The underbidding episode of 3 December 2002 should be analysed in conjunction with the episode of 17 December 2002, as they both impacted on liquidity conditions in the same reserve maintenance period. While the episode of 3 December took place in an environment of expectations of interest rate reductions and entailed a fairly marginal underbidding amount, the one on 17 December 2002 appeared atypical insofar as it did not seem to be related to expectations of reductions in the key ECB interest rates (see Panels (c) and (d) of the chart). Indeed, the spread between the two-week swap rate and the tender rate was positive at the time of bid submission (see Table I). Anecdotal evidence suggests that underbidding on 17 December 2002 was related to the reluctance of credit institutions to participate

Chart

Overnight rates, key ECB interest rates and related spreads on the six most recent underbidding episodes

(percentages; time in days relative to settlement date T)

- overnight interest rate (EONIA)
- minimum bid rate in the main refinancing operations
- - - marginal lending rate
- - - deposit rate
- one-month/one-month forward rate (OIS based)¹⁾



Source: ECB.

1) The forward rate is derived from overnight indexed swaps, i.e. EONIA swaps, in which the fixed leg is exchanged against a variable leg. The variable leg is the result of the compounded EONIA.

in an MRO with maturity on 31 December, which was considered to be a particularly unattractive day for the settlement of the tender. This episode was even more atypical as it occurred in the last MRO of the maintenance period, implying that the related liquidity deficit could not be offset before the end of the maintenance period, unless a liquidity-providing fine-tuning operation was

conducted. Actually, on this specific occasion, the ECB conducted a fine-tuning refinancing operation on the settlement day of the underbid MRO with a view to reducing the liquidity shortage. The allotment amount reflected a balance between the ECB's aim to restore normal liquidity conditions, while at the same time preserving incentives for credit institutions to bid sufficiently in MROs.

Table I
Episodes of underbidding

(EUR billions)

Date of allotment of MRO	Bid volume (= actual allotment)	Allotment volume that would have allowed smooth fulfilment of reserve requirements ¹⁾	Underbidding amount	Spread between two-week swap rate and tender rate (in basis points) ²⁾	Number of days between the settlement day and the end of the maintenance period	Total net recourse to marginal lending facility ³⁾	Number of MROs after underbidding and until the end of the maintenance period
06/04/99	67	96	29		16	11.35	2
13/02/01	65	88	23	-1	9	71.71	1
10/04/01	25	53	28	-7	12	61.40	1
09/10/01	61	79	18	-3	13	24.73	1
06/11/01	38	66	28	-9	16	-2.74	2
03/12/02	112	116	4	-14	19	25.08	2
17/12/02	104	118	14	22	5	21.82	0
03/03/03	54	97	43	-4	19	1.89	2
03/06/03	72	92	20	-12	19	5.22	2

Source: ECB.

1) The benchmark allotment is calculated on the basis of the liquidity needs of the banking system arising from autonomous factors and minimum reserve requirements over the maintenance period (see the article entitled "The liquidity management of the ECB" in the May 2002 issue of the ECB's Monthly Bulletin).

2) Spread between the two-week rate at 9.15 a.m. on the allotment day and the key ECB interest rate (fixed rate or minimum rate).

3) Accumulated net recourse to the marginal lending facility for the period between the MRO and the end of the reserve maintenance period.

Finally, most recently, underbidding occurred on 3 June 2003. Again, underbidding took place in a environment of strong expectations of interest rate decreases, as indicated by the level of the one-month forward rate starting in one month compared with the ECB minimum bid rate level (see Panel (f) of the chart). As, however, underbidding turned out to be less significant than initially expected, overnight rates fell after the tender result was announced. Apart from the very end of the maintenance period, the overnight rate presented a pattern similar to that observed in the underbidding episode of 3 December 2002.

Overall, all these episodes show that no instrument is available to the Eurosystem to prevent the occasional tensions, which arise within the current framework. On the one hand, the ECB cannot immediately compensate for any shortfall in liquidity created by interest rate speculation and needs to preserve incentives for bidding. On the other hand, the resulting temporary volatility in money market rates is undesirable.

Turning now to overbidding, several episodes occurred in the period from mid-1999 to mid-2000, when the Eurosystem conducted the MROs through a fixed rate tender procedure in an environment of strong expectations of interest rate increases. Over that period, the allotment ratio reached extremely low levels, dropping to 0.87% on 31 May 2000. In addition to a general downward trend, this allotment ratio was volatile, implying that it was difficult for participants in the MROs to predict the amount of liquidity they would actually receive. During the overbidding period, when the corresponding market rates tended to be above the fixed tender rate, credit institutions faced difficulties in forecasting precisely the rather volatile allotment ratio and, accordingly, the risk of receiving significantly more or less liquidity in the tender than desired. Furthermore, some credit institutions most likely felt uncomfortable bidding for amounts which exceeded the collateral they had available. As the fixed rate tender system did not allow these issues to be addressed, these factors led the ECB to change the tender procedure to variable rate tenders.

3 The changes to the framework and their implementation

As previously mentioned, the changes to the framework for monetary policy implementation agreed by the Governing Council will align the start of the reserve maintenance period with the implementation of changes in the key ECB interest rates. This will also avoid a situation whereby an MRO overlaps with the subsequent maintenance period. This section briefly recalls how these measures should contribute to the stabilisation of the conditions in which bidding in MROs takes place by neutralising the impact of interest rate change speculation. It also reviews a series of more technical issues concerning the implementation of the changes.

The changes to the framework

The direct relationship between the start of the maintenance period, on the one hand, and the implementation of interest rate change decisions, on the other, will help remove expectations of changes in interest rates during the relevant maintenance period. Consequently, within a maintenance period, the overnight rate will normally no longer be affected by rate change expectations. Hence, the overnight rate will tend, due to the generally neutral liquidity management policy of the ECB, to remain close to the minimum bid rate.⁵ This should eventually prevent speculative considerations from disrupting the bidding of credit institutions in MROs. In addition, the spillover of interest rate expectations and liquidity conditions between maintenance periods should be eliminated.

In sum, these measures will (i) strongly reduce the likelihood of underbidding in periods of expectations of interest rate decreases and (ii) prevent overbidding in periods of expectations of interest rate increases even in the case of fixed rate tenders. The measures will also prevent short-term market rates and the MRO tender rates from increasing significantly above the minimum bid rate of variable rate tenders, which could potentially be a source of noise

for the signalling of the monetary policy stance.

Implementation issues

In practical terms, the implementation of the changes to the framework for the conduct of monetary policy will have a bearing on several other features of the current set-up of the Eurosystem's operational framework. In addition to reviewing these features, the timing of the phasing-in of the changes and the new timing of LTROs are addressed below.

Instead of starting and ending on fixed calendar days, the reserve maintenance period will start and end on different calendar days throughout the year. The tender calendar will depend on the calendar of Governing Council meetings. Furthermore, the maintenance periods will no longer last one calendar month, but will instead vary in length. For instance, taking 2004 as an example, the duration of maintenance periods will range from 28 to 46 days (see Table 2). In this context, it should be noted that a particularly long maintenance period was already experienced by credit institutions in 1999, when the first maintenance period after the start of Economic and Monetary Union had a duration of 54 days.

Two further effects of the new timing of the reserve maintenance period should also be mentioned. First, the new timing will ensure that the reserve maintenance period always starts on TARGET operating days, i.e. days when the payment system TARGET is operating, as MROs are always settled on such days. At the same time, reserve maintenance periods ending on non-TARGET days will be rare since they would occur only if an MRO were settled just after a non-TARGET day and would therefore

⁵ For a further detailed discussion of this issue, see the article entitled "The liquidity management of the ECB" in the May 2002 issue of the ECB's Monthly Bulletin.

Table 2
Indicative maintenance period calendar for 2004

Date of relevant Governing Council meeting	Start of maintenance period	End of maintenance period	Reserve base data for credit institutions reporting monthly	Reserve base data for credit institutions reporting quarterly	Length in days of the maintenance period
-	24 January 2004	9 March 2004	December 2003	September 2003	46
4 March 2004	10 March 2004	6 April 2004	January 2004	December 2003	28
1 April 2004	7 April 2004	11 May 2004	February 2004	December 2003	35
6 May 2004	12 May 2004	8 June 2004	March 2004	December 2003	28
3 June 2004	9 June 2004	6 July 2004	April 2004	March 2004	28
1 July 2004	7 July 2004	10 August 2004	May 2004	March 2004	35
5 August 2004	11 August 2004	7 September 2004	June 2004	March 2004	28
2 September 2004	8 September 2004	11 October 2004	July 2004	June 2004	34
7 October 2004	12 October 2004	8 November 2004	August 2004	June 2004	28
4 November 2004	9 November 2004	7 December 2004	September 2004	June 2004	29
2 December 2004	8 December 2004	19 January 2005	October 2004	September 2004	43

require a very atypical calendar. Moreover, maintenance periods will no longer start and will rarely end on a weekend, thus practically eliminating the occasional occurrence of days at the beginning and end of maintenance periods on which reserve holdings of, or the use of standing facilities by, credit institutions cannot be adjusted. Second, the last MRO of the maintenance period will always be settled six days prior to the end of the maintenance period, a period longer than the current average of around half a week. All things being equal, this extension implies, on average, a higher risk of accumulated forecasting errors by the ECB at the end of the reserve maintenance period. In this respect, it should be stressed that the Eurosystem has embarked upon a continuing process of improving the predictability of autonomous liquidity factors. Ultimately, of course, fine-tuning operations will always be available to the ECB to cope with extreme cases of unbalanced liquidity conditions.

For the sake of clarity and in order to help credit institutions prepare the timely management of their reserves, the ECB will publish a maintenance period calendar together with the indicative tender calendar, on a yearly basis and three months before the start of the relevant year.

In terms of the calculation of the reserve base, i.e. the sum of the liabilities which constitute the basis for calculating the reserve requirement of a credit institution, it should be noted that the gap between the date on which the reserve base is calculated, i.e. the last day of the month, and the start of the relevant reserve maintenance period will continue to be at least as long as it is at present. For credit institutions reporting on a monthly and quarterly basis, there will be a full month and a two-month gap, respectively, between the month on which the reserve base is calculated and the month on which the reserve maintenance starts. For instance, for a credit institution reporting on a monthly basis, the reserve requirement for a maintenance period starting in April would be calculated using the reserve base data from the end of February. In the case of credit institutions reporting on a quarterly basis, the reserve requirement for maintenance periods in June, July and August would be calculated using the reserve base data from the end of March (see Table 2).⁶

⁶ For background information on the calculation of these requirements, see "The single monetary policy in the euro area – General Documentation on Eurosystem monetary policy instruments and procedures", ECB, April 2002.

As a result of the implied discontinuation of overlap between two MROs, the average allotment amount in MROs will approximately double in order to allot, in each future MRO, the amount which is currently allotted in two operations. Although this does not imply a change in the total amount of collateral to be used by credit institutions, the weekly turnover of collateral will be higher. To address the operational and settlement issues associated with the higher weekly turnover, there might be a need for some credit institutions to review their strategies of refinancing and to optimise the use of collateral. Overall, however, the liquidity management of credit institutions is facilitated by the discontinuation of the overlap between MROs, which will allow liquidity to be managed in closed weekly cycles.

Finally, the supporting legal and technical documentation will be amended to reflect the changes agreed by the Governing Council of the ECB. The legal and technical documentation encompasses the following: the Regulation of the European Central Bank of 1 December 1998 on the application of minimum reserves (ECB/1998/15) as amended, the document entitled "The single monetary policy in the euro area – General documentation on Eurosystem monetary policy instruments and procedures" (April 2002) and its subsequent transposition into the national legislation of the euro area countries.

4 Conclusions

It is generally recognised that the operational framework for the monetary policy of the Eurosystem has been functioning well since the launch of the euro in 1999, providing stable money market conditions with low volatility of short-term interest rates and a clear signalling of the monetary policy stance. The framework has also been robust when faced with a series of unforeseen developments, showing a high degree of flexibility. In general, there have only been few cases of tensions. Notably, in periods of

Given the lead-times required to revise the underlying legal documentation and transpose it into national legislation, and to carry out the necessary adaptation of the information systems which support the implementation of monetary policy, the two agreed measures are scheduled to come into effect in March 2004. To phase in the new definition of reserve maintenance periods, a transitory extended maintenance period will start on 24 January and end on 9 March 2004. Reserve requirements for the transitory maintenance period will be calculated using the reserve data as at 31 December 2003. The reserve base as at 30 September 2003 will be used for credit institutions reporting on a quarterly basis. On 9 March 2004, the first one-week MRO will be allotted and the first reserve maintenance period, being defined fully in accordance with the amended framework, will start on 10 March 2004.

In addition, in order to minimise disruption to the current timetable of LTROs, the link between the maintenance period and LTRO allotment days will be discontinued. Currently, LTROs are allotted on the first Wednesday of each reserve maintenance period. From 26 February 2004 onwards, LTROs will normally be allotted on the last Wednesday before the end of the month, with the exception of December. The schedule of MROs and LTROs will, as in the past, be announced at least three months before the start of the relevant calendar year.

high expectations of imminent changes in the key ECB interest rates, interest rate speculation has resulted in large demand fluctuations in the MROs accompanied by high temporary money market volatility.

In reaction to these occasional disturbances, the Governing Council of the ECB decided in January 2003 to implement two changes to the Eurosystem's operational framework, with effect from March 2004, also taking account of the feedback from a public

consultation on the issue. First, the start of reserve maintenance periods will be aligned with the implementation of changes in the key ECB rates. Second, the maturity of the MROs will be shortened from two weeks to one. The primary objective of these measures is to limit the impact of interest rate speculation on very short-term money market conditions during a maintenance period and hence to contribute to the

stabilisation of the environment in which bidding in MROs takes place. The measures should thus further enhance the efficiency of the operational framework by significantly reducing occurrences of high volatility in short-term money market rates and thereby further support the signalling of the monetary policy stance provided by the minimum bid rate in the MROs.