



THE EURO BANKNOTES: DEVELOPMENTS AND FUTURE CHALLENGES

Demand for euro banknotes and coins has, following their successful introduction in 2002, increased continuously in terms of both value and volume. Work has been conducted to continuously improve the areas of both banknote production and banknote issuance. A framework for the detection of counterfeits and fitness sorting by credit institutions and other professional cash handlers has been established. This contributes to ensuring the integrity and longevity of the euro banknotes in circulation and thus the public's trust in those banknotes. Furthermore, the ECB has established a Guideline on the future procurement of euro banknotes. This Guideline establishes a single Eurosystem tender procedure for the production of euro banknotes in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources.

With regard to developments in euro banknote counterfeiting, the public can be confident of the quality of the euro banknotes and their security features. The vast majority of counterfeit euro banknotes can be easily distinguished from genuine ones by using the simple "feel-look-tilt" test. Even well-made counterfeits can be detected by carefully applying this method. Looking further ahead, research and development continues to support the next series of euro banknotes, which is expected to be issued towards the end of the decade.

I THE ISSUANCE OF EURO BANKNOTES AND THE CASH CYCLE

DEVELOPMENTS IN EURO BANKNOTE CIRCULATION

Banknote demand has remained strong following the euro cash changeover in 2002. The average annual growth rate of the value of euro banknotes in circulation was 31.1% in 2003 and 19.0% in 2004. Moreover, growth in the period from January to June 2005 was at almost the same pace as in 2004, resulting in an average annual growth rate of 16.6% in the

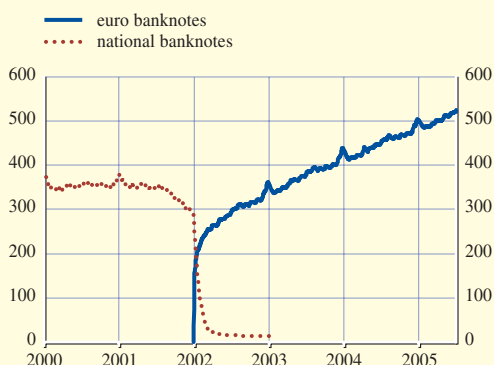
first six months of this year (see Chart 1). In absolute terms, the average monthly increase in the value of banknotes in circulation was €6.5 billion in 2003 and €5.4 billion in 2004.

Demand was strongest for the €500 and €50 banknotes, which accounted for more than three-quarters of the increase in circulation value in 2003 and 2004.

That strong demand is also reflected in the fact that the number of euro banknotes in circulation rose from 7.3 billion in June 2002 to 9.7 billion in June 2005, an increase of 32.9%

Chart 1 Total value of banknotes in circulation between 2000 and June 2005

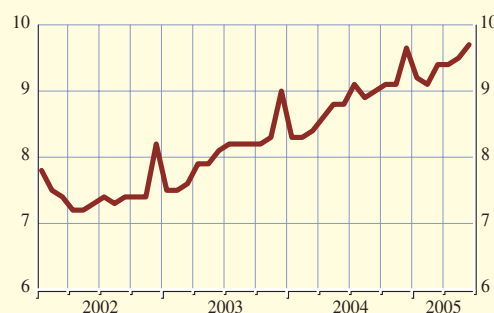
(EUR billions)



Source: ECB.

Chart 2 Total number of euro banknotes in circulation between 2002 and June 2005

(billions)



Source: ECB.

(see Chart 2). The average annual growth rate of the number of banknotes in circulation was 8.2% in 2003 and 10.1% in 2004. The average monthly increase in the number of banknotes in circulation was 69.4 million in 2003 and 51.1 million in 2004. With the number of banknotes in circulation growing more slowly than the value of those banknotes, the value of the average banknote in circulation increased from €43.7 at the end of 2002 to €54.0 at the end of June 2005.

In addition to withdrawing euro banknotes from the NCBs, credit institutions also regularly deposit surplus stocks with those NCBs. On the whole, the frequency with which euro banknotes are returned to the NCBs has remained fairly stable since 2003. Between January 2002 and June 2005 euro banknotes returned to NCBs an average of 3.3 times per year.

Demand for euro coins has also remained strong in the years following the cash changeover. The average annual growth rate of the value of euro coins in circulation was 21.8% in 2003 and 18.7% in 2004. In terms of the number of coins in circulation, the annual growth rate dropped slightly, from 13.7% in 2003 to 10.3% in 2004. At the end of June 2005 there were a total of 59.6 billion euro coins in circulation (excluding NCBs' stocks and collectors' coins not intended for circulation) with a face value of €16.0 billion.

ECB FRAMEWORK FOR THE DETECTION OF COUNTERFEITS AND FITNESS SORTING

After being put into circulation by the NCBs, banknotes are handled by other stakeholders in the cash cycle. In order to implement a common policy for banknote handling and processing by credit institutions and other professional cash handlers and in order to provide those parties with assistance in fulfilling their obligations as laid down in Article 6 of Council Regulation (EC) No 1338/2001 regarding the detection and withdrawal of counterfeit euro banknotes, the ECB adopted the Framework for the detection of counterfeits and fitness sorting by credit

institutions and other professional cash handlers (the Framework) in December 2004. Translations of the Framework in all official languages of the EU were published on the ECB's website in February 2005.

According to the Framework, credit institutions and other professional cash handlers are allowed to put euro banknotes back into circulation, provided that the banknotes have been duly checked for authenticity and quality (i.e. their fitness for circulation). Banknotes that are reissued via automated teller machines (ATMs) and other customer-operated devices have to be checked using banknote handling machines which have been successfully tested by an NCB. The Eurosystem is currently finalising preparations for such a testing procedure and will publish a central list of successfully tested machines on the ECB's website in due course. In addition, the Eurosystem, in cooperation with the Cash Working Group of the European Payments Council and the European Security Transportation Association, is defining the details of the methods by which NCBs will collect data from credit institutions and professional cash handlers that recycle euro banknotes in accordance with the Framework.

THE EUROSISTEM'S ROLE IN THE CASH CYCLE

In December 2004 the Governing Council agreed upon common principles and objectives in respect of the Eurosystem's role and responsibilities in the cash cycle. The definition of its role and responsibilities will contribute to the establishment of the Single Euro Payments Area. Besides the above-mentioned Framework, the ECB has in this respect already agreed on a number of measures with a view to moving to a fair competitive environment. A couple of examples of these are outlined below.

– A fee policy for the Eurosystem

NCBs offer basic services free of charge, but may have additional services for which a fee is

charged. The latter could also be provided by third parties, so NCBs offering these services should charge market fees in order to avoid distortions.

- A common approach to opening hours and debiting/crediting rules

A common window of at least six hours per working day has been introduced for deposits and withdrawals of banknotes at a certain number of NCB facilities (i.e. branches, headquarters and/or cash centres). Debiting/crediting must normally be effected at the time of the physical withdrawal/deposit at the NCB counters.

By defining its role and responsibilities in this context, the Eurosystem also provides a reliable framework for its partners in the cash cycle (i.e. the banking industry and cash-in-transit companies). In line with the principle of decentralisation, the Governing Council has not established a fully harmonised system for euro area cash services. Whilst it is necessary that some harmonisation and standardisation be carried out under the guidance of the ECB, the NCBs are responsible for implementation at the national level, taking into account their respective national economic environments and banking structures, the existing NCB branch network and the relative shares of cash payments and/or long-term agreements. In this context, a number of issues have been identified which need to be addressed and will be considered by the Eurosystem in the near future.

MAINTAINING THE DENOMINATIONAL STRUCTURE OF THE EURO BANKNOTES

Following calls from various sources seeking the introduction of very low-denomination banknotes, the ECB conducted an analysis involving the European Commission and European associations representing credit institutions, cash-in-transit companies, retailers, consumer organisations and operators and manufacturers of vending machines. This analysis showed that, on balance, the negative

aspects of introducing very low-denomination banknotes outweighed the positive aspects. Concerns related, in particular, to the insufficient demand for such banknotes, the reduced efficiency that the introduction would entail for most of the affected third parties (particularly for the retail sector and the vending machine industry) and the high costs of printing and processing. Accordingly, the Governing Council decided in November 2004 not to introduce €1 or €2 banknotes.

The Governing Council has also decided to keep the €200 and €500 banknotes. The denominational structure of the euro banknotes will thus remain unchanged for the second series of euro banknotes.

THE SECOND SERIES OF EURO BANKNOTES

As previously announced, the ECB started planning the second series of euro banknotes a couple of years ago. This is in line with the standard practices of banknote issuing authorities, which typically update banknotes after a few years of circulation in order to ensure that they always incorporate the latest security features. The functional requirements will also be reviewed at this time.

The Governing Council recently endorsed the “master plan” for this Eurosystem project. The plan sets out the main specifications of the project and identifies major issues. The timing and sequencing of that issuance will depend on the availability of new security features and substrates, as well as on the counterfeiting situation. The first denomination of the second series is expected to be issued towards the end of this decade.

2 PRODUCTION OF EURO BANKNOTES

The quantities of banknotes to be produced have evolved significantly since the start of euro banknote production in 1999, having a peak rate of approximately 1 billion banknotes per month in 2001. This high rate was

necessary in order to build up the stocks required for the launch of the euro banknotes on 1 January 2002.

In the years following the introduction of the euro banknotes, the production requirements have been determined by the number of banknotes needed to accommodate the increases in demand described above or to replace unfit banknotes that have been destroyed. The replacement needs are particularly important for lower denominations, given their shorter lifespan, whereas the production requirements for higher denominations are, on account of their longer lifespan, dependent more on the increase in demand for such banknotes. As a result, production volumes decreased after the launch in 2002 but have now started to increase again, with production requirements of approximately 3.6 billion banknotes for 2005 and 7.0 billion banknotes for 2006 (see table).

At the same time, the Eurosystem has continued to reflect upon the improvement of its operating standards and processes. This has resulted in the refining of some of its technical standards and continual improvements to its quality management system.

DEVELOPMENT AND MAINTENANCE OF THE TECHNICAL STANDARDS AND THE QUALITY MANAGEMENT SYSTEM

The technical specifications for the production of euro banknotes have recently undergone a complete review. The review mainly concerned the measuring methods and instruments for machine-readable features, taking into account information from both users and producers of banknotes. The review has resulted in the improvement of both standards and procedures.

Consistency across all production entities is checked by collecting and evaluating banknote samples from all production batches. The evaluation concerns both the visual appearance and the machine readability of the banknotes. The consistency of the visual appearance is

regularly checked by comparing the banknote samples with one another and against a single reference banknote.

The results of both visual and laboratory assessments have confirmed that the production of euro banknotes has stabilised, and the consistency of the production in terms of both visual appearance and technical performance is very good.

There are regular liaison meetings with suppliers (such as banknote producers or paper mills) and banknote users, where these groups are informed and consulted on issues relevant to them. This flow of information allows the Eurosystem to monitor the performance of the current banknote series and prepare for the second series of euro banknotes.

In order to achieve the same level of quality at all printing works, a quality management system was introduced before the start of production and comprehensively reviewed in 2003. The upgraded system focuses less on final checks of the finished product and more on process controls, in order to reduce waste costs.

As part of the general improvement programme and in order to enhance communication in the supply chain, all printing works, paper mills and other key suppliers are periodically audited to ensure compliance with the quality management system requirements. All manufacturing sites now work according to the most stringent industrial standards. Common requirements relate in particular to banknote production documentation, the quality control process (inspection of raw materials, process checks and final inspection) and quality control standards.

BANKNOTE PROCUREMENT

In September 2004 the Governing Council adopted a Guideline (Guideline ECB/2004/18) setting out how euro banknotes would be procured in the future. The single Eurosystem

Production volume and allocation of euro banknote production in 2006

| Denomination | Quantity (millions) | Value (EUR millions) | NCBs commissioning production |
|--------------|---------------------|----------------------|-------------------------------|
| €5 | 1,080 | 5,400 | ES, FR, IE, AT, FI |
| €10 | 1,780 | 17,800 | DE, GR, FR, NL |
| €20 | 1,940 | 38,800 | DE, ES, FR, IT, PT |
| €50 | 1,920 | 96,000 | BE, DE, ES, IT, NL |
| €100 | 280 | 28,000 | IT, LU, AT |
| €200 | - | - | - |
| €500 | - | - | - |
| Total | 7,000 | 186,000 | |

Source: ECB.

tender procedure (SETP) establishes an open and transparent procurement system in accordance with the principle of an open market economy with free competition, favouring an efficient allocation of resources. It also takes into account the fact that several NCBs within the Eurosystem have in-house printing works or use public printing works rather than seeking tenders for the euro banknote production allocated to them.

Under the current system the annual production requirement is pooled and each NCB defines its own procurement rules for its own allocated production. According to the SETP, NCBs which do not have in-house printing works and do not use public printing works must seek tenders for the banknote production allocated to them. NCBs which have in-house printing works or use public printing works may decide not to participate in the SETP, in which case their printing works will continue to print their respective allocated shares. The new tender procedure will apply from the beginning of January 2012 at the latest but will be preceded by a transitional period designed to allow NCBs and the printing works to prepare for the changes. The transitional period will start no earlier than 1 January 2008, but the precise starting date – which will be decided by the Governing Council – is dependent on the achievement of a critical mass in terms of both the number of NCBs seeking tenders for their allocated shares and the total volume of production for which tenders are sought.

3 DEVELOPMENTS IN EURO BANKNOTE COUNTERFEITING

Since the launch of the euro banknotes in January 2002 the quantity of counterfeit banknotes being removed from circulation has increased gradually. However, since October 2003 the figure has levelled off at just under 50,000 counterfeit banknotes per month. Counterfeit banknotes show the same seasonal fluctuations as the circulation data for genuine banknotes, with peaks around the summer holiday and Christmas periods. The ECB recently announced that around 293,000 counterfeit banknotes had been removed from circulation during the first six months of 2005, compared with the 287,000 recovered during the previous six-month period.

These figures should be considered in the context of the number of genuine banknotes in circulation (approximately 9 billion), the population of the euro area countries (more than 300 million inhabitants) and the number of cash transactions involving banknotes (estimated to be approximately 120 billion per year). In this environment, the chances of an individual being passed a counterfeit are extremely small. A few counterfeit euro banknotes are of good quality, but the vast majority can be readily distinguished from genuine banknotes by using the simple “feel-look-tilt” tests described in the Eurosystem’s information material. Even well-made counterfeits can be detected by carefully

applying this test. If in doubt, another good test of authenticity is to compare a suspect banknote with one that is known to be genuine.

There are three principal ways of guarding against counterfeits: protection of the banknotes by means of a range of high-quality security features; educating the public about them; and good police work. As regards the latter, the police have had some significant successes in the fight against counterfeiting over the past year, both inside and outside the euro area. Several incidents have been prominently reported in the media. For instance, inside the euro area, in March 2005 two illegal print shops were dismantled in Spain, where counterfeits with a total face value of approximately €2.5 million were seized and 27 people were arrested. In November 2004 a carabinieri unit dismantled an illegal print shop in Italy, seizing counterfeit €50 banknotes with a face value of €195,000. Outside the euro area, in November 2004 a print shop producing counterfeit euro banknotes was dismantled in Lithuania. High-quality €100 counterfeits with a face value of around €1 million were seized, along with partially completed counterfeits with a potential face value of around €8 million, and 13 people were arrested. Subsequently, Lithuanian police also reported the dismantling of another clandestine print shop, which was being used to make €50 counterfeits.

Counterfeit banknotes are frequently passed in retail or catering businesses, typically by purchasing low-value items with relatively high-denomination counterfeits, in order to receive as much genuine currency in change as possible. Many counterfeits are only detected when they reach the banks and NCBs, i.e. after they have caused financial damage to those accepting the counterfeits. This could be minimised, or avoided entirely, if cashiers carefully authenticated all banknotes received from their customers. If several features are checked carefully, this not only increases the chances of detection, but also increases the deterrence factor in the mind of someone who is

knowingly attempting to pass a counterfeit. With this in mind, the Eurosystem regularly adapts its communication materials and training sessions to meet cash handlers' requirements.

4 RESEARCH AND DEVELOPMENT

The objective of the research and development (R&D) activities undertaken by the Eurosystem is to maintain the integrity of the current and future euro banknotes. This consists of assessing and addressing the counterfeiting threat, whilst ensuring both circulation quality and the consistency and efficiency of the production processes. There is a race between banknote designers, who include new features in the banknotes, and counterfeiters, who try to emulate these features. For the banknote designers to stay ahead in this race and to continue to design resilient euro banknotes, it is clear that a substantial R&D effort is required to develop new technologies. In order to investigate new paradigms and produce new designs, NCBs and a range of other research organisations are involved in undertaking R&D activities coordinated by the ECB. The R&D strategy stresses the need for the euro banknotes to be "self-defending", rather than relying on heavy law enforcement. Therefore, when addressing the counterfeit threat, the European approach has traditionally focused on having the banknotes place as many obstacles as possible in the paths of counterfeiters. This European approach, which remains the basis of the current euro R&D strategy, was also the strategy of the legacy currencies and is complemented by significant communication to the general public on the security features of the banknotes.

At the end of 1999 the Eurosystem adopted a structured R&D management system in order to prepare for future euro banknote upgrades and the second series. This approach differentiated between the long-term R&D work that generates the technology that supports the new

features necessary to stay ahead of the counterfeiters and specific R&D activities dedicated to supporting the development of future banknotes. Whereas the dedicated R&D activities are directly linked to a particular time frame and a particular design project, the long-term R&D is a continuous activity that provides the technological foundations for future design projects. The balance between these two elements is vital to ensuring a smooth long-term banknote design programme.

Euro R&D operates as a decentralised network coordinated by the ECB. The network connects the ECB, the NCBs and their long-term suppliers, and other industry players, thereby enhancing the potential for innovation. The network is open to all companies and individuals willing to propose ideas and projects to improve the performance of the euro banknotes, thus providing the innovation that a global currency such as the euro needs. The Eurosystem has developed this R&D policy and has created a procedural framework to assess and select projects for funding in order to develop the euro R&D technology portfolio. This set of procedures is certified under the ISO 9001:2000 standard.

The effectiveness of banknotes' security features diminishes over time: initially a newly designed feature will perform well, but then, as it becomes known by legitimate users and as the counterfeiters' technology advances, it is eventually emulated and needs to be replaced. This life cycle can be expected to speed up as other banknote design authorities regard the euro as a technical standard and opt for similar security systems. It falls to R&D to provide replacement features from the R&D technology portfolio.

The euro banknote features should allow the public to make swift judgements on their authenticity and it is thus essential that banknote features be designed in such a way that they are easily recognised by the public and other users. Accordingly, the Eurosystem strives to exploit new developments by

converting new technologies into security features that could be used efficiently by the general public and by other users, such as professional cash handlers, to verify the authenticity of euro banknotes.

5 CONCLUSION AND CHALLENGES AHEAD

After more than three and a half years, the euro is continuing to develop into a well-established currency. Much has been learnt in all respects, and a key factor in that was continuous improvement. Historical data and trend analysis continue to become more useful as time goes by, but the focus is now firmly on the future and on the development of the second series, which will take the euro into the next decade. However, there is still much to be done in terms of the consolidation of processes and systemic improvement to ensure that the next series is born into an environment which is even more favourable than that of the first series.

The promotion of a "level playing field" and the reaping of the benefits of a common currency, in terms of both the cash cycle and banknote procurement, will continue in the future.

The arrangements for credit institutions and other professional cash handlers as set out in the Framework will be implemented by 2006 at the latest. Work on the single Eurosystem tender procedure for the production of banknotes will be completed by 2008, although the precise implementation date will be determined by market conditions.

The Eurosystem will strive to further enhance its effectiveness and efficiency in all areas, taking advantage of all the experience available and exploiting potential synergies and economies of scale wherever possible.

