

# The liquidity management of the Eurosystem during the period of financial turmoil

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## Introduction

The Eurosystem has regularly faced very strong demand for liquidity from the euro area banking sector since 9 August 2007, after the tension on the American sub-prime mortgage market spread to other market segments and other economic regions. This article describes the way in which the Eurosystem responded to this increased demand for liquidity via its open market operations. In so doing, it discusses the liquidity management during the period between 8 August and 13 November – the last day of the tenth reserve maintenance period in 2007, which is also the cut-off date for the information used in this article – thus raising the question whether the supply of additional liquidity during that period plays any role in signalling the monetary policy stance. Supplying extra liquidity for the market could in fact be seen as a factor encouraging money creation and therefore indicating an easing of monetary policy.

Nevertheless, the Eurosystem's monetary policy stance is clearly determined by the level of the key interest rates, and more specifically the minimum bid rate applied to the main refinancing operations: these are weekly open market operations which, as will become apparent, generally cover most of the liquidity needs of the resident banking sector. Since that rate remained unchanged during the period considered, the monetary policy stance also remained the same. The operational framework used to implement monetary policy is designed to adjust the liquidity supply to demand, so that the very short-term

interest rates on the money market settle down at levels close to the minimum bid rate. That therefore maximises the signalling function on the monetary policy stance. This implies that the Eurosystem conducts an interest rate policy in which both the liquidity supply and the structure of its balance sheet become endogenous, and therefore cease to provide information on the monetary policy stance. The central banks of other industrialised countries with well-developed financial markets have also opted to conduct an interest rate policy. Another article in this Economic Review explains why it is usual to adopt an interest rate policy, and how that choice affects the interpretation of central bank balance sheets<sup>(1)</sup>.

The article is structured as follows. The first section deals with the Eurosystem's key interest rates. The second section discusses the Eurosystem's liquidity management under normal circumstances. The third section explains how the Eurosystem managed the liquidity situation during the period from the beginning of August to mid November 2007, in the context of the turbulence on the money market. The final section summarises the main conclusions.

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(1) Aucremanne L., J. Boeckx and O. Vergote (2007), Interest rate policy or monetary base policy: implications for a central bank's balance sheet, Economic Review of the National Bank of Belgium, III, 17-26.

## 1. The Eurosystem's key rates

At the start of each month, the ECB Governing Council discusses the monetary policy stance to be adopted. For that purpose, it conducts a structured analysis of all the relevant economic information at its disposal. On the basis of that economic and monetary analysis, it systematically considers the risks to price stability and consequently determines the key interest rates of the Eurosystem<sup>(1)</sup>.

The ECB Governing Council indicates the monetary policy stance by setting the minimum bid rate for the main refinancing operations. In 2007, that rate was raised from 3.5 to 3.75 p.c. in March, before being increased again to 4 p.c. in June. While a further tightening of monetary policy was widely expected in the early summer – as the Governing Council had hinted at that in its communication –, this expectation faded during August. Subsequently, the Governing Council effectively kept the minimum bid rate unchanged after each of its monthly discussions. On each occasion it stated that, in view of the increased uncertainty, it would need to obtain additional information before drawing further conclusions for monetary policy.

The other two key rates of the Eurosystem form a symmetrical corridor of 100 basis points on either side of the minimum bid rate. The rate of the marginal lending facility, which enables banks facing unexpected liquidity needs to obtain overnight credit backed by eligible assets, has stood at 5 p.c. since June 2007, whereas the rate of the deposit facility, which offers banks the opportunity to deposit surplus liquidity overnight, has been 3 p.c. since then. The overnight interest rates fluctuate within those margins, because if the interbank interest rates were higher or lower, that would imply that banks could borrow or deposit funds on more advantageous terms with the Eurosystem than on the interbank market. Furthermore, the rates applicable to these standing facilities are so punitive compared to the minimum bid rate that banks are strongly encouraged to deposit their surpluses and cover their deficits on the interbank market before resorting to the Eurosystem's standing facilities.

By active liquidity management – i.e. by adjusting the supply of liquidity in line with demand from the banking system – the Eurosystem is able to influence short-term interest rates on the interbank market to bring them into line with the minimum bid rate. It thus tries to safeguard the signal reflecting the monetary policy stance. To that end, an operational framework was developed: the way in which it functions is explained below, both under normal market conditions and during the last three reserve maintenance periods when demand for liquidity

was sometimes very strong. These broadly correspond to the period from the beginning of August to mid November 2007.

## 2. Steering money market interest rates under normal conditions: liquidity management by the Eurosystem in the first seven reserve maintenance periods in 2007

The Eurosystem's consolidated balance sheet offers an overview of the liquidity supply and demand. The assets side of the balance sheet shows liquidity-providing items, while the liabilities side records items which are liquidity-absorbing. To understand the essence of the operational framework of monetary policy, it is sufficient to refer to a simplified presentation of the Eurosystem balance sheet in which all items are divided into three main categories: autonomous liquidity factors, current account holdings of credit institutions – known as the reserves – and monetary policy instruments.

Three factors explain the banks' liquidity needs: autonomous liquidity factors, reserve requirements and any excess reserves. The autonomous factors are determined either by the public's behaviour or by institutional arrangements, so that the Eurosystem generally has no influence over them<sup>(2)</sup>. Examples are the banknotes in circulation and government deposits on the accounts of certain central banks. Since the sum of these factors is higher on the liabilities side than on the assets side, the banking sector faces a structural liquidity deficit vis-à-vis the Eurosystem.

A second important component of the liquidity needs consists of the minimum reserve requirements imposed on credit institutions. The amount of the reserves to be maintained is determined for each credit institution according to the reserve basis, which includes the majority of its short-term liabilities. It is calculated by multiplying the reserve basis by the 2 p.c. reserve ratio. Credit institutions can deduct a lump-sum allowance from their minimum reserve requirements in order to reduce the administrative expense of managing very small reserve requirements. The minimum reserves must be maintained on average over the reserve maintenance period, so that the current account holdings of credit institutions may – subject to that constraint – fluctuate freely in relation to the amount of the reserves to be maintained. Since March 2004, the

(1) Chapter 4 of the ECB publication entitled "The monetary policy of the ECB" gives a more detailed account of the ECB's monetary policy strategy.

(2) The movements in the autonomous liquidity factors resulting from possible intervention by the Eurosystem on the foreign exchange markets are an exception to this rule. However, there is no direct link between these and the implementation of monetary policy.

length of the reserve maintenance periods has been about one month, since they start on the settlement date of the first main refinancing operation following the Governing Council meeting at which the monetary policy decision was taken, and end the day before the corresponding settlement day in the next month. The current account holdings maintained by credit institutions are remunerated up to the level of the reserve requirement, so that the system of minimum reserve requirements does not impose any additional costs on the banking sector. The remuneration corresponds to the average, over the reserve maintenance period, of the marginal rate of allotment on the main refinancing operations.

Any unremunerated excess reserves, i.e. the (usually small) amount which credit institutions hold on their current accounts with the Eurosystem in excess of the minimum reserve requirements, constitute the third component of the banks' liquidity requirements.

It is precisely because credit institutions face structural liquidity needs which can only be met by the central bank that the latter is able to steer the overnight interest rate by adjusting the liquidity which it provides. In this connection it should be mentioned that credit institutions can obtain liquidity from the Eurosystem only on presentation of adequate collateral (ECB, 2006). The Eurosystem accepts a broad range of assets as collateral, from government bonds to asset-backed securities. This is intended to prevent credit institutions from being unable to obtain liquidity purely because they do not have adequate collateral.

A substantial part of the liquidity needs of credit institutions is covered by the longer-term refinancing operations. These operations, conducted monthly with a three-month maturity, offer credit institutions a stable source of financing. The Governing Council decided to allot an amount of 50 billion euro in each operation from 1 February 2007, so that the outstanding total of the longer-term refinancing operations has stood at 150 billion euro since the end of March. However, as will become apparent later in this article, that amount increased further during the period of money market turmoil. As the longer-term refinancing operations are not intended to signal the monetary policy stance, they are usually executed by variable rate tenders with a pre-announced volume. That means that the bids offering the highest interest rates are allotted first, followed by the lower rate bids until the total liquidity available for allotment has been exhausted. At the lowest interest rate accepted, called the marginal rate, bids are allotted pro rata. For each individual allotment, the interest rate applied is the rate offered by the counterparty, so that it is possible to calculate a weighted average rate.

The Eurosystem generally covers the bulk of the credit institutions' liquidity needs via the weekly main refinancing operations. These operations with a maturity of one week are conducted via variable rate tenders. The lowest interest rate which credit institutions can bid, known as the minimum bid rate, is fixed each month by the Governing Council and is intended to signal the monetary policy stance. In order to provide the counterparties with sufficient information on the total liquidity needs of the

**TABLE 1** CONSOLIDATED AND SIMPLIFIED BALANCE SHEET OF THE EUROSISTEM  
(average daily outstanding totals during the first seven reserve maintenance periods in 2007, billions of euro)

Assets		Liabilities	
<b>Autonomous liquidity factors</b>		<b>Autonomous liquidity factors</b>	
Net foreign assets .....	322.78	Banknotes in circulation .....	620.11
Other autonomous factors (net) .....	98.13	Government deposits .....	49.87
		<b>Current account holdings including the minimum reserve requirements .....</b>	<b>184.35</b>
<b>Monetary policy instruments</b>		<b>Monetary policy instruments</b>	
Main refinancing operations .....	290.35	Fine-tuning operations (net) .....	0.49
Longer-term refinancing operations .....	143.65	Deposit facility .....	0.32
Marginal lending facility .....	0.23		
<b>Total .....</b>	<b>855.13</b>	<b>Total .....</b>	<b>855.13</b>

Source: ECB.

banking sector, the ECB publishes forecasts of the consolidated liquidity needs, and these are used as the basis for calculating the benchmark allotment (ECB, 2004b). This benchmark allotment is calculated in such a way that the amount, if allotted, would enable the credit institutions to meet their reserve requirements smoothly, up to the day before the settlement of the next main refinancing operation. For that purpose, account is taken of the liquidity already allotted via the longer-term refinancing operations and other open market operations, the liquidity imbalance which has already accumulated since the start of the reserve maintenance period, and an estimate of future movements in both the autonomous factors and the excess reserves. This benchmark allotment enables credit institutions to decide the amount of their bid. Moreover, since March 2004 the Eurosystem has published, on the day of allotment of the main refinancing operation, an update of the benchmark allotment published the day before when the main refinancing operation was announced. Since 1 January 2005, in an effort to reduce the positive, though – under normal market conditions – small, difference between the minimum bid rate and the overnight rate, the Eurosystem has regularly opted to conduct a generous allotment policy consisting in allocating a volume of liquidity slightly greater than the benchmark allotment announced prior to each weekly tender. The (positive) difference between the amount actually allotted and the benchmark allotment thus always came to 1.00 billion euro in the first seven reserve maintenance periods of 2007. For 2006, the average difference came to 1.37 billion euro. A larger positive difference increases the probability of excess provision of liquidity at the end of the reserve maintenance period, exerting downward pressure on short-term interest rates. Conversely, allotting a smaller amount would exert upward pressure on short-term interest rates.

The Eurosystem may also conduct fine-tuning operations. These may take the form of liquidity-providing or liquidity-absorbing operations. This instrument enables the Eurosystem to attenuate abnormal fluctuations in the overnight interest rate in relation to the minimum bid rate on the main refinancing operations. Fine-tuning operations are conducted mainly at the end of the reserve maintenance periods. Credit institutions have to meet their reserve requirements on average over the reserve maintenance period, so that they can allow their current account holdings to fluctuate freely at the start of the period. However, since the reserve requirements become binding towards the end of the period, there can be significant movements in money market rates, which the Eurosystem will try to attenuate by adjusting the liquidity which it provides via the fine-tuning operations. Thus, in the first seven reserve maintenance periods in 2007, six

fine-tuning operations were conducted, each of them taking place on the last day of the reserve maintenance period. On 13 February and 10 July, additional liquidity was provided totalling 2 and 2.5 billion euro respectively. Excess liquidity was absorbed on the following occasions: 2.3 billion euro on 13 March, 22.5 billion on 17 April, 2.46 billion on 14 May and 6 billion on 12 June.<sup>(1)</sup> In 2006, the Eurosystem had used fine-tuning operations on eleven occasions, each time on the last day of the reserve maintenance period. In absolute terms, the amounts of these operations averaged 9.9 billion euro.

In order to absorb residual liquidity imbalances (deficits or surpluses) of individual credit institutions, the Eurosystem set up standing facilities. Any surplus liquidity can be deposited on the deposit facility, while the marginal lending facility can be used to obtain liquidity until the next morning. It is mainly at the end of the reserve maintenance period that banks use the standing facilities. In the first seven reserve maintenance periods of 2007, an average of 231 million euro was borrowed each day via the marginal lending facility, while an average of 321 million euro a day was placed in the deposit facility. Use of the standing facilities on the last day of the reserve maintenance period has a considerable influence on these average amounts.

As usual, the credit institutions' recourse to the standing facilities has been marginal overall, notably because of the punitive level of the associated interest rates. Moreover, the open market operations cover more or less all the banks' liquidity needs, in accordance with the principle of neutrality adopted by the Eurosystem in regard to its liquidity management, the aim being to avoid any systematic bias in the use of the standing facilities.

The Eurosystem's operational framework made it possible to stabilise the overnight rate around the desired level in the first seven reserve maintenance periods of 2007. Thus, the average daily spread, in absolute terms, between the Eonia<sup>(2)</sup> and the minimum bid rate of the main refinancing operations was 7 basis points, and only rarely did it exceed 20 basis points. Also in 2006, the Eurosystem succeeded in keeping the overnight rate at a level very close to the minimum bid rate, even on the last day of the reserve maintenance period, when unexpected fluctuations in liquidity are more likely (NBB, 2007).

(1) The total of liquidity-absorbing fine-tuning operations was constantly higher between 1 January and 30 April 2007 owing to accounting reasons related to Slovenia's accession to the monetary union. Those amounts are disregarded here.

(2) The Eonia is an effective overnight rate, calculated as the weighted average of the rates charged on unsecured loans by a panel of 49 banks on the interbank overnight market in the euro area.

### 3. Facing strong demand for liquidity: liquidity management by the Eurosystem between 8 August and 13 November 2007

As described above, the Eurosystem's operational framework had already proved its soundness under normal market conditions. In the last three reserve maintenance periods, it has also proved capable of coping successfully with episodes of very strong demand for liquidity, and – even when market conditions were strained – satisfactorily stabilising the interest rates of the shortest segment of the money market around the minimum bid rate. As will become apparent in the chronological account of liquidity management below, during this period of tension on the financial markets, the practical implementation of the operational framework – which remained unchanged – differed in three respects from what happens under normal market conditions. First, at the start of the reserve maintenance period, there was less reliance on the benchmark amounts as a guide for determining the amounts actually allotted in the main refinancing operations, in an attempt to keep the marginal rate on those operations close to the minimum bid rate. This policy responded to demand for frontloading from the banking sector, i.e. the banks wanted to be able to meet the reserve requirements more than proportionately at the start of the reserve maintenance period. In this way, it was the timing of the provision of liquidity during the reserve maintenance period that was altered, while the total amount allotted over the same period was unaffected. Second, greater use was made of fine-tuning operations, initially for the purpose of injecting liquidity and then, at the end of the reserve maintenance period, in order to absorb liquidity when it became apparent that the additional supply was beginning to exert downward pressure on the overnight interest rate. Consequently, both the number of fine-tuning operations – which in fact no longer took place solely on the last day of the reserve maintenance period – and their volume was stepped up. Third, the amount allotted in the longer-term refinancing operations was increased considerably on two occasions, to ensure that the credit institutions had a larger volume of liquidity available over three months.

#### 3.1 Reserve maintenance period ending on 11 September 2007

The reserve maintenance period running from 8 August to 11 September started under normal market conditions: as usual, the volume allotted in the first main refinancing operation slightly exceeded the benchmark amount (by one billion euro). On the second day of the reserve

maintenance period, however, the Eurosystem was forced to conduct additional open market operations. On the morning of 9 August, the money market was unsettled by a sudden rise in the overnight rate (from 4.1 to 4.7 p.c.) following a surge in demand from credit institutions for current account holdings with the Eurosystem. This was caused by the growing tension on the American money market and the European banks' fear that they would get into difficulty following the turmoil on the American sub-prime mortgage market (cf. box 1). Having expressed its concern during the morning, the Eurosystem injected liquidity via an overnight fine-tuning operation in order to stabilise the overnight interest rate. This operation took the form of a fixed-rate tender at 4 p.c. (corresponding to the minimum bid rate), with the prior announcement that all the bids would be fulfilled. Forty-nine credit institutions submitted bids for a total of 94.8 billion euro with an overnight maturity. The overnight interest rate thus subsided to a level close to the minimum bid rate, so that the Eonia – which is an average daily rate – came to 4.22 p.c. on that day.

On the morning of 10 August, the ECB decided to conduct another overnight fine-tuning operation as the liquidity injected by the previous day's fine-tuning operation would disappear from the market, being an overnight operation. This was conducted as a variable rate tender without prior announcement of the amount of the allotment. This would enable the Eurosystem to gain a clearer idea of the demand for liquidity from the banking sector. Sixty-two credit institutions submitted bids for a total of 110 billion euro at interest rates ranging between 4.00 and 4.15 p.c. The ECB decided to allot liquidity for all bids at a rate equal to or exceeding the marginal rate of 4.05 p.c., so that 61.1 billion euro was allotted until the next working day at a weighted average rate of 4.08 p.c. This brought the Eonia down to 4.14 p.c. on that date.

On Monday, 13 August, in a context of very subdued activity on the money market, the ECB conducted another fine-tuning operation with a specification similar to that of 10 August. Fifty-nine counterparties submitted bids for a total of 84.4 billion euro at interest rates ranging between 4.00 and 4.10 p.c. The Eurosystem decided to allot liquidity to all bids at or above 4.06 p.c., so that 47.4 billion euro was allotted at a weighted average rate of 4.07 p.c. The Eonia stood at 4.10 p.c. on 13 August.

On the morning of 14 August, the Eurosystem decided to conduct another overnight fine-tuning operation in addition to the weekly main refinancing operation, in order to meet the additional need for liquidity which might arise from the fact that the main refinancing operation allotted on that day would not be settled until the next day.

Once again, the fine-tuning operation was conducted by means of a variable rate tender without a pre-announced allotment amount. Bids were submitted for a total of 46 billion euro, and the rates offered ranged between 4.00 and 4.09 p.c. All bids at rates equal to or exceeding 4.07 p.c. were fulfilled, so that 7.7 billion euro was allotted at a weighted average rate of 4.07 p.c. Apart from this fine-tuning operation, the ECB decided to allot 73.5 billion euro more than the benchmark amount in the main refinancing operation on 14 August. This operation aimed to prevent the outflows in the current account holdings of credit institutions which would have resulted from the “mechanical” allotment of the benchmark volume, because that amount takes account of the past current account holdings in estimating the liquidity needs arising from the reserve requirements which have to be met on average during the period in question. As a result of the ample supply of liquidity which, under normal circumstances, would have caused demand to moderate during the rest of the reserve maintenance period, those holdings had increased sharply in the initial weeks of the reserve maintenance period. However, that automatic neutralisation was at odds with the tension on the money market, since demand for liquidity remained high. The marginal rate and the average rate of the main refinancing operation mentioned above stood at 4.08 and 4.10 p.c. respectively. After this allotment in excess of the benchmark volume, the Eonia stabilised over the next few days in the region of 4 p.c.

Since substantial excess reserves had accumulated in the initial weeks of the reserve maintenance period, the ECB decided to set the allotment volume of the main refinancing operations on 21 August, 28 August and 4 September at a level which would permit a gradual reduction in the current account holdings. On 22 August, the ECB Governing Council also decided to conduct an additional longer-term refinancing operation, as financing needs were particularly acute on this money market segment given the sharp rise in the three-month interbank rate. This operation injected 40 billion euro into the market on 24 August, for a three-month period, at a marginal rate of 4.49 p.c. and a weighted average rate of 4.61 p.c. The Eurosystem announced that this operation would not affect the regular monthly longer-term refinancing operations, but that the amount allotted in the main refinancing operations would compensate for this supply of liquidity. In the main refinancing operation on 21 August, 46 billion euro more than the benchmark amount was allotted at a marginal rate of 4.08 p.c. and a weighted average rate of 4.09 p.c. Following this relatively substantial injection of liquidity, the Eonia declined significantly to around 3.7 p.c. in the week following the operation. In the main refinancing operation on 28 August, the amount allotted

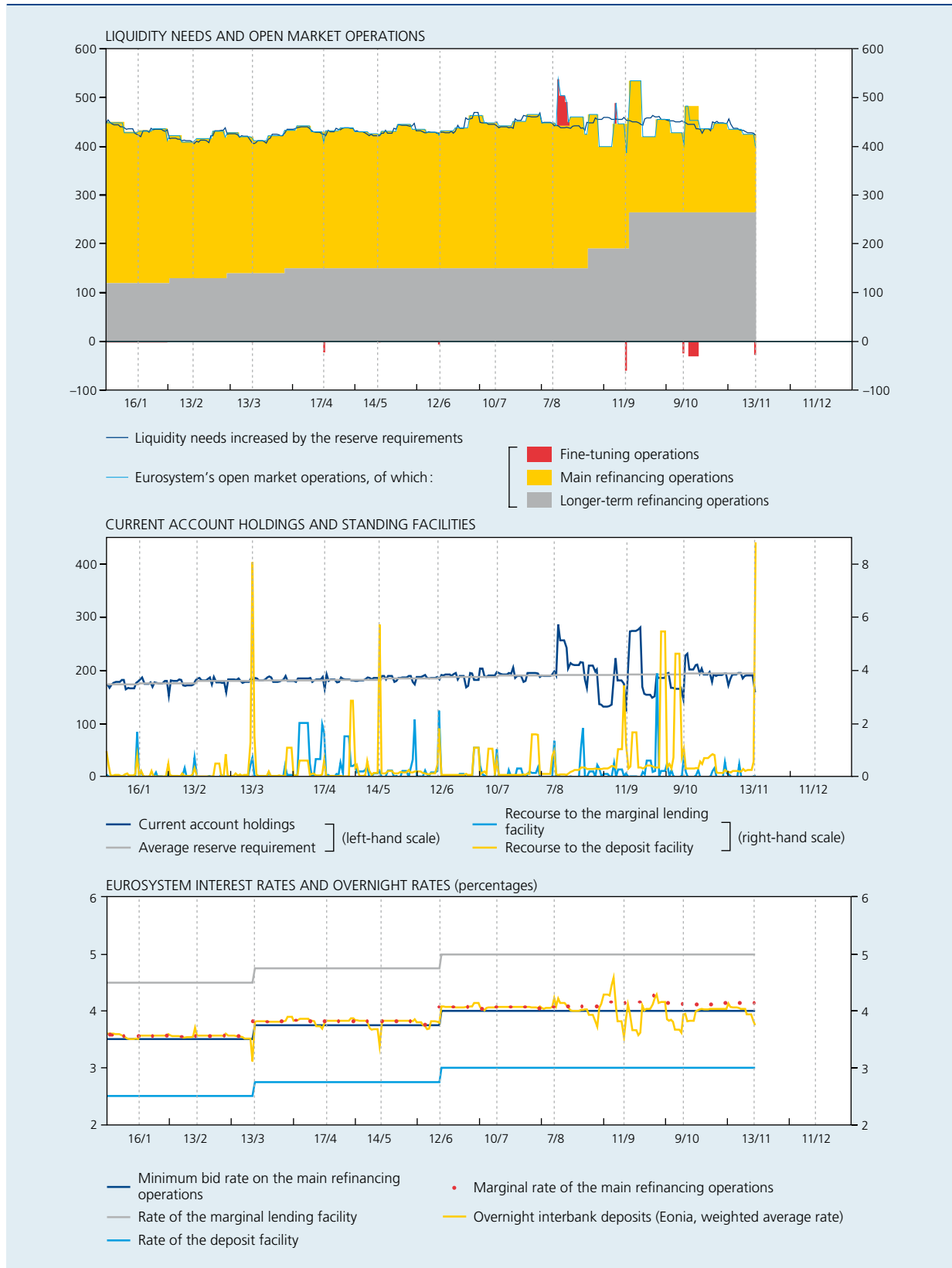
was 14.5 billion greater than the benchmark volume at a marginal rate of 4.08 p.c. and a weighted average rate of 4.09 p.c. From 28 August onwards the Eonia began rising steadily again. On 29 August one of the regular longer-term refinancing operations reached maturity. In line with normal practice it was renewed and 50 billion euro was allotted, though without increasing the overall outstanding amount. The marginal rate and the weighted average rate of this operation came to 4.56 and 4.62 p.c. respectively.

On 4 September, the ECB allotted 5 billion euro more than the benchmark amount in the last main refinancing operation, despite the approaching end of the reserve maintenance period, a time when the ECB normally tries to achieve balanced liquidity conditions in order to avoid large fluctuations in the overnight rate. However, this operation proved to be less generous than the credit institutions expected, as the marginal rate and the weighted average rate came to 4.15 and 4.19 p.c. respectively. There was therefore renewed tension on the short-term segment of the money market, and the overnight interest rate climbed to 4.70 p.c. in the morning of 5 September, whereupon the Eurosystem announced that it was monitoring the situation closely and was standing by to intervene if necessary. On 6 September it therefore conducted a variable rate fine-tuning operation with an overnight maturity, which injected 42.2 billion euro into the market. The marginal rate on this operation came to 4.06 p.c., well below the level of the marginal rate on the last main refinancing operation. The weighted average rate on this operation came to 4.13 p.c. The Eonia therefore declined on that date, falling to 4.05 p.c. The Governing Council decided on that same day not to adjust the key interest rates and to conduct another three-month longer term refinancing operation with no pre-announced allotment volume on 12 September, in order to help the money market to return to normal.

Given the abundant liquidity, the current account holdings were well in excess of the level needed to meet the reserve requirements. At the end of the reserve maintenance period, this inevitably depresses the overnight interest rate so that the Eonia declined to 3.54 p.c. on 10 September, its lowest level in that reserve maintenance period. In order to halt this downward pressure, on 11 September – the last day of the reserve maintenance period in question – the Eurosystem conducted a liquidity-absorbing fine-tuning operation. This operation withdrew 60 billion euro from the market at a rate of 4.00 p.c. so that the Eonia climbed back up to 3.87 p.c.

**CHART 1** THE LIQUIDITY MANAGEMENT OF THE EUROSISTEM <sup>(1)</sup>

(daily outstanding amounts, billions of euro unless otherwise stated)



Source : ECB.

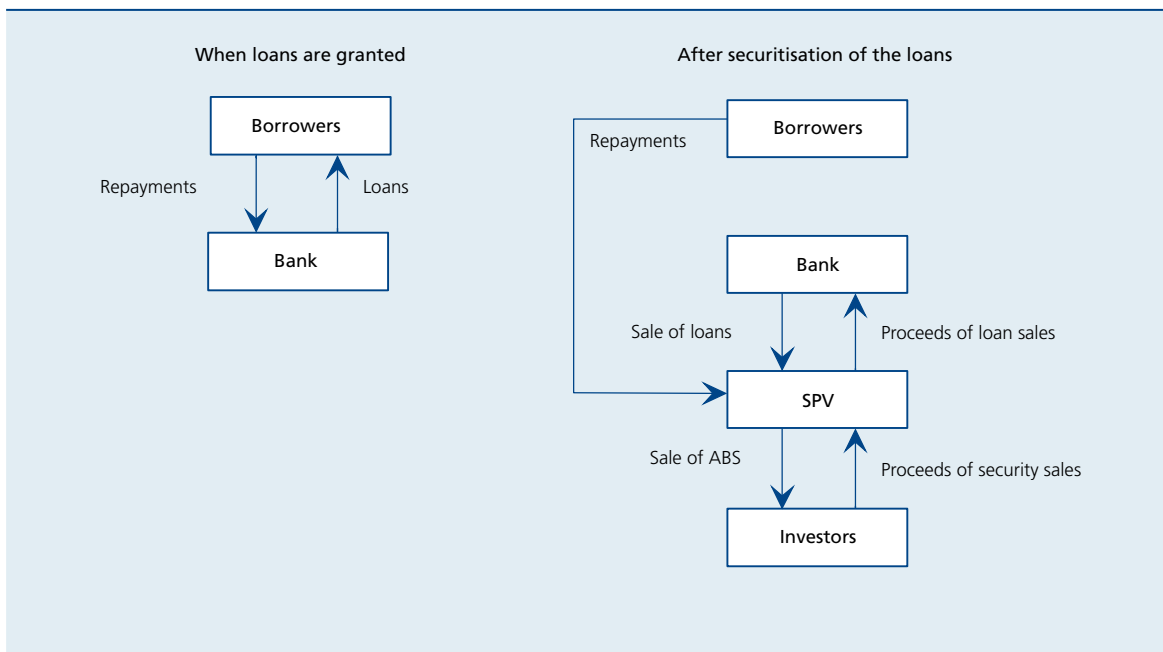
(1) The vertical grey lines indicate the last day of the reserve maintenance periods.

## Box 1 – Causes of the liquidity shortage

This box examines how the problems affecting a relatively small market such as the United States sub-prime mortgage market (a market in mortgage loans to borrowers with a particularly poor credit rating) had global repercussions on other segments of the financial markets, eventually creating a liquidity shortage on the money markets necessitating central bank intervention. Securitisation played a key role in these events.

Loans granted by a credit institution are traditionally recorded on its balance sheet until maturity. However, securitisation enables the bank to remove these illiquid assets from its balance sheet and convert them into liquid assets via an entity set up specifically for that purpose (also known as a Special Purpose Vehicle, SPV). An SPV has its own legal personality and is therefore separate from the bank which set it up (bankruptcy remote). Nevertheless, it may have a back-up credit line with that bank.

### THE CREATION OF STRUCTURED FINANCING INSTRUMENTS VIA SECURITISATION



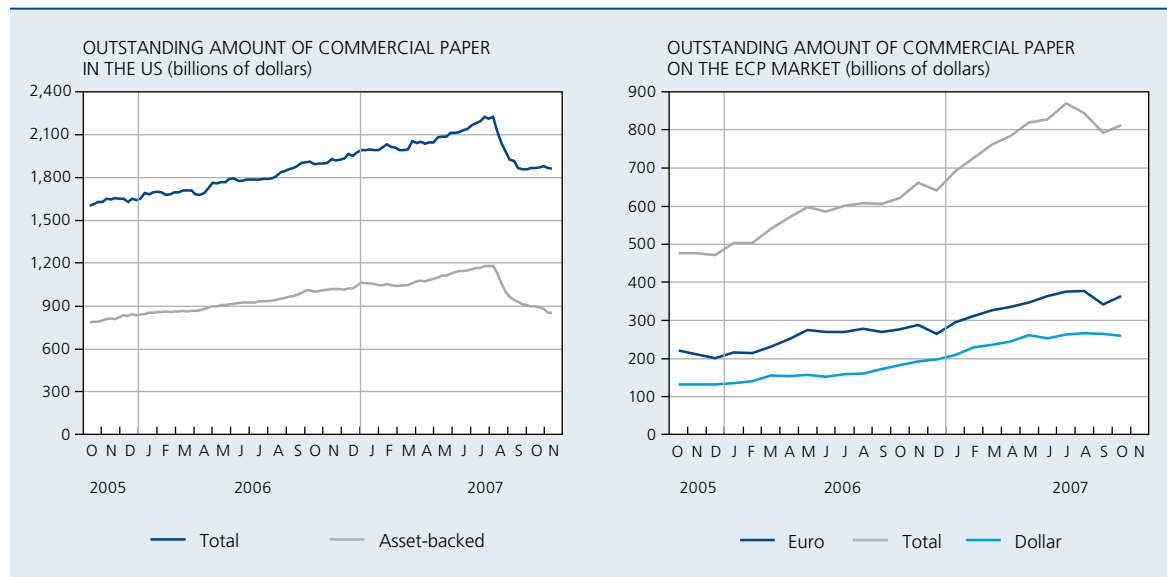
In the case of conventional securitisation, the loans of a credit institution are pooled and sold to the SPV (this is called true sale securitisation). Afterwards, the loans are repaid to the SPV, enabling the SPV in turn to repay its investors. In contrast, in the case of synthetic securitisation, only the credit risk is transferred, and not the loans. This form of securitisation is effected via derivatives (credit default swaps) which enable a bank to hedge against the risk of default.

In the case of “conventional” pass-through securitisation, the cash-flows are passed on without distinction to the investors as they come in, but securities issued via SPVs are currently often split up and divided into tranches, thus creating structured financing instruments. Each tranche has a risk profile which reflects the allocation of the losses and gains on the underlying assets among the various tranches (subordination), making it possible to issue a certain number of securities with a high rating such as AAA or AA (credit enhancement). The new instruments (known as asset-backed securities, ABS) are ultimately sold with different ratings. Some entities, such as asset-backed commercial paper conduits (ABCP conduits) and structured investment vehicles (SIVs), which invest in these

products, issue short-term paper to finance their longer-term assets. By investing long and lending short, they incur a liquidity risk in the same way as a traditional bank.

As a result of securitisation, the risks are no longer concentrated on the bank but spread through the financial system. In itself, that risk dispersion is welcome, but it now makes it very difficult to locate the risks. The lack of transparency regarding the effective exposure resulting from these complex structures has heightened the uncertainty. Since some of these products may be highly complex, it is a major challenge to value them at a time of tensions on the financial markets. These valuation problems were most acute in the case of products with a direct or indirect exposure to sub-prime mortgages, but they also emerged in the form of higher risk premiums for other structured financing instruments. The market in some debt instruments dried up owing to the information asymmetries, as demonstrated by Akerlof's analysis of the "market for lemons" (Akerlof, 1970, in which the *lemons* are defective second-hand cars). In the end, it was not only mortgage-backed securities that came under pressure, but the entire ABS market.

#### THE MARKET IN COMMERCIAL PAPER



Sources : Euroclear, Federal Reserve.

Owing to the increased risk aversion, it became difficult for the above-mentioned entities to raise finance by issuing short-term commercial paper (CP). The commercial paper market in the United States is huge. Before the crisis erupted, the outstanding amount of CP was around 2,225 billion dollars, which illustrates the market's success. However, by mid-October 2007, this figure had already fallen by 16 p.c. to 1,869 billion dollars and it has remained around that level since then. That decline was due to the massive fall in ABCP, which amounted to 27.5 p.c. mid-November. In the euro area, on the other hand, the market is still highly segmented, but the market in euro commercial paper (ECP), which transcends international borders, is gaining in importance. In July 2007 the outstanding total in commercial paper on this market reached the equivalent of 869 billion dollars before falling by 9 p.c. in September to 792 billion (owing to the depreciation of the dollar, the decline would be even greater if the amounts were stated in euro). This seems to indicate that the ABCP issuers were no longer able to refinance themselves and renew the securities which they had issued once they matured. Furthermore, there was a reduction in the average maturity of new paper issued.



This put the ball back in the banks' court, mainly via two mechanisms. They either had to provide liquidity for the ABCP conduits and SIV's via the back-up credit lines available to the latter from their associate bank, or they had to take some of the assets off the balance sheet of those entities in order to lighten it. In either case, the credit institutions were obliged to seek the necessary finance, so that they began to hoard up liquidity. In addition, banks refused to lend one another funds in the face of uncertainty regarding the potential exposure of the counterparties.

Under these conditions which threatened to paralyse the operation of the interbank market, the benchmark amounts on which the Eurosystem bases its allotments in the main refinancing operations become irrelevant, because the benchmark figures are based on parameters (mainly the autonomous factors and the minimum reserve requirements) for the consolidated banking system, in the knowledge that, under normal market conditions, credit institutions with surplus liquidity and those with a liquidity shortage soon find one another on the interbank market. However, in the event of a crisis of confidence, the individual credit institutions express additional demand for central bank reserves so that the total demand for liquidity at the level of the consolidated banking system far exceeds the normal benchmark amounts which are not influenced by the financial market turmoil. In other words, the demand for central bank money experiences a substantial upward shock. Under such conditions, it is desirable to provide additional liquidity to stabilise the overnight interest rate.

Providing appropriate liquidity ensures that credit institutions with a liquidity shortage have access to resources so that solvent institutions are protected against the risk of a simple liquidity shortage forcing them to sell assets or contract loans, which could lead them into solvency problems. However, that does not mean that credit institutions which face solvency problems as a result of excessive risk-taking will be bailed out, since the supply of liquidity via the open market operations is conditional upon the pledging of adequate collateral.

The substantial provision of liquidity during the initial weeks of the reserve maintenance period was reflected in the level of the credit institutions' current account holdings, which exceeded the levels recorded in other reserve maintenance periods. Recourse to the standing facilities was limited overall, although there was a slight increase in the average recourse to the deposit facility.

### 3.2 Reserve maintenance period ending on 9 October 2007

In the first main refinancing operation of the reserve maintenance period on 11 September (with settlement the next day), 10 billion euro more than the benchmark amount was allotted at a marginal rate of 4.14 p.c. and a weighted average rate of 4.17 p.c. The Eurosystem also announced that, in setting the benchmark allotment for this operation, it had taken no account of the amount of liquidity that would be allotted for three months on 12 September in the additional longer-term refinancing operation announced previously. Eventually, the ECB decided to allot 75 billion in that operation. The marginal rate and the average rate of this operation came to 4.35 and 4.52 p.c. respectively, or about ten basis points

lower than in the two longer-term refinancing operations conducted since the start of the period of money market turmoil.

The settlement of the longer-term refinancing operation exerted downward pressure on the Eonia, which dropped from 4.11 p.c. on the first day of the reserve maintenance period to 3.96 p.c. on 13 September. This decline continued in the ensuing days, so that by 17 September the Eonia was down to 3.57 p.c. On Tuesday, 18 September, 36 billion euro more than the benchmark amount was allotted in the main refinancing operation. The marginal rate and the weighted average rate of this operation came to 4.15 and 4.16 p.c. respectively. In comparison with the very ample liquidity conditions prevailing in the first week of the reserve maintenance period – not only was 10 billion euro more than the benchmark volume allotted in the main refinancing operation, but an additional 75 billion euro was allotted in the longer-term refinancing operation – this tender can be seen as a first step towards normalisation. On Wednesday 19 September, the settlement date of the main refinancing operation, the Eonia therefore climbed to 4.1 p.c., and the overnight interest rate continued to hover around that level in the ensuing days.

In the main refinancing operation on 25 September, 33 billion euro more than the benchmark volume was allotted at a marginal rate of 4.27 p.c. and a weighted average rate of 4.29 p.c. Around that date, owing in particular to the tension normally seen at the end of a quarter, the Eonia rose to around 4.2 p.c. On 27 September, a regular longer-term refinancing operation comprising 50 billion euro was renewed without providing additional liquidity for the market. The marginal rate and the weighted average rate of this operation came to 4.50 and 4.63 p.c. respectively, exceeding the rates of the longer-term operation allotted on 12 September. On 1 October, once the end-of-quarter effects had faded, the Eonia stood at 3.86 p.c., bearing witness to a situation of abundant liquidity. On 2 October, in the last main refinancing operation of the reserve maintenance period, 7.5 billion euro more than the benchmark volume was allotted at a marginal rate of 4.14 p.c. and a weighted average rate of 4.16 p.c. On that date, the Eonia stood at 3.83 p.c. To prevent further downward pressure on the overnight interest rate, 24.5 billion euro was taken out of the market on 9 October, the last day of the reserve maintenance period, by means of a fine-tuning operation at a fixed rate of 4 p.c. The Eonia was 3.95 p.c. on that day. The day before, when announcing the first main refinancing operation of the next reserve maintenance period, the Eurosystem had issued a statement indicating that it would reinforce its policy of allocating more liquidity than the benchmark amount in main refinancing operations to accommodate the demand of counterparties to fulfil reserve requirements early within the maintenance period. Yet, it would aim for gradually more balanced liquidity conditions towards the end of the period, taking into account the prevailing market conditions. It also announced that it would steer liquidity towards more balanced conditions also during the maintenance period, in a way which is consistent with the objective to keep very short-term rates close to the minimum bid rate. The Eurosystem would follow this policy for as long as needed.

In the reserve maintenance period under review, credit institutions increased their recourse to the deposit facility. Thus, during the ninth reserve maintenance period daily recourse to this facility averaged 1.56 billion euro, whereas in the previous maintenance period it had averaged only 445 million euro. There was also greater recourse to the marginal lending facility – an average of 312 million euro was borrowed each day during the reserve maintenance period, compared to 178 million euro in the previous period. For instance, on 26 September, 3.9 billion euro was borrowed via the marginal lending facility. The Eurosystem's liquidity management places the banking system as a whole in a comfortable position by making it

easy for credit institutions to obtain liquidity via the open market operations at the start of the reserve maintenance period, and to dispose of any surpluses at the end of that period without incurring serious penalties. However, that does not mean that credit institutions can systematically get such favourable conditions when they apply to the Eurosystem. Indeed, when credit institutions resort to the Eurosystem outside of the open market operations they have to use the standing facilities which are associated with punitive interest rates.

### 3.3 Reserve maintenance period ending on 13 November 2007

In the first main refinancing operation of the reserve maintenance period, which was allotted on 9 October with settlement the next day, 40 billion euro more than the benchmark volume was allotted at a marginal rate of 4.12 p.c. and a weighted average rate of 4.16 p.c. This ample allotment unexpectedly pushed the Eonia down to 3.82 p.c. on 11 October, so that the Eurosystem decided to conduct a fine-tuning operation to absorb liquidity on 12 October. This mopped up 30 billion euro at a fixed rate of 4 p.c. for five days, until settlement of the next main refinancing operation, thus keeping the Eonia steady around that level from 15 October.

In the next three main refinancing operations, 18, 14.5 and 9.5 billion euro above the benchmark allotment respectively were allotted at marginal and weighted average rates comparable to those of the first main refinancing operation. On 31 October, the Eonia climbed to 4.13 p.c. owing to the month-end effects, whereas it had remained stable in the two preceding weeks (at around 4 p.c.). On the same day, a regular longer-term refinancing operation which had matured was renewed at a marginal rate of 4.45 p.c. and a weighted average rate of 4.53 p.c.

Finally, in the last main refinancing operation of the reserve maintenance period, 3.5 billion euro more than the benchmark volume was allotted on 6 November at a marginal rate of 4.14 p.c. and a weighted average rate of 4.15 p.c. At the end of the reserve maintenance period, however, the Eonia dropped below 4 p.c., prompting the Eurosystem to conduct a fine-tuning operation on the last day of the reserve maintenance period, to withdraw liquidity at a fixed rate of 4 p.c. This operation only enabled the Eurosystem to take 27.75 billion euro out of the market, which was less than it had aimed for. On that day, the Eonia dropped to 3.76 p.c. as credit institutions tried to place their surplus liquidity in the interbank market, driving down the overnight rate. The residual liquidity surplus, equivalent to 8.8 billion euro, was ultimately

put in the deposit facility. This was therefore the greatest recourse to the deposit facility during the first ten reserve maintenance periods of 2007.

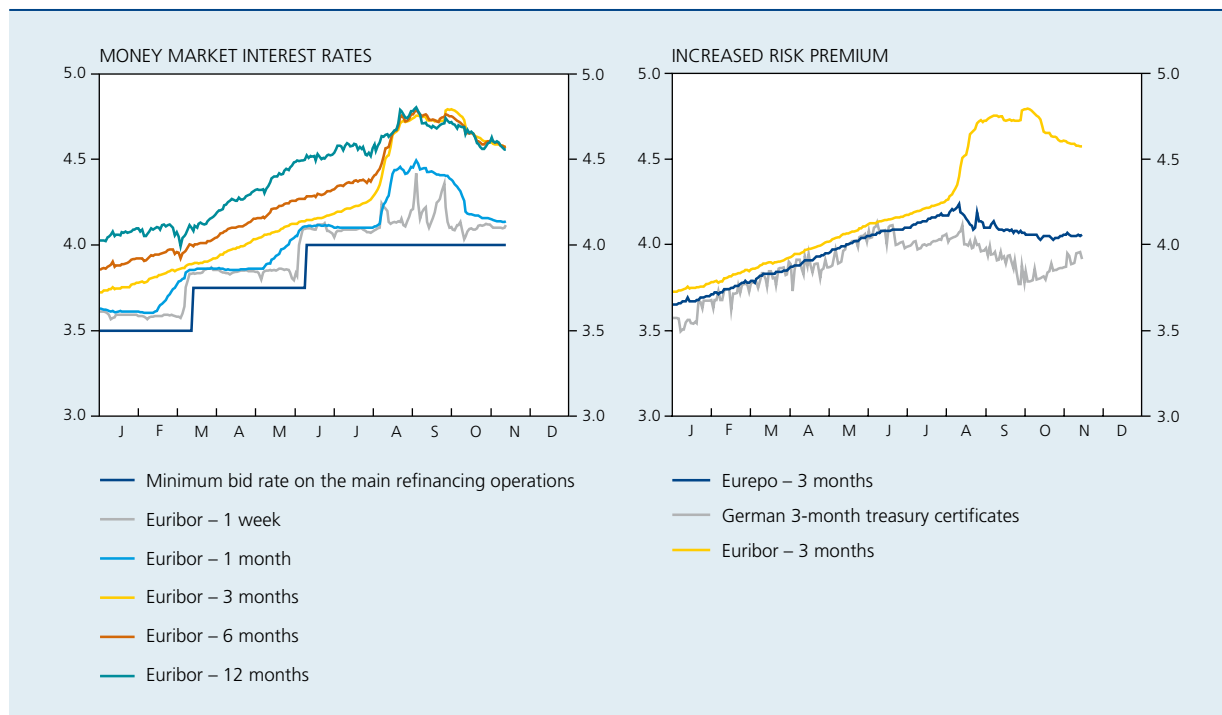
### 3.4 Interest rate structure on the money market

The foregoing demonstrates that, during the period of turmoil extending from early August to mid November, the Eurosystem succeeded in stabilising interest rates on the shortest segment of the money market – the marginal rate of the main refinancing operations and the Eonia – but it cannot be denied that those rates were more volatile than usual during that period. Thus, in absolute terms the average spread between the Eonia and the minimum bid rate on the main refinancing operations increased to 17 basis points during the three reserve maintenance periods which ran from 8 August to 13 November, whereas that spread had been only 7 basis points in the first seven reserve maintenance periods of 2007. However, in the longer-term segment of the money market, interest rates on interbank loans without collateral rose sharply at the beginning of August and remained at a high level for the rest of the period under review. This movement was particularly marked in the case of the three-month interbank rate, which went up from around 4.2 p.c. at

the beginning of August to 4.75 p.c. on 5 September. It then dipped slightly before beginning to rise again in early October, as the due date would thenceforward come after the end of the year. Such calendar effects do also occur under normal market conditions, but are then less pronounced. Thereafter, the three-month Euribor fell to 4.57 p.c. on 13 November.

Interest rates in the longer-term segment of the interbank market are influenced by a number of factors. For instance, expectations regarding future monetary policy decisions have a major influence on longer-term interest rates. While expectations of further interest rate hikes explained the positive spread between longer-term interbank rates and the minimum bid rate of the main refinancing operations up to the beginning of August, that was not true subsequently, since expectations of a further tightening of monetary policy soon ebbed away following the turmoil on the financial markets. Moreover, longer-term interest rates include a term premium which compensates for the uncertainty over future interest rate movements and which, in the given circumstances, reflects a greater preference for longer-term funding in particular. Finally, these interest rates include a premium covering the possible risk of payment default – the Euribor is in fact the rate on interbank loans without collateral. This last

**CHART 2** MONEY MARKET INTEREST RATES  
(daily data)



Sources: ECB, Bloomberg.

premium currently seems to be a decisive factor driving up longer-term rates on the money market. The spread between the unsecured three-month Euribor (the rate at which banks lend one another funds without collateral) and the three-month Eurepo (the rate at which banks lend one another funds against collateral) suddenly increased at the beginning of August to 60 basis points, after hovering around 7 basis points during the first seven months of 2007. This spread then stabilised before widening again at the beginning of October as a result of calendar effects, reaching around 70 basis points. Thereafter, the spread decreased to around 50 basis points on 13 November. The Eurepo itself fell slightly during August and September, after expectations of subsequent interest rate hikes faded away. That factor also explains the decline in the yield on German three-month treasury certificates. Additional downward pressure on that yield also came from the safe haven status of government paper in periods of financial market turmoil, which may have a considerable impact on a relatively small market. The spread between the three-month Euribor and the yield on German three-month treasury certificates therefore climbed to around 100 basis points at the beginning of October after which it declined to around 60 basis points on 13 November. During July, it had already edged upwards to 20 basis points, after remaining around 10 basis points in the first half of 2007. It is therefore apparent that banks were demanding higher risk premiums in a context of uncertainty over credit institutions' degree of exposure to the troubled American sub-prime mortgage market. Moreover, a number of banks probably also hesitated to grant interbank loans pending clarification of their own liquidity situation, and that also drove up longer-term interbank interest rates.

The fluctuations on the longer-term segment of the money market, resulting from the behaviour of credit institutions and their risk perception, are beyond the control of the central bank. In fact, by its liquidity management the Eurosystem can only exert direct control over very short-term interest rates. The consequences of the strong movements which occurred in the longer-term segment of the money market may, however, extend beyond the interbank market in that the three-month interbank rate, as measured by the Euribor, is used as a benchmark by many credit institutions for a wide range of interest rates applicable to loans granted to households and to non-financial corporations. If the increase in the three-month Euribor were to be passed on, that would imply a real tightening of financing conditions, even in the absence of any adjustment to the key interest rates of the Eurosystem. Although the central bank cannot remedy that by its liquidity management, such a potential tightening of financing conditions is certainly a

factor which is taken into account in deciding the monetary policy stance. The possible, but hard to quantify, influence on the real economy of the financial market turmoil – not only following the rise in interest rates on the longer segment of the money market but also, for example, owing to the widening of the corporate bond spreads, the announcement of a tightening of credit conditions in the bank lending survey, the euro's appreciation and the possible repercussions on the confidence of the economic agents – in fact heightened the uncertainty over the growth and inflation outlook. This prompted the Governing Council, following the September, October and November meetings, to wait for more detailed information before drawing further conclusions for monetary policy, despite the confirmed existence of upside risks to price stability. The upshot was that the originally expected rise in interest rates did not materialise.

## Conclusion

The effectiveness of the Eurosystem's operational framework (this set of instruments and procedures enables the Eurosystem to steer money market interest rates towards the level desired by the Governing Council) has been put to the test in recent months. This article described the implementation of monetary policy under normal market conditions. It then examined in detail the way in which the Eurosystem managed liquidity on the money market during the three reserve maintenance periods which extended from the beginning of August to mid November, a period characterized by financial market turmoil.

Despite the difficult conditions on the money market, the Eurosystem succeeded in bringing money market rates close to the minimum bid rate on the main refinancing operations set by the Governing Council, thus preserving the signal on the monetary policy stance given by short-term interest rates. Flexible use of the existing operational framework, which was therefore not modified in any way, was sufficient to achieve that. Thus, in order to enable credit institutions to meet the reserve requirement fairly early in the reserve maintenance period, the Eurosystem supplied, via its main refinancing operations, a volume of liquidity well in excess of the benchmark amounts calculated beforehand. The Eurosystem also made greater use of the fine-tuning operations which, in contrast to normal practice, were not confined to the last day of the reserve maintenance period and also involved larger amounts. Finally, it enabled the credit institutions to obtain longer-term liquidity by refinancing a larger part of the liquidity deficit via the longer-term three-month refinancing operations. An operational framework which gives priority to stabilising money market interest rates implies that the balance

sheet of the central bank, and more particularly the supply of base money, becomes endogenous, so that it does not signal the monetary policy stance (cf. separate article on this subject in this edition of the Economic Review). The injections of liquidity which were sometimes very substantial therefore do not in any way point to an easing of the monetary policy stance, which remained unchanged as the key rates were not adjusted during the period under review.

Despite the relatively successful stabilisation of short-term money market interest rates, the longer-term rates increased sharply during the period under review. However, the central bank cannot remedy that by its liquidity management. The direct influence which the Eurosystem exerts on money market rates is in fact confined to the very short term. Conversely, it is the market itself that determines the interest rates for more distant horizons, according to expectations concerning monetary policy decisions and relevant risk premiums. The rise in longer-term money market rates in fact reflects the strong increase in the

compensation demanded by credit institutions to cover the risk of default on the unsecured interbank loan market. Of course, that development may have some impact on the real economy, and hence on the future movements in inflation. Many credit institutions in fact use the three-month Euribor as the benchmark for a wide range of interest rates applicable to loans to households and to non-financial corporations. If the increase in the three-month Euribor were to be passed on, that would imply a real tightening of credit conditions, even in the absence of any adjustment to the key interest rates of the Eurosystem. Such a potential tightening of credit conditions is certainly a factor which is taken into account when deciding the monetary policy stance. The possible but hard to quantify influence on the real economy of the financial market turmoil prompted the Governing Council, following the September, October and November meetings, to wait for more detailed information before drawing further conclusions for monetary policy, despite the confirmed existence of upside risks to price stability. That is why the rise in interest rates initially expected did not materialise.

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