



# THE EUROSISTEM'S EXPERIENCE WITH FINE-TUNING OPERATIONS AT THE END OF THE RESERVE MAINTENANCE PERIOD

*Following the changes to the Eurosystem's operational framework for the implementation of monetary policy in March 2004, the average time span between the last main refinancing operation of a reserve maintenance period and the last day of that period has increased. A side effect of this measure was the occasional occurrence of large liquidity imbalances at the end of maintenance periods. Since autumn 2004, the ECB has been counteracting these imbalances more actively by conducting fine-tuning operations at the end of maintenance periods. This article describes the aim and functioning of these fine-tuning operations and gives a first assessment of their stabilising effect on short-term money market interest rates. It also provides evidence that conducting fine-tuning operations at the end of the reserve maintenance period has led to lower fluctuations in short-term interest rates and, at the same time, to less use of standing facilities on the last day of the maintenance period. Furthermore, it analyses the factors behind counterparties' individual bidding behaviour by studying their decision to participate in the end-of-period fine-tuning operations. Finally, the role of fine-tuning operations in the reduction of spreads between short-term money market rates and the minimum bid rate is discussed.*

## I INTRODUCTION

Fine-tuning operations are one type of open market operation available to the Eurosystem in its operational framework, but they are not a regular tool for the provision or absorption of liquidity to the market. They are conducted when needed. While main refinancing operations (MROs) and, to a lesser extent, longer-term refinancing operations (LTROs) are used for the systematic provision of liquidity to the banking sector, fine-tuning operations are used for different purposes and in a more flexible way. Under very specific circumstances, the aim of fine-tuning operations is to “manage the liquidity situation in the market and to steer interest rates, in particular in order to smooth the effects on interest rates caused by unexpected liquidity fluctuations in the market”.<sup>1</sup> In order to allow for a rapid reaction, the maturity and the frequency of the fine-tuning operations are not standardised, but can be adapted in a flexible manner to any particular situation. Usually, they are conducted via a quick tender, which is executed within 90 minutes from the announcement of the operation. Given that these tenders need to be executed quickly, only a limited number of banks can participate in fine-tuning operations. National central banks (NCBs) select the counterparties on the basis of a number of quantitative criteria and an assessment of their participation in the money

market. Currently, 129 counterparties are eligible for fine-tuning operations.

Between January 1999 and September 2006, 29 fine-tuning operations were conducted, of which seven before autumn 2004 were on an irregular basis. These were mostly related to specific events and aimed, for example, to mitigate disturbances in the money market in the aftermath of the terrorist attacks in September 2001, or to prevent potential tensions in liquidity conditions related to the cash changeover in January 2002. Since autumn 2004, fine-tuning operations have been more frequently conducted on the last day of a maintenance period. This article focuses on the latter type of operation. Section 2 explains the rationale for conducting fine-tuning operations at the end of reserve maintenance periods, while Section 3 analyses counterparties' participation in these operations. An assessment based on the experience gained in the last one and a half years is given in Section 4, and Section 5 contains some concluding remarks.

<sup>1</sup> ECB: “The implementation of monetary policy in the euro area: General documentation on Eurosystem monetary policy instruments and procedures”, September 2006.

## 2 FINE-TUNING OPERATIONS CONDUCTED AT THE END OF A RESERVE MAINTENANCE PERIOD

In March 2004 the operational framework of the Eurosystem underwent a number of changes. One modification concerned the timing of events during a reserve maintenance period: prior to the reform, the reserve maintenance period ended always on the 23rd of each calendar month, i.e., on varying days of the week. At the same time, MROs were conducted on a weekly basis, usually on Tuesdays. As a consequence, the number of days between the last MRO allotment and the last day of a maintenance period varied between one and six business days. Within the new framework, MROs are still conducted on Tuesdays, but the maintenance period now ends in the week following a meeting of the Governing Council, usually on a Tuesday.

This change implies that the time span between the last allotment and the end of the maintenance period has increased from four business days on average to six business days. As a result, during this longer period, larger liquidity imbalances, resulting mainly from errors in the Eurosystem's forecast of the autonomous liquidity factors, can build up in the banking sector (see box). If anticipated by the market, such imbalances – whether they are on the loose or on the tight side – may lead to strong reactions in market interest rates, especially on the last days of the reserve maintenance period, when banks need to manage their reserve holdings carefully in order to fulfil reserve requirements. Indeed, in the months after the changes to the framework, occasional large spikes in market rates on the last days of the maintenance period were observed. At the same time, these spikes may have led to an increase in the spreads observed between the marginal tender rate and the minimum bid rate, and the EONIA (euro overnight index average) and the minimum bid rate, respectively. For instance, while the marginal tender rate had been equal to the minimum bid rate in the first months after the changes to the framework were implemented, it slowly increased during the second half of 2004 before temporarily

stabilising at around 5 basis points above the minimum bid rate in early 2005.

With the changes to the operational framework in March 2004, the occasional spikes in short-term money market rates, which had previously largely been limited to the last day of the maintenance period, began to affect earlier days in the last week of the maintenance period. This broadening of the spike at the end of the maintenance period led the ECB to consider conducting fine-tuning operations on the last day of maintenance periods. Alternative measures, such as improving the quality of liquidity forecasts, were not considered feasible at that point in time. Consequently, since late 2004, the ECB has been conducting fine-tuning operations more often with the aim of establishing balanced liquidity conditions on the last day of the reserve maintenance period.

Fine-tuning operations can either be liquidity-providing or liquidity-absorbing. Liquidity-providing operations are usually conducted via variable rate tenders with a minimum bid rate equal to the one applied in the main refinancing operations. Liquidity-absorbing operations, on the other hand, are usually conducted as a fixed rate tender in which counterparties can bid to deposit money with the Eurosystem. The money deposited is then remunerated at the minimum bid rate. The maturity of both liquidity-providing and liquidity-absorbing operations has, in all cases, been one day: the last day of the reserve maintenance period.

Given an unbiased forecast for the evolution of autonomous factors, the resulting balanced liquidity conditions should lead to an overnight interest rate close to the middle of the corridor set by the ECB's standing facility rates, which, for a symmetric corridor, would be equal to the minimum bid rate.<sup>2</sup> Moreover, the conduct of fine-tuning operations, if anticipated by market participants, should not only affect market rates on the date of the operations, but should be able

2 See, for instance, G. Pérez Quirós and H. Rodríguez Mendizábal, "The Daily Market for Funds in Europe: What Has Changed with the EMU?", *Journal of Money, Credit and Banking* 38(1), 91-118, 2006.

to stabilise rates throughout the preceding week: when market participants trust the ECB to re-establish balanced liquidity conditions on the last day of the maintenance period, they can expect an EONIA close to the middle of the corridor set by the two standing facilities on that day. With this confidence, one can expect interest rates to be already at this level on the days prior to the operation. Thus, the conduct of fine-tuning operations should help to avoid

large swings in market rates also on the days preceding the end of the maintenance period and indeed throughout the entire maintenance period.

### 3 PARTICIPATION IN FINE-TUNING OPERATIONS

Of the 20 fine-tuning operations conducted at the end of a maintenance period between

#### Box

#### LIQUIDITY SUPPLY AND FORECAST ERRORS

The ECB regularly satisfies the bulk of the banking sector's liquidity needs via its main refinancing operations. These tenders, which are conducted once a week, have a maturity of one week and currently a size of around €300 billion.<sup>1</sup>

On the allotment day, the ECB calculates and publishes the benchmark allotment based on a forecast of the average liquidity needs of the banking sector. The benchmark allotment is defined as the amount of liquidity that is expected to allow banks to smoothly fulfil their reserve requirements<sup>2</sup> until the settlement of the next MRO, assuming an aggregate zero net recourse to the standing facilities. Banks' liquidity demand can be broken down into autonomous factors (e.g. banknotes in circulation and government deposits with the central bank), reserve requirements and excess reserves (current account holdings in excess of reserve requirements).<sup>3</sup> While reserve requirements normally remain unchanged until the end of a maintenance period, developments in autonomous factors and excess reserves prior to the next MRO allotment need to be forecast.

In the days following the MRO allotment, autonomous factors and excess reserves may indeed develop differently from their forecast values. The most common reasons for forecast revisions are unforeseen developments in banknotes in circulation and government deposits with the central bank. As a result, liquidity imbalances can build up in the banking sector, leading to either loose or tight liquidity conditions.

The increase in the number of days between the last MRO allotment and the end of the maintenance period that resulted from the revision of the Eurosystem's operational framework in March 2004 inevitably led to an increase in the accumulation of forecast errors. The standard deviation of accumulated errors increased from €5.5 billion for a forecast horizon of four business days to €9.2 billion for six business days (see chart). Consequently, the probability of ending the maintenance period with sizeable liquidity imbalances – and therefore possibly

1 Additionally, LTROs currently for a total amount of €120 billion with a maturity of three months are conducted on a monthly basis.

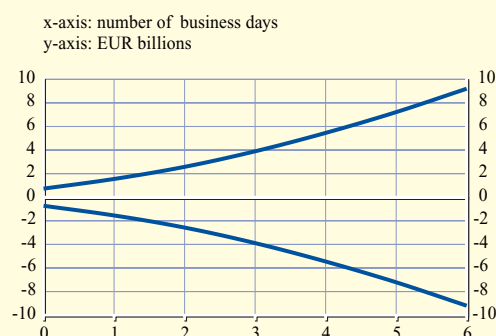
2 The Eurosystem's minimum reserve system enables counterparties to make use of averaging provisions, as compliance with reserve requirements is determined on the basis of the average of the end-of-calendar day balances on counterparties' reserve accounts over a maintenance period. The averaging provision gives institutions the possibility to adjust to liquidity shocks within the maintenance period, thereby stabilising money market interest rates.

3 See also Box 3 entitled "Excess reserves and the ECB's implementation of monetary policy" in the October 2005 issue of the Monthly Bulletin.

spikes in short-term money market interest rates – increased.

A fine-tuning operation conducted on the last day of the period is able to correct, at least to a large extent, the liquidity imbalances. The fine-tuning operation is based on updated figures for the evolution of autonomous factors and excess reserves that the ECB receives just prior to the operation.<sup>3</sup> These figures are usually quite accurate, since the uncertainty about their evolution only concerns one day. Indeed, the standard deviation for one-day forecast errors of autonomous liquidity factors is only €0.7 billion (see chart).

**Chart Standard deviation of accumulated forecast errors for autonomous factors**



Source: ECB.

November 2004 and September 2006, seven were liquidity-providing and thirteen were liquidity-absorbing (see Table 1). Only three maintenance periods ended without a fine-tuning operation.

On average, 31 counterparties submitted bids in liquidity-providing operations. The average size of each liquidity-providing operation was €9.43 billion and the ECB was successful in allotting the intended amount. The bid-to-cover ratio in these operations, i.e. the ratio between submitted bids and allotted volumes, was 4.5. This is much higher than the bid-to-cover ratio observed in the ECB's main refinancing operations, which on average was only 1.27 in the same period. The marginal and weighted

average tender rates were on average 5 and 6 basis points respectively above the minimum bid rate. These tender rates often diverged from the tender rates observed in the preceding MRO allotments, however, on average they were of the same magnitude as the MRO tender rates.

In the liquidity-absorbing operations, the bid rate equalled the minimum bid rate, which ranged from 2% to 3% in the relevant period. On average, the ECB intended to drain €9.08 billion. In eight of these operations, the ECB was able to drain the intended amount. In the other five operations, there was some underbidding, i.e. the total bid amount submitted by counterparties, and thus the drained amount, was lower than the volume that the ECB had

**Table 1 Summary of end-of-period fine-tuning operations**

Operation type	Tender type	Number of operations	Average intended volume <sup>1)</sup>	Average total bid amount <sup>1)</sup>	Average allotted amount <sup>1)</sup>	Average bid-to-cover ratio	Average proportion of bids allotted	Average number of participating counterparties
Liquidity-providing	Variable rate	7	9.43	33.67	9.43	4.49	26.00%	31
Liquidity-absorbing	Fixed rate	13	-9.08	-11.33	-8.10	1.22	82.80%	12

Source: ECB.

Note: Data refer to the period November 2004-September 2006. Negative signs refer to liquidity drains.

1) In EUR billions.

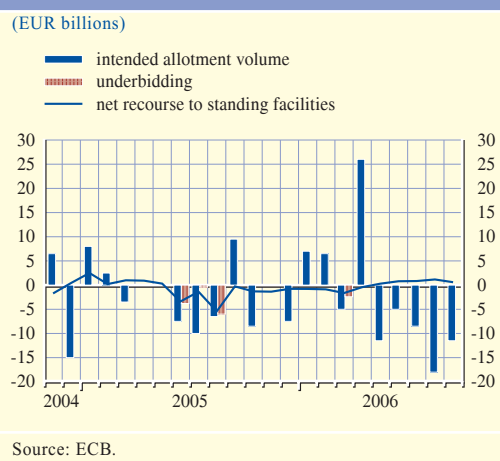
been intending to drain (see also Chart 1). Three cases of more severe underbidding were observed in June 2005, August 2005 and March 2006. The more subdued bidding in liquidity-absorbing operations is also reflected in a rather low bid-to-cover ratio of 1.22 and a low number of bidders (12), both of which are significantly lower than in liquidity-providing operations.

### UNDERBIDDING

It is not a coincidence that all cases of underbidding occurred in liquidity-absorbing operations. The fixed rate applied in these tenders – the minimum bid rate – lies in the middle of the corridor set by the two standing facilities and thus coincides with the hypothetical value of liquidity when the probability of having recourse to either facility is 50% and is equally costly. Counterparties may, however, value the possibility of ending the maintenance period with a liquidity surplus or deficit slightly differently, for instance because they face different costs in the two cases. On the one hand, a liquidity surplus will induce them to deposit the excess liquidity at the deposit facility. On the other hand, a liquidity deficit leads to a use of the marginal lending facility, or to non-compliance with reserve requirements, which incurs a penalty. In this case, the market's valuation of liquidity may exceed the minimum bid rate and counterparties may decide not to deposit the entire amount of excess liquidity with the Eurosystem.

At the same time, market conditions play an important part in a counterparty's decision to participate in liquidity-absorbing fine-tuning operations. When the market perceives liquidity conditions to be ample, there is pressure for the overnight rate to drop to levels below the minimum bid rate. In this case, it is worthwhile for market participants to deposit their excess liquidity with the Eurosystem via the fine-tuning operation, because the remuneration at the minimum bid rate is better than the one they can obtain in the money market. This is not the case when market rates are at the same level as,

Chart 1 Allotment in fine-tuning operations and the use of standing facilities



or even exceed, the minimum bid rate. Indeed, the bid-to-cover ratio tends to be higher for lower levels of the spread between the overnight rate and the minimum bid rate on the morning of the fine-tuning operation.

Underbidding may also occur when market participants have a perception of tighter liquidity conditions than were estimated by the ECB. This can happen, for instance, when the ECB expects a reduction in liquidity-absorbing autonomous factors on the last day of the maintenance period (such an expectation is not directly visible to the market and is reflected only in the published average value for the entire week). Similarly, a wrong perception of tight liquidity conditions could arise when liquidity is distributed unevenly across market participants. If that were the case, a liquidity absorption of the full amount in the fine-tuning operation would lead to a net recourse to the marginal lending facility on the last day. If, however, liquidity were evenly distributed, the amount of liquidity that was not absorbed because of underbidding would be reflected in a net use of the deposit facility. Indeed, the positive relationship between the use of standing facilities and the amount of underbidding is quite strong; on average, these two variables differ only by €200 million. Chart 1 indicates that in fact any net recourse to the deposit

facility (indicated by a negative net recourse to standing facilities) of more than €1 billion was related to an episode of underbidding.

### DRIVERS OF PARTICIPATION IN FINE-TUNING OPERATIONS

While 129 counterparties are currently eligible to participate in the ECB's fine-tuning operations, on average only 19 banks participated in the end-of-period fine-tuning operations. Almost half of all the institutions that were eligible during the period under review never participated in a fine-tuning operation conducted during that period. On average, eligible counterparties participated less than twice.

Generally, the participation of banks is positively correlated with their size in both types of operations, indicating that larger banks tend to bid more often than smaller ones. Indeed, 20% of the largest banks bid, on average, more than three times as often as 50% of the smallest counterparties. This finding reflects the fact that larger banks tend to be more active in the interbank market.

Another possible reason for participating in fine-tuning operations is a counterparty's

individual reserve deficit on the penultimate day of the maintenance period. However, somewhat surprisingly, the percentage of reserve fulfilment does not seem to play a role in the decision to bid in the tender.

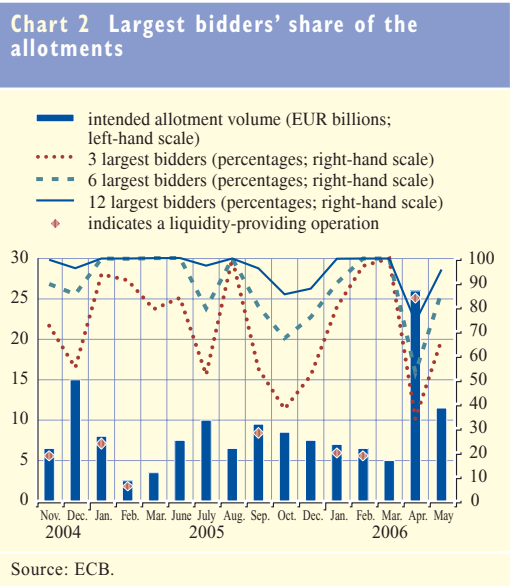
Of all the participating counterparties, on average the three largest bidders accounted for 72% of the volume allotted in the operations, the six largest bidders for 88%, and the 12 largest bidders for 96%. Chart 2 shows that the concentration of bids was especially high whenever the allotment volume – be it liquidity-absorbing or providing – was low. This could indicate that counterparties decided to take the initiative to bid only when they expected to receive an allotment above a certain size, possibly because of costs related to the submission of bids.

Overall, the main factor behind participation in the end-of-period fine-tuning operations seems to be the counterparties' role in the interbank market rather than their individual liquidity position at the moment of the operation.

## 4 INITIAL ASSESSMENT

### USE OF STANDING FACILITIES

As discussed in Section 2, the aim of end-of-period fine-tuning operations is to establish balanced liquidity conditions and to stabilise short-term interest rates at the end of the maintenance period. By definition, when liquidity conditions are balanced, there should be no shortage or surplus of liquidity in the markets. Any surplus or shortage of liquidity at the level of the aggregate banking sector should be reflected in the use of one of the ECB's standing facilities on the last day of the reserve maintenance period. Table 2 shows how, since November 2004, the use of standing facilities on this day has fallen: the net recourse to the facilities in absolute terms has decreased from €4.2 billion to €1.2 billion. While the use of the deposit facility has remained rather stable, the overall reduction has mainly been caused by the



**Table 2 Average use of standing facilities on the last day of the maintenance period**

(EUR billions)				
Period	Marginal lending facility (A)	Deposit facility (B)	Net recourse to standing facilities <sup>1)</sup>	Net recourse in absolute terms <sup>2)</sup>
Apr.-Oct. 2004	3.5	1.6	1.9	4.2
Nov. 2004-Sep. 2006	1.0	1.4	-0.4	1.2

Source: ECB.

1) Average of [(A)-(B)].

2) Average of absolute value of [(A)-(B)].

lower recourse to the marginal lending facility, which used to be, on average, more than twice the average use of the deposit facility.

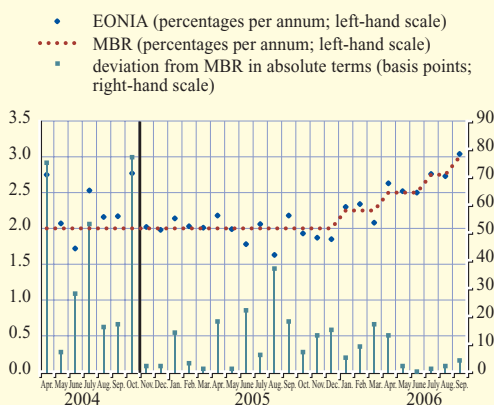
### IMPACT ON SHORT-TERM MONEY MARKET INTEREST RATES

The impact on rates of having more numerous end-of-period fine-tuning operations is noteworthy. The occasional large spikes in the EONIA spread that occurred on the last day of a maintenance period have been reduced substantially. Chart 3 plots the time-series of the minimum bid rate and the EONIA since March 2004 using data for the last day of each maintenance period only. The difference in absolute terms between the two – the EONIA spread – is also displayed. This sequence illustrates the success, so far, of conducting fine-tuning operations at the end of maintenance

periods. On the left-hand side of the vertical line, the occasional large spikes in the EONIA spread, which occurred on the last day of a maintenance period before fine-tuning operations were conducted, are displayed. On four occasions the deviations from the minimum bid rate were larger than 25 basis points, and on three of these occasions they were even above 50 basis points. Since November 2004, the frequency of these spikes has been substantially reduced: only on one occasion did the EONIA spread exceed 25 basis points. This was one of the days on which underbidding in a liquidity-absorbing operation was rather severe and the EONIA fell because of the large liquidity surplus that was left in the market.

The evolution of the standard deviation of daily changes in the EONIA gives a similar picture. Chart 4 illustrates how the more frequent conduct of end-of-maintenance period fine-tuning operations had a striking effect on the day-to-day volatility of the EONIA: the average standard deviation for the days after the last MRO (measured on a day-to-day basis) was reduced from more than 12 to 3.2 basis points. Even though there was a slight increase in the standard deviation for all other weeks (from 1 to 1.4 basis points), the overall effect on the volatility of the entire maintenance period was reflected in a reduction in the standard deviation from 4 to 3.2 basis points.

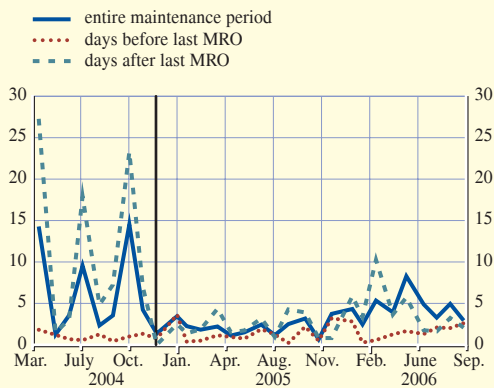
Chart 5 shows the average evolution of the EONIA spread, i.e. the difference between the EONIA and the minimum bid rate, over the course of the last seven calendar days of each maintenance period. Conducting fine-tuning

**Chart 3 Fluctuations of the EONIA around the minimum bid rate (MBR) on the last day of the maintenance period**

Source: ECB.

**Chart 4 EONIA standard deviation per maintenance period**

(basis points; on a day-to-day basis)



Source: ECB.

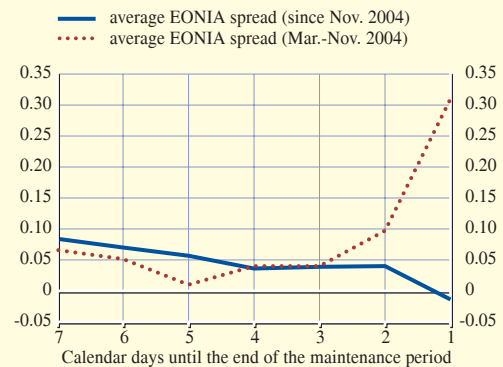
operations had a strong effect on the very last day of the maintenance period, reducing the EONIA's average deviation from the minimum bid rate from 31 basis points to 1 basis point. There is also a small reduction in the spread on the penultimate day, although no stabilising effect can be seen for more than two calendar days ahead of the end of the maintenance period.

#### EVOLUTION OF INTEREST RATE SPREADS

During the first half of 2005, the spreads between short-term money market rates and the minimum bid rate stabilised. This situation most likely reflected both the more frequent fine-tuning operations and the ECB's liquidity policy of allotting more than the benchmark amount in the MROs in the period October 2004-February 2005. This is illustrated by Chart 6, which displays the time series of the EONIA spread, as well as the spread between the one-week repo rate and the minimum bid rate. Since the beginning of 2005, the upward trend in both spreads has halted. However, towards the end of 2005 the spreads widened again, even though spikes in interest rates were largely avoided. The causes of the widening spreads at that point in time thus seemed to be unrelated to the liquidity situation at the end of maintenance periods and, consequently, the

**Chart 5 Average EONIA spread during the last week of a maintenance period**

(percentage points)



Source: ECB.

ECB resorted to additional measures for countering the spreads. In the period May-September 2006, the ECB allotted more than the published benchmark amount in all MROs, including the last one in each maintenance period. This measure has indeed led to continued progress in countering the elevated spread between money market rates and the minimum bid rate.

Moreover, this measure temporarily changed the role of fine-tuning operations. Allotting more than the benchmark amount in the last MRO of a maintenance period implied a targeted liquidity surplus during the last week of the period. Given that the ECB still aimed to achieve balanced liquidity conditions on the last day, it implied with a high likelihood a liquidity-absorbing fine-tuning operation on the last day of the maintenance period. Indeed, from May to September 2006, all of the fine-tuning operations were liquidity-absorbing (see also Chart 1).

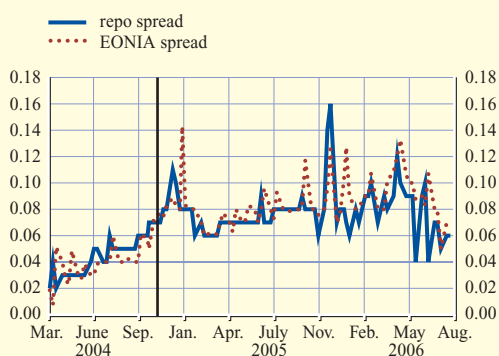
#### 5 CONCLUSION

Since autumn 2004, the ECB has been conducting fine-tuning operations more frequently in order to establish balanced liquidity conditions at the end of reserve maintenance periods.



**Chart 6 Weekly averages of EONIA spread and one-week repo rate spread<sup>1)</sup>**

(percentage points)



Sources: Reuters and ECB.

1) Data excludes figures for the last week of the maintenance period.

The analysis indicates that this measure was generally successful in stabilising interest rates on the last days of maintenance periods. In fact, large spikes in market overnight rates towards the end of the maintenance period were largely avoided. Moreover, the day-to-day volatility of the EONIA was visibly reduced. The more frequent conduct of fine-tuning operations had its main stabilising effect on the last two days of a period; this effect was only very small on preceding days. Therefore, the aim of stabilising short-term money market rates towards the end of maintenance periods was clearly achieved.

At the same time, the spreads between short-term money market rates and the minimum bid rate temporarily stabilised. Nevertheless, when other factors contributed to an increase in spreads at the end of 2005, the ECB had to take further measures to reduce them.