

# ESCB preparations for the year 2000

*The European System of Central Banks (ESCB) has been concentrating significant efforts and resources on issues related to the year 2000 transition, although the degree of year 2000 compliance of the systems used by the European Central Bank (ECB) and the national central banks (NCBs) participating in Monetary Union was expected to be relatively high owing to the recent establishment of the institution. Following intensive testing, the ECB is confident that the systems of the ESCB – whether it be the technical systems used for the data transfers necessary for the preparation of monetary policy decisions or those used for the execution of monetary policy operations, the Trans-European Real-time Gross settlement Express Transfer system (TARGET) or the correspondent central banking model (CCBM) – will continue to function properly when entering into the year 2000. Nonetheless, the ECB and the NCBs have tested their contingency procedures to ensure business continuity, even in the event of unexpected problems. At the same time, the monetary and economic implications of the year 2000 transition have been analysed and are not very likely to be of relevance to the ECB's medium-term oriented monetary policy strategy. In any case, the monetary policy operational framework of the Eurosystem (comprising the ECB and the NCBs of the Member States participating in the euro area) ensures high flexibility in the implementation of monetary policy and has built-in mechanisms designed to accommodate any level of liquidity demand from market participants. The ECB sees no need for the public to hold excess cash around the turn of the year. However, should such extraordinary precautionary demand for banknotes arise, NCBs will have sufficient stocks of banknotes available to cover it.*

## I Facing the year 2000 issue

The year 2000 issue is a phenomenon that is affecting individuals and companies all over the world. While it is widely recognised that the responsibility for preparing for the transition to the year 2000 lies mainly with each individual institution, many initiatives have been launched in the last two years to co-ordinate activities at industry, national and global levels. In particular, since early 1999, following the completion of the preparations for the introduction of the euro, the European financial community has devoted significant efforts to resolving year 2000-related issues. Of particular relevance to the financial industry are the initiatives of the Global 2000 Co-ordinating Group, for private institutions, and the Joint Year 2000 Council, for financial market authorities. In addition, the providers of utilities such as water and electricity and of telecommunications facilities have, in general, been able to demonstrate a satisfactory level of year 2000 compliance in their services.

The global banking and financial community has faced a major challenge in its efforts to ensure a smooth transition of financial systems to the year 2000. With the support of infrastructure providers, financial institutions in the euro area – including the Eurosystem – have carried out extensive testing to make sure that their IT applications are year 2000 compliant. Like many other institutions, the Eurosystem has, over the past year, given high priority to year 2000-related tasks and ensured, through extensive testing, that its systems are year 2000 compliant. Since mid-1999 the Eurosystem's focus has been on the review and testing of contingency procedures, the assessment of potential monetary policy and legal implications, and the establishment of an efficient communications infrastructure for the ESCB for the year 2000 transition period.

## **Box I**

### **Year 2000 compliance**

The year 2000 compliance problem stems primarily from the data field defining the year, which permeates files, reports, screens, databases, environmental programs and work areas. Programs to determine time-dependent information and business events use this field. In programs that use only a two-digit field, it may not be possible for the system to differentiate between the 1900s and the 2000s. The year 2000 problem may also affect “non-IT” systems such as utilities, entry control systems, machine management functions, etc. through the use of date data in chips embedded within these systems.

It is therefore necessary to test and, where problems are identified, to remediate systems in order to ensure that the computer correctly recognises the new date as 2000. In line with the definition of year 2000 compliance as specified by the British Standards Institution, the ECB has assessed its level of compliance against the following criteria:

1. No value for current date will cause any interruption in operation.
2. Date-based functionality must behave consistently for dates prior to, during and after year 2000.
3. In all interfaces and data storage, the century in any date must be specified either explicitly or by unambiguous algorithms or inferencing rules.
4. The year 2000 must be recognised as a leap year.

## **2 Technical compliance activities of the ESCB**

As the year 2000 issue has its roots in computer technology, initial work was aimed at achieving year 2000 compliance for IT systems, with a particular focus on the systems needed to conduct monetary policy and on TARGET.

### **Testing and remedial activities for systems used for the conduct of monetary policy**

The Eurosystem employs a sophisticated technical infrastructure to link together the ECB and the NCBs. The applications used in the conduct of monetary policy operations, such as open market tender operations and bilateral interventions, have been added to this infrastructure, as have the applications used for the exchange of the statistical and non-statistical information needed for the preparation of monetary policy decisions.

The monetary policy operations of the Eurosystem are conducted in a decentralised manner by the NCBs, following instructions from the ECB. The ECB receives statistical

information from all 11 NCBs in order to establish a basis for its monetary policy decisions. Owing to the integrated nature of the systems used for such operations, a decision was made to conduct both local and ESCB-wide testing.

Each NCB was responsible for carrying out a series of tests designed to assess the compliance status of its internal systems as well as location-specific parts of the ESCB systems. In addition to its internal system compliance tests, the ECB conducted the initial testing of the ESCB-wide systems, to the extent that this was possible within a closed environment at the ECB. In this way, all the individual components of the Eurosystem-wide systems were tested for their year 2000 compliance in the first months of 1999.

Following the completion of the individual tests, a series of bilateral tests was conducted between the ECB and all the NCBs of the Eurosystem, as well as other NCBs which chose to participate. These tests were carried out in a simulated year 2000 environment, in order to test the continued business

functionality of the applications. During testing, only a very small number of year 2000-related problems were found, which can be largely attributed to the relative newness of the Eurosystem's integrated and individual systems. In the few cases in which non-compliance issues were detected, remedial work was successfully carried out. It can therefore be confirmed with an acceptable level of certainty that the systems used by the Eurosystem for monetary policy purposes are year 2000 compliant.

### **Testing and remedial activities for TARGET and the CCBM**

TARGET is a decentralised system connecting the national real-time gross settlement (RTGS) systems via an interlinking infrastructure, the purpose of which is to conduct payments efficiently throughout Europe.

In line with other year 2000 compliance activities of the ESCB, TARGET has undergone a period of intensive testing. The approach used in these tests was based on the testing procedure which proved successful for the testing of TARGET before it went into operation on 4 January 1999.

The TARGET testing was carried out in a number of distinct phases. In the first phase, the NCBs and the ECB individually tested the national components and the connections to the S.W.I.F.T. FIN service. Following the successful completion of this phase, "cross-system" tests were conducted, in which all the NCBs' and the ECB's systems ran for the full TARGET business day in a simulated year 2000 environment, including starting the systems, payments processing, end-of-day procedures, closing the systems and, finally, preparations for the next business day. During this second phase a number of credit institutions were involved in the testing of the national RTGS system in each country. In addition, some major EU national RTGS systems participated successfully in the Global Year 2000 test organised by the New York Clearing House in June 1999.

Finally, TARGET's year 2000 compliance was demonstrated on Saturday, 25 September 1999. Several hundred credit institutions demonstrated their ability to carry out operations for sending and receiving TARGET cross-border payments in a "dress rehearsal" of a full business day in a simulated year 2000 environment. In several countries domestic payment systems have also been tested with third parties.

In parallel, tests were carried out on the correspondent central banking model (CCBM). The CCBM is a system for mobilising collateral across borders in order to ensure the availability of collateral for monetary policy operations and for payment systems needs. The CCBM is based on multilateral agreements between the NCBs and the ECB. Since all message flows are bilateral, year 2000 compliance testing was carried out by pairs of institutions that utilise computer systems for this procedure. The testing did not reveal any problems.

### **Monitoring EU payment systems**

The ESCB is also monitoring the progress made by other large-value and major retail EU payment systems, in particular those settling their end-of-day balances in TARGET. By introducing the TARGET year 2000 strategy as the norm, country reporting procedures were established to verify that all payment systems had completed internal testing by the end of April 1999 and multilateral testing by the end of July 1999. The general verdict is that all major payment and securities settlement systems in the EU area are making good progress with their year 2000 preparations and are able to comply with the defined framework. According to the available information, the electronic retail payment systems and the automated teller machines (ATMs) in the euro area have been successfully tested and are therefore expected to function smoothly. The ESCB is closely monitoring the progress in the few cases of individual retail systems being slightly behind in their preparations.

### 3 Other precautionary measures

Following such intensive testing, it is essential that the level of compliance is maintained and not jeopardised by further changes to the systems. Therefore, the Eurosystem has placed a moratorium on any changes to its systems from 1 October 1999 to 1 March 2000. Nonetheless, the ECB cannot rule out unexpected problems that might affect the smooth functioning of its systems. As a precautionary measure, the ECB is therefore

reviewing the contingency procedures developed for the euro changeover in order to ensure their viability in the event of any problems arising during the year 2000 transition. In this respect, it is worth noting that the recent reports on the year 2000 testing carried out by major European utility companies, such as gas, electricity and water, and by telecommunications service providers have been very positive.

#### Box 2

##### Closing of TARGET on 31 December 1999

In order to ensure a smooth transition, not only for the institutions of the European System of Central Banks (ESCB) but also for the other European financial institutions, on 31 March 1999 the ECB announced its decision to close TARGET on 31 December 1999. This day can thus be kept free to enable banking institutions to conduct end-of-year operations and produce full backups of the relevant systems prior to the transition to 2000.

### 4 Monetary, financial and other economic implications

In addition to its intensive internal compliance activities, the ECB has also analysed the impact that the year 2000 transition could have on the euro area. As a result of this exercise, it sees no need for the public to hold higher amounts of banknotes during the transition period than is normally the case at year-ends. Nonetheless, NCBs have built up excess stocks of national banknotes to cover the period up to 2002, in order to be able to free capacities for the production of euro banknotes. Therefore, should some extraordinary precautionary demand for banknotes arise around the turn of the year, NCBs will have available sufficient stocks of banknotes to cover it.

An increase in the demand for banknotes around the turn of the year would be unlikely to have more than a small, temporary impact on the broad monetary aggregate (M3) (this monetary aggregate having been assigned a prominent role in the Eurosystem's monetary policy strategy), since it is expected that any additional demand for currency in circulation would be drawn mostly from short-term bank

deposits which form part of M3. In addition, households can be expected to gradually reduce their holdings of currency to more normal levels as soon as fears of major disruption arising from IT problems subside following the transition to 2000.

There are a few other economic effects to be expected from this transition to the year 2000. Beside the sectoral effects resulting from the diversion of resources to cope with the year 2000 problem, temporary economic effects could result from malfunctions leading to disruption in production processes. For this reason, the year 2000 problem could induce some hoarding of products by firms in an effort to ensure uninterrupted supply in early 2000. Households may also increase their stocks of food, etc. In addition, fixed investment could be affected by an advancement of purchases of IT equipment. Overall, these factors may somewhat distort the pattern of economic growth, tending to boost growth at the end of 1999 and to weaken it in early 2000. In addition, these factors could have monetary effects in the

form of a temporary increase in bank lending. While none of these effects can be estimated with any reasonable degree of precision, they are likely to be limited in size and are unlikely to affect the long-term growth and inflation outlook for the euro area.

The monetary and economic implications of the year 2000 transition are therefore not very likely to be of relevance for a medium term-oriented monetary policy strategy. However, financial markets have been affected by the perception of increased risks when lending short-term funds during the transition to the year 2000, in particular if such lending is undertaken without collateral. In fact, over the past months the interest rate implied in the three-month EURIBOR futures contract maturing in December 1999 has traded above the notional interest rate which would be obtained by linear interpolation between the September 1999 and March 2000 contracts. This “year 2000 spike” has tended to grow over the summer, but has diminished significantly more recently.

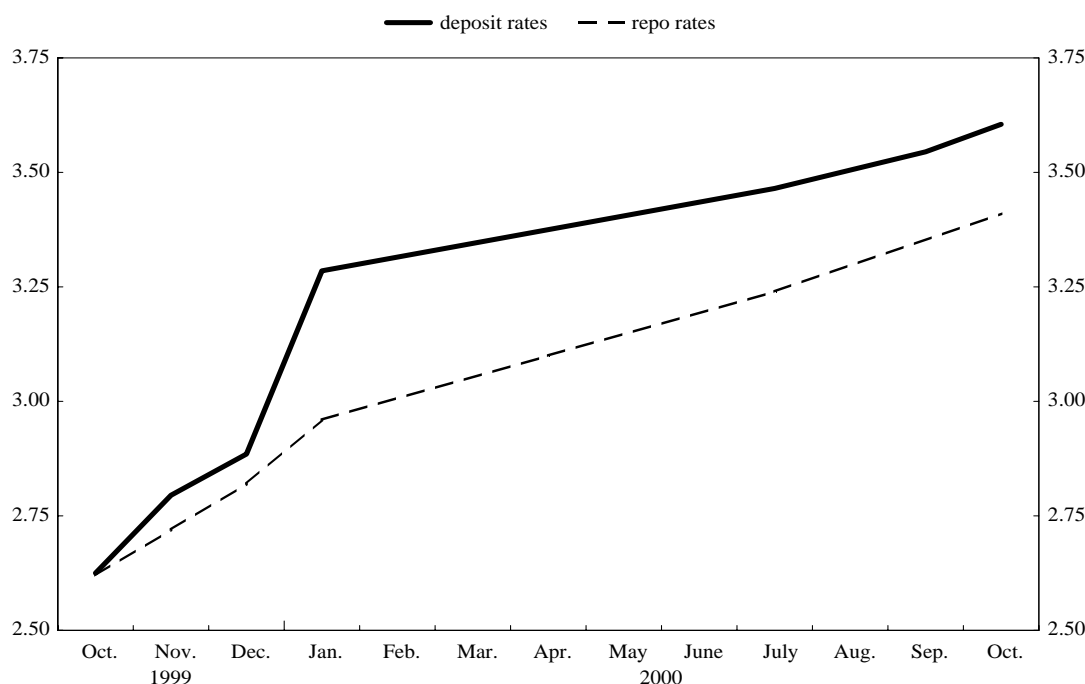
The existence of the “year 2000 spike” is visible from the chart below, which shows interest rates on uncollateralised interbank deposits with different maturities as at 6 October 1999.

However, it should be emphasised that the year 2000 effect on short-term interest rates is significantly lower for secured transactions, i.e. for transactions carried out with the protection of collateral. In the chart below it is apparent that the deposit curve shifts up between December and January, incorporating the expected spike at the turn of the year. Instead, the yield curve for collateralised instruments shows a far more regular pattern. This suggests that market participants are confident with regard to the provision of sufficient liquidity by the Eurosystem. At the same time, however, the significant difference between expected interest rates on secured and unsecured transactions reflects a heightened awareness of the credit risk considerations around the turn of the year.

### Chart I

#### Deposit and repo market yield curve

(as at 6 October 1999; percentage per annum, by maturity)



Source: Reuters.

Note: The rates shown in the chart are spot rates. Accordingly, the abnormally high level of the implied overnight rate for unsecured transactions at the turn of the century affects all rates with a maturity beyond that date, through a simple actuarial effect.

The Eurosystem announced in August 1999 that it does not see a need to introduce any systemic changes to its operational framework because of the changeover to the year 2000. Indeed, the operational framework of the Eurosystem was, from the outset, designed with a view to ensuring maximum flexibility in the implementation of monetary policy and thus allows for any technical adaptation that may be considered worthwhile. The Eurosystem's operational framework already has built-in mechanisms designed to accommodate any level of liquidity demand from market participants.

First, since fluctuations in liquidity are a frequent occurrence in money markets, the averaging mechanism applied to the one-month maintenance period of the minimum reserve system generally contributes to smoothing out temporary liquidity fluctuations, which may occur, for example, because of technical delays in payment systems or unforeseen changes in the demand for banknotes. The aggregate reserve requirement of the euro area banking system amounted to around EUR 100 billion in the first half of 1999 and provides a considerable buffer of liquidity to cover exceptional liquidity needs at the turn of the year. Second, the very large amount of around EUR 5,700 billion of assets in the list of collateral eligible for the refinancing operations of the Eurosystem, together with the CCBM (which allows the cross-border use of collateral), should ensure that there is a sufficient amount

of eligible assets available as collateral even under rather exceptional circumstances. Third, the Eurosystem has at its disposal a diverse range of fine-tuning instruments that may, if necessary, complement its main and longer-term refinancing operations. The Eurosystem's fine-tuning operations can take various forms, such as outright purchases or sales, collection of fixed-term deposits and foreign exchange swaps. Finally, the Eurosystem's standing facilities (marginal lending facility and deposit facility) offer credit institutions in the euro area an automatic means of dealing with any potential fluctuation in the demand for liquidity, and thereby limit any impact that these fluctuations may have on short-term interest rates.

Taking the above into account, only a minor technical change has been introduced in the indicative calendar of the main refinancing operations for the year 2000 in order to eliminate any potential problems that may arise as a result of the maturing and renewal of a main refinancing operation in the first week of 2000. The ECB announced on 23 September 1999 that no new main refinancing operation will be initiated in the first week of 2000, and that no such operation will mature during that week. This adaptation is considered useful to minimise any potential problems for counterparties and for the financial markets which could result from the conduct and settlement of a large operation directly after the transition to 2000.

## **5 Legal implications**

### **Legislative measures**

The ECB also discussed and was instrumental in bringing forward legislative initiatives by the Member States of the European Union (EU) with regard to year 2000 liability issues, in order to ensure the stability of the financial markets.

In order to facilitate the performance of end-of-year procedures and the full backup of all

systems before midnight on 31 December 1999 by all market participants – including credit institutions, securities markets, clearing systems and depositories, and associated bodies within the financial industries – the governors of the NCBs of the euro area unanimously agreed in March 1999 that the ECB should recommend to the members of the ECOFIN Council that 31 December 1999 be declared a non-business day throughout the EU.

At their informal meeting on 17 April 1999 the Ministers of Finance endorsed a communiqué which urged the Member States of the EU to ensure that payment and delivery obligations of financial institutions and other agents neither fall due nor are enforceable on 31 December 1999 in the financial markets. In this communiqué each Member State undertook a political commitment to take appropriate measures in order to ensure the stability of financial markets in its jurisdiction and to mitigate potential liability issues for market players if amounts in euro fall due on 31 December 1999. In addition, this measure should provide clarity as to when such obligations should be payable. The result depends, as for any public holidays, on the provisions made in the legislation in each jurisdiction in relation to obligations due on a public holiday: some stipulate that the obligation shall be deferred, others that it

shall be advanced. The communiqué did not take a position on this issue, which can be settled pursuant to the national rules of procedure.

### **Review of contracts at the ECB**

In addition, existing agreements of the ECB have been reviewed and, where necessary, updated to ensure their operability in any year 2000 scenario. The ECB's stance is that year 2000-related malfunctions and problems involving hardware or software cannot be viewed as cases of *force majeure*, since the year 2000 is a foreseeable risk that can be mitigated with enough planning and resources. Therefore, counterparties should take all necessary measures to ensure the preparedness of their IT systems and business continuity into 2000.

#### **Box 3**

##### **Communiqué endorsed by the Ministers of Finance on 17 April 1999 concerning the transition to the year 2000**

With a view to minimising the risks for the European financial industry related to the year 2000 changeover, the ECOFIN Ministers, the European Commission and the ECB discussed whether any measures should be taken in order to ensure a smooth transition to the first day of operation in 2000. In this respect, the Ministers and the European Commission took note of the ECB's decision to close its TARGET system on 31 December 1999 in order to enhance the safety of the transition to the year 2000.

Against this background and following requests by a number of market participants, the Ministers agreed that, with a view to facilitating the performance of end-of-year procedures and completing the full backup of all systems before midnight on 31 December 1999, Member States should ensure by appropriate means that, as on a normal public holiday, the fulfilment of any contractual obligations on the part of credit institutions or other agents in the financial markets, at least for transactions in euro, shall neither fall due nor be enforceable on 31 December 1999.

## **6 Communication infrastructure**

The ESCB's co-ordination is characterised by a number of expert committees which prepare Decisions of the Governing Council, submitted via the Executive Board, in their area of competence. These committees have devoted significant resources to the year 2000 preparations over the past year. In order to

ensure the overall consistency of year 2000 preparations within the ESCB, the Governing Council decided to establish an ESCB Year 2000 Co-ordination Committee consisting of year 2000 co-ordinators from each NCB. The aim of this Committee is to determine practical arrangements for the year 2000 transition.

The ESCB Year 2000 Co-ordination Committee is responsible for co-ordination among the ESCB institutions and between the ESCB and international bodies dealing directly with year 2000 issues. Its main tasks include analysing the suitability and feasibility of contingency measures and the procedures for activating such measures, as well as defining ESCB milestones that will be monitored before, during and after the transition to the year 2000. The ESCB Year 2000 Co-ordination Committee will form the core of an efficient communications infrastructure between the ECB and the NCBs, which will be established specifically to monitor the developments over the year 2000 transition period. During the year 2000 transition period (from 31 December 1999 until the first day of normal operation and around the leap year date) the Committee

will be at the centre of an “early warning” procedure for alerting the decision-making bodies of the ECB. In emergency situations, the Committee will be responsible for consulting the relevant business experts to expedite the decision-making process in order to ensure that critical functions can be performed. It will regularly exchange information on global issues of relevance to the year 2000 transition, with particular reference to major unexpected events (should they occur) concerning the ESCB internal systems and infrastructures, as well as the Eurosystem financial markets.

The ECB will also exchange information with the Joint Year 2000 Council in an effort to contribute to mitigating year 2000-related risks beyond the Eurosystem at a global level.

#### **Box 4**

##### **Major year 2000 initiatives**

###### **Joint Year 2000 Council**

In April 1998 the sponsoring committees, i.e. the Basel Committee on Banking Supervision (Basel Committee), the Committee on Payment and Settlement Systems (CPSS), the International Association of Insurance Supervisors (IAIS), and the International Organisation of Securities Commissions (IOSCO) established the Joint Year 2000 Council. The Council comprises senior representatives from the sponsoring committees. Roger W. Ferguson Jr., a Governor on the Board of Governors of the Federal Reserve System, chairs the Council and its secretariat is provided by the Bank for International Settlements (BIS).

The Council has agreed on a range of initiatives to ensure a high level of awareness of the year 2000 computer challenge within the global financial supervisory community, to share information on regulatory and supervisory strategies and approaches, to discuss possible contingency measures, and to serve as a point of contact with national and international private sector initiatives.

The Joint Year 2000 Council recognises that efficient cross-border communication between Financial Market Authorities (FMAs) will be an essential ingredient for a smooth transition to the year 2000 in financial markets. During this critical period, to the extent possible, the resolution of cross-border issues and other information gathering and decision-making by FMAs is expected to be carried out according to normal procedures. As such, existing arrangements among market authorities – bilateral and multilateral contacts with regulatory counterparts in foreign markets – are expected to handle most developments. Nevertheless, there remain a number of ways in which communication efficiency can be organised by a central hub. The Council Secretariat plans to facilitate and support cross-border exchanges of information among key financial market authorities during the transition period by setting up an information sharing platform which would provide various services. These central services would include maintaining up-to-date contact lists, collecting and disseminating information on the operational status of core infrastructure components, enabling FMAs to announce emerging developments and facilitating the organisation of conference calls. The Secretariat will



co-ordinate with the sponsors of other international information exchange initiatives to ensure that duplication of communication channels and multiple reporting by FMAs are minimised.

#### **Global 2000**

The Global 2000 Co-ordinating Group (Global 2000), an informal organisation of banks, securities firms and insurance companies, is a voluntary private sector financial industry grouping consisting of 630 institutions representing 70 countries. The overall objective of Global 2000 is to identify and resource areas where co-ordinated initiatives will facilitate efforts by the global financial community to minimise the risks to global financial markets arising from the year 2000 date change.