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Electronic money –the payment instrument of the future?

- **Electronic money** (e-money) is a prepaid bearer instrument that allows direct, final payment without performance risk for either user or acceptor.

- Among the existing methods of payment e-money **competes** especially with cash on face-to-face transactions and credit cards on remote ones.

- E-money has **great potential for widespread use**. Payments can be made effectively, cheaply and fast. This holds especially for small amounts. Multi-currency capability and mutual compatibility will likely additionally strengthen the competitiveness of e-money schemes.

- Demand for e-money is subject to strong **network effects**. It depends on the availability of loading and payment terminals and the number of participants in e-money schemes. This requires both sizeable initial investment by the operators as well as a high degree of user acceptance. However, after a critical mass of users is achieved, the volume of e-money in circulation is expected to grow rapidly.

- So far, e-money is not in widespread **use**. At EUR 140 million, the current volume of e-money constitutes merely 0.04% of total cash in circulation in the euro area. The schemes in operation differ greatly in an international comparison in terms of proliferation and technical features. So far, no provider has succeeded in capturing a critical user mass or a far-flung user community.

- Theoretically, a pronounced substitution of cash and sight deposits can have far-reaching **implications for monetary policy** since it will influence the size of the money supply; it can hamper the assessment of the monetary situation and limit the effectiveness of monetary-policy instruments.

- However, this can be countered effectively by **adapting monetary indicators and tools**, that is to say by widening the money supply aggregates and setting minimum reserve and redemption requirements. As long as the central banks do a good job of preparing the ground, substantial problems for monetary policy are unlikely to arise.

- The issuance of e-money thus needs clear **regulation** from an early stage. The EU is playing a leading role in this regard. It has already created a comprehensive legal framework. As things stand today, the central banks of the EU, spearheaded by the ECB, and the supervisory authorities are already equipped with the tools required for effective monetary-policy and market regulation in view of a strong increase in e-money in circulation. Other countries, particularly the USA and Japan, have not taken any comparable steps as yet.

- Given the **security risks** specifically linked with e-money, the battle against fraud, money laundering and counterfeiting will not only require supervision at national level but also closer **international cooperation**.
It is virtually impossible to imagine day-to-day business life without cash. Since coins were first introduced in the 7th century BC and banknotes in the 11th century AD they have been a central component of business and trade. In principle, cash has hardly changed its appearance since then.

According to many people working on the development of electronic money (e-money), though, the cash era could now be coming to an end. Electronic monetary units – stored on chip cards or in computer programmes – could replace coins and banknotes in future. Given the rapidly growing volume of trade conducted via the internet, expectations for electronic currency media are particularly high. But e-money might also create competition for more than just conventional cash. E-money can be employed in numerous respects as an alternative to, for example, sight deposits, cheques, bank transfers, credit cards and debit cards.

If e-money is to enter widespread use in future, this will have a major impact on the payment transaction landscape and the monetary system as a whole. This suggests that even though the development and use of e-money are still in their infancy, it makes sense to consider the potential implications of the growing use of electronic storage media today. This report will therefore look at how e-money functions and discuss its development potential, possible repercussions for monetary policy and related regulatory action.

**Definition of “electronic money”**

The term “electronic money” refers to a narrowly defined group of payment instruments. The European Central Bank (ECB) calls it a “payment instrument whereby monetary value is electronically stored on a technical device in the possession of the customer.”

This clearly sets e-money apart from the traditional instruments of retail payment transactions. Cheques, bank transfers, credit cards and debit cards are instruments for accessing existing scriptural holdings usually kept in current accounts. By contrast, e-money is not an access product but instead a bearer instrument prepaid with cash or scriptural money (“pay before”, see chart p. 3) and is itself a store of monetary value.

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**Debit dates: payment instruments in comparison**

<table>
<thead>
<tr>
<th>Interest loss</th>
<th>Payment due</th>
<th>Deferral</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“Pay before”</strong></td>
<td><em>Cash</em></td>
<td><em>Debit card</em></td>
<td><em>Charge card</em></td>
</tr>
<tr>
<td><em>Prepaid e-money units on chip cards</em></td>
<td><em>Bank transfer</em></td>
<td><em>Credit card</em></td>
<td></td>
</tr>
<tr>
<td><em>Prepaid e-money units as network money</em></td>
<td><em>Direct debiting</em></td>
<td><em>Debit authorisation</em></td>
<td></td>
</tr>
</tbody>
</table>

**“Pay now”**

| *Cheque* |

**“Pay later”**

Source: Hartmann, 2000, p. 38; Kabelac, 1999, pp. 5-7; DBR

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value. A payment with e-money is final thanks to the transfer of e-money units and entails no performance risk between payer and payee. As with cash, it is done without any intermediary – such as a bank.

The term “e-money” is confined to payment instruments that can be widely employed for transactions between users and acceptors. Single-purpose electronic instruments, such as telephone cards, are thus not considered e-money products.

Besides its function as a payment instrument e-money also serves as a store of monetary value and unit of account. Assuming e-money circulates in a stable price environment, e-money units retain their value over time and can be used as a generally accepted value standard. These properties endow e-money with the classical functions of money (see chart).

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**Payment instruments: an overview**

<table>
<thead>
<tr>
<th>Payment instruments</th>
<th>Money</th>
<th>Money substitutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td></td>
<td>Cheque</td>
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<tr>
<td>Scriptural money</td>
<td></td>
<td>Bill of exchange</td>
</tr>
<tr>
<td>E-money</td>
<td></td>
<td>Credit card</td>
</tr>
</tbody>
</table>

- **Bank-notes**
- **Coins**
- **Overnight dep. with central banks**
- **Sight dep. with commercial banks**
- **Network money**
- **Card-based money**

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**How e-money circulates**

The flows of an e-money scheme mainly link three groups: the issuer, the users or payers, and the acceptors or payees.

Issuance and circulation of e-money are organised by the issuer who provides e-money units to the user in exchange for cash or scriptural money. When purchasing goods or services the payer (user) transfers units to the payee (acceptor). The latter exchanges these units with the issuer for cash or scriptural money. Besides perhaps charging fees for participating in the scheme or effecting transactions, the issuer of e-money units generates income mainly by investing for profit the liquidity that results from the different dates of booking incoming and outgoing payments.

Generally, it is necessary to differentiate between software-based products and card-based e-money schemes. Software-based schemes are tailored to remote payment transactions and are used when

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2 In practice, the value chain of e-money supply is typically divided into four steps: the issuance of e-money units, the provision of payment transaction infrastructure, the development, production and distribution of the required hardware and software products, and clearing of the e-money transactions. If the issuer does not cover all these steps himself, other providers can become involved in the production process.

3 In principle, the issuer can be a government institution – such as the national central bank, which is also responsible for issuing cash – or else a private institution. The extent to which private undertakings may issue e-money, and the licensing and legal supervisory requirements they have to meet, depend on the statutory framework in the respective country or currency area.
transferring units via telecommunications networks such as the internet. The monetary units are stored in computers or similar user terminals equipped with special programmes. Software-based e-money is loaded via a data transfer line from a bank account. E-money units can then be passed on to the acceptor via the internet for payment purposes.

In card-based schemes the e-money units are stored in a memory chip embedded in a plastic card. As a rule, the card is loaded at an automatic teller machine (ATM) by transferring the desired amount from a bank account to the card. Payment is effected by deducting the amount in question from the chip card by means of a card-reading machine. Card-based schemes are therefore primarily suited for face-to-face transactions; however, they can be used for making payments via computer networks with the help of special card readers.

Furthermore, the industry differentiates between closed-loop and open-loop schemes for both hardware-based and software-based e-money. With closed-loop schemes, units “paid” to the acceptor first have to be redeemed by the issuer, who credits them to the former’s bank account or exchanges them for new units. Therefore, longer transaction chains are not possible. At present, most schemes are based on closed-loop circulation.

By contrast, open circulation schemes allow a beneficiary to re-use e-money units received from other users of the scheme and spend them again directly. This opens the way to long transaction chains, so e-money can be used practically like cash. This makes it more cost effective and easier to use, although it raises the difficulty of monitoring the amount of money in circulation.

**Great potential for widespread use in the long term**

The most important determinant of the development potential of electronic currency media is the cost of their use in comparison with the cost of existing payment instruments. Generally speaking, these costs are probably lower than those of cash or non-electronic payment instruments such as cheques or bank transfers since no physical units need to be processed. A comparison with other electronic access products such as credit cards and direct debit procedures also highlights e-money as having low transaction costs. It is likely mainly worthwhile for users who make a large number of payments or payment transactions involving small amounts. Its attractiveness declines for large payment volumes since e-money, similar to cash, harbours a loss risk. For example, if an e-money card goes astray, the owner loses the units that are stored on it. Therefore, most schemes set an upper limit on the amount that can be loaded on the storage media.

While transaction costs are low, there are initially fixed costs for the installation of the e-money scheme. Such costs can hit not only the providers of the e-money schemes but also the users, if participation in e-money transactions is based on the purchase of specific equipment or programme components. Widespread acceptance of an e-money scheme is predicated on being able to offset these start-up costs as rapidly as possible through the comparatively cheap transaction costs.

The second basic determinant for the success of e-money schemes is their security and reliability in payment transactions. As a bearer instrument, e-money has a major advantage over non-cash access...
products such as cheques and credit cards since e-money transactions, similar to cash payments, are final and this eliminates performance risks.

Nonetheless, there is a host of security risks linked with the provision and settlement of e-money payments (see box). The authenticity, confidentiality and integrity of the data processed in e-money transactions have to be guaranteed in order to win the confidence of users. Even though the risks linked with the use of e-money are in principle similar to those of conventional money, the development of the schemes requires utmost attention to detail on the part of issuers, users and supervisory authorities given the lack of experience in the use of e-money units. Therefore, the demands on the development of hardware and software, particularly electronic cryptography, are very high.

Two other aspects likely to influence the potential growth of e-money products are ease of handling and understandability. Given current payment habits and users’ familiarity with the existing instruments, simple and versatile application will probably be a major factor shaping the competitiveness of e-money products going forward. One argument supporting the use of e-money, for example, is that as a rule currency-unit transfers do not require users to identify themselves first by means of a PIN code or signature. In addition, it is possible to develop e-money media that enable different currencies to be processed (multi-currency capability) as well as interoperability, i.e. compatibility with other e-money schemes, say, in foreign countries.

Ultimately, the crucial factor determining the potential of e-money is the size of the network. Following the logic of network effects, demand for e-money products will hinge strongly on the availability of loading and payment terminals and the number of participants in the payment scheme. In closed-loop circulation, this primarily refers to the number of companies that accept payment in electronic units, whereas in open circulation it also includes the number of end-users with whom units can be exchanged.

It follows that to establish a far-flung e-money scheme the issuer has to achieve a critical mass of network subscribers. This means, for example, that the provider of an e-money scheme has to invest heavily to develop the infrastructure and provide storage media, card-reading equipment and/or application software. At the same time, the fee structure, security and anonymity features as well as additional services such as multi-currency capability and interoperability have to be attuned to customer needs in order to create the basis for popular demand.

The extent to which an e-money system can achieve a broad-based presence also depends on the market structure. In an environment in which e-money schemes are still in the development stage and providers are locked in strong competition for innovative products, experience shows that establishing a critical mass of users usually proves a difficult task. The larger the number of competing providers or schemes, the higher the hurdles generally encountered on the road to broad-based, intensive use. By contrast, cooperative ventures among providers and common product standards can enhance the pace of market penetration.

To put it in a nutshell, e-money combines a number of positive features and can in certain market segments attain a good competitive position versus conventional payment instruments. This holds especially for small amounts and remote payments. With face-to-face transactions

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**Security risks linked with using e-money**

E-money hardware and software have to withstand a host of security risks to guarantee the authenticity, confidentiality and integrity of transactions:

**Counterfeiting and duplication risks**

- Illegal duplication of e-money media including their cryptographical codes, credit balances or other data
- Illegal duplication of data, especially e-money credit balances
- Manipulation of media functions, e.g. of chip cards or software, so deduction procedures cannot be executed
- Manipulation of data transfers
- Alteration, repetition, deletion of or access to data flows in the e-money system

**Theft**

- Theft of e-money media or units

**Non-acknowledgement of transactions**

- Fraud by users who claim that they did not authorise a transaction actually commissioned

**Erroneous function**

- Unintentional corruption or loss of data, function error by hardware or software, non-execution of electronic data transfer

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**E-money in the internet**

The potential for widespread use of e-money is particularly high for remote payments over the internet. Cash plays no part in internet transactions since it is physically impossible to transfer monetary units via this medium. Therefore, many payments over the net are currently done via credit card. However, this harbours the risk of customer details transferred on the internet being misused. Moreover, credit card transactions involve comparatively high settlement costs for the customer. As suitably equipped e-money schemes allow anonymous payment at a cheaper cost, they could be positioned as strong competitors to credit cards in the context of remote payments via the internet.

**Highly competitive in small amounts and remote payments**
it will probably be more difficult in the short term to influence payment habits that are closely associated with hard cash. When the anticipated network effects are also factored in, it looks as though the use of e-money instruments will initially be limited and then later enter a phase of rapid expansion. The market environment for payment transactions and user habits differ substantially from country to country, so the development, advances and technical features of electronic money will probably differ just as much in an international comparison.

**E-money not in widespread use so far**

E-money is not in widespread use so far in the EU or other industrial countries. The value of e-money in circulation in the countries reporting to the Bank for International Settlements (BIS) totalled a mere EUR 230 m or so at mid-2000, with more than half the volume held in the EMU member states. The ECB puts the volume in circulation in the euro area as of June 2000 at EUR 140 m. The fact that e-money currently plays a negligibly small role is illustrated by a comparison with the scale of the conventional money supply: in EMU, e-money accounts for only 0.04% of cash in circulation, and a mere 0.007% of M1, which includes overnight deposits at commercial banks. After initially robust figures, the growth of e-money in circulation has slowed noticeably over the past three years (see graph).

An international comparison shows considerable differences in the degree to which electronic money media have taken root (see table, p. 9). An initial indicator is the number of broadly based systems operating within a country. For example, there are already six different e-money schemes in operation in Finland, whereas in Ireland not a single project has gone beyond the pilot phase so far.

The degree of market penetration by card-based and network money also varies substantially. The number of payment cards and software-based devices ranges from a few thousand to several million per country. France and Ireland rank in last place, since so far no significant share of the population of either country uses e-money. The Netherlands leads in the standings. Statistically speaking, each person there has more than one card to access the schemes in operation.

Moreover, there are significant differences in respect of the number of e-money transactions conducted daily as well as their total and average values. In France, for example, the software-based e-money scheme handles about 300 transactions per day; the total value comes to approximately EUR 300 and the average value EUR 1.1. By contrast, Belgium’s card-based e-money scheme processes 149,000 payment transactions each day with a total volume of EUR 563,000 and an average value of EUR 3.8.

In addition, a negative relationship has been established between the number of e-money schemes in a country and their degree of penetration and use (see graph). The establishment of a uniform standard appears to promote broad-based use. A high market concentration is frequently achieved after a fairly large number of companies join forces to operate a common e-money scheme or establish a joint technical standard, such as in Belgium (Proton), Germany (GeldKarte) or Portugal (PMB); countries with a fragmented

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4 However, the BIS has not yet released data on the volume of e-money in circulation in a number of countries, including the USA.
e-money system generally show a lower level of acceptance for electronic money media. This is probably mainly attributable to positive network effects.

The USA is noticeably behind in the development of the e-money system; so far there is no sign of it spreading across the country. Credit cards have long taken root as payment instruments in the USA. For that reason, efforts there are being concentrated on upgrading the existing credit card infrastructure and related systems; however, these generally do not fall into the category of electronic money. Regional card-based e-money projects are still largely in the pilot phase. There are a number of pilot projects being conducted in Japan, too, although these have failed to generate a significant volume of e-money units to date.

All in all, this produces a very mixed picture which bears the stamp of strongly differing payment customs in different countries on the one hand and the continuing development of competing technologies, especially in the area of software-based e-money products, on the other. This is indicated by the large number of, often regional, pilot projects in the individual countries that frequently vary strongly in their application potential and technical features. So far, no provider has succeeded in achieving critical mass or a far-flung user community.

Implications for monetary policy

Despite its still low degree of penetration e-money is already a matter of interest to central banks. Their job, in general, is to safeguard the integrity of the monetary system, and this includes maintaining price stability in the respective national economy. Their monopoly on the issuance of money is an important element for performing these tasks. In order to be prepared for changes in the framework conditions

E-money: international comparison\(^1\) of systems and usage

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of systems</th>
<th>Number of issuers</th>
<th>Number of devices</th>
<th>Number of merchant terminals</th>
<th>Volume of daily transactions</th>
<th>Value of daily transactions</th>
<th>Average value per transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m % of population</td>
<td>'000</td>
<td>'000</td>
<td>EUR '000</td>
<td>EUR</td>
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<td>n.a</td>
</tr>
</tbody>
</table>

\(^1\) Different reporting periods in 1999. Figures for USA between 1997 and 1998.

\(^2\) C = card-based; N = network-based

Source: BIS, ECB, DBR

USA noticeably behind in the development of the e-money system

E-money and monetary targets

Increasing use of e-money has a different impact on monetary strategy depending on whether the latter is geared to the money supply or to an inflation target. Pure money-supply targets are directly affected by any distortions of the information content of the underlying monetary aggregates since in such cases the money supply is applied as the sole yardstick for monetary policy. Broad-based use of e-money could possibly change the interest-rate elasticity of demand for money, which could also affect monetary policy.

Unstable monetary demand, by contrast, will have less of an impact on an inflation target since the development of price levels and not the money supply is the main factor. However, repercussions cannot be ruled out since with inflation targets the growth of the money supply is often used indirectly as an indicator of general monetary conditions in the economy or as an intermediate target.
affecting monetary policy, the central banks must, at the earliest stage possible, analyse the potential implications of traditional money being replaced by privately issued e-money.

The degree of e-money usage is relevant for monetary policy since e-money could crowd out conventional cash as well as overnight deposits. If e-money proves competitive versus banknotes and coins in practice, the demand for electronic money will rise at the expense of conventional cash. If e-money issuers were to offer to pay interest on units credited, the demand for e-money could be additionally boosted and sight deposits might lose significance as a result.

Cash and overnight deposits with commercial banks are a major component of the money supply. Combined, they form the narrowly defined monetary aggregate M1, which accounts for 48% and 40%, respectively, of the more broadly defined aggregates M2 and M3 in the EMU area (see table). The aggregates are essential steering and orientation factors for the central banks when seeking to stabilise price levels, since experience has shown that in the long run there is a close relationship between the development of the money supply and the development of the inflation rate.

If e-money were to broadly replace cash or sight deposits, the informative value of monetary aggregates would, in the absence of corrective measures, be reduced. Moreover, e-money is likely to create a platform for more efficient payment structures and the velocity of circulation of the monetary aggregates will rise. Under these conditions it would be considerably more difficult to assess the money supply.

At the same time, a large degree of substitution for cash or deposits might limit the efficiency of monetary-policy instruments. A resultant decline in commercial bank demand for central bank money would bring about a contraction of central bank balance sheets. Central banks steer interest rates in the money market by setting the conditions at which they provide liquidity to the banking sector or siphon it off. A reduction in a central bank’s liabilities could therefore narrow its scope for steering money market rates.5

Finally, the use of e-money could, in extreme cases, harbour risks for the monetary system as a whole. E-money issuers might attempt to increase their profits in the short term through an inflationary supply of e-money units. As a consequence, price stability would decline in the respective e-money system. Besides the damage inflicted on the holders of the e-money units, this could also jeopardise the functioning of the underlying currency as a uniform unit of account, and thus as a common financial denominator for the economy as a whole.

Effective countermeasures

While these are possible implications of e-money, the present level of use harbours absolutely no dangers for monetary policy. The volume of e-money units outstanding in the member states of EMU makes up only a small fraction (0.003%) of M3, the reference aggregate for the

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5 Besides potential restrictions on monetary manoeuvrability, a reduction in the commercial banks' dependence on the central banks would probably result in a reduction in the profits generated by the latter when issuing cash. These so-called seigniorage profits are a key source of revenue for the central banks and contribute significantly to their financial independence. However, according to BIS calculations, the volume of cash in circulation in the large industrial countries would have to shrink by more than 80% as a rule before the current expenditures of the central banks were no longer covered by seigniorage profits.
ECB’s monetary policy. Even if the amount of e-money in circulation rises strongly, it is unlikely to cause any serious problems in monetary policy for quite some time. Besides, the effects on the monetary-policy concept and transmission mechanism can be minimised by modifying the relevant indicators and instruments in good time.

To ensure that the monetary aggregates contain the necessary information and thus continue to be reliable indicators, issuers of e-money can be required to report the amount they issue, making it possible to calculate the e-money supply and include it in the monetary aggregates. Any substitution of traditional money with electronic money then has no effect on total money supply.

It is also possible to avoid the central bank’s scope in monetary policy being eroded owing to a decrease in its liabilities. A fall in central bank liabilities can be prevented from happening in the first place. Issuers of e-money can be required to hold minimum reserves with the central bank. Provided conventional book money and e-money are subject to the same minimum reserve requirements, substitution will have no effect on the total volume of minimum reserves. It is desirable in any case that identical minimum reserve requirements be imposed on e-money issuers and traditional banks, as there should be a level playing field for the creation of electronic money and the creation of conventional money.

In addition, central banks can issue e-money themselves and can even go so far as to monopolise its issuance. A monopoly would make the supply of e-money in circulation as controllable as the supply of conventional cash. But it would hinder the market-based development of e-money, and in view of the whole array of alternative regulatory measures it should not be necessary.

The emergence of different units of account within one economy due to inflationary issuance of e-money can also be extensively precluded. For this, issuers have to be obliged by law to redeem e-money at par value with central bank money at the user’s demand. Such a redemption obligation creates a direct relationship between the supply of e-money outstanding and the supply of conventional money. This rules out the creation of unlimited e-money and upholds the function of the national currency as unit of account. If such a requirement for redemption in the respective currency is instituted in all legal systems world-wide, then it will be possible, if necessary, to take action against the creation of new, „stateless“ e-currencies.

Central banks still able to act under extreme conditions

Even without such countermeasures central banks are in a position to steer the liquidity of the banking sector. As state institutions they can always over or under-bid rates in the money market, and thus set reference rates for market participants. Since central bank money is free of credit risks, it will probably be used as payment medium in the interbank market even if e-money comes into widespread use. In addition, the central bank can always steer conditions in the money market by issuing debt or taking in deposits.

Even if e-money were to totally replace conventional cash and overnight deposits with banks, a central bank could still use its status as a state institution to steer short-term interest rates by buying or selling...
e-money. However, such extreme conditions would have considerable disadvantages for monetary policy. Central bank influence on interest rates and inflation would be greatly diminished. Also, any losses from market interventions would have to be directly offset at the taxpayer’s expense.

Regulation, supervision and monitoring of e-money systems

In theory, therefore, the effectiveness of monetary policy can be ensured through measures such as statistical reporting requirements, the imposition of minimum reserve requirements or a redemption obligation for issuers of e-money. In practice, an explicit legal basis will generally be required in order to make these instruments applicable to e-money. Since it is quite possible that the amount of e-money in circulation may increase rapidly once a critical mass of users has been reached, central banks and supervisory authorities should be provided with the necessary regulatory basis as early as possible.

The EU is playing a leading role in this regard. The regulation of e-money issuance within the EU was harmonised last year through two directives (see box). The key points of this legislation from the monetary-policy point of view relate to the creation of a redemption obligation and the applicability of minimum reserve requirements to electronic money...

... at the taxpayer’s expense

Early regulation necessary

EU plays leading role in regulation of e-money issuance

Main elements of the regulatory framework in the EU*

Limitation of activities

Business activities of electronic money institutions (ELMIs) is limited to the issuance of electronic money, the provision of closely related services and the issuance and administration of other means of payment, but excluding the granting of any form of credit.

Scope of application of banking directives

ELMIs are largely subject to the EU directives relating to the taking-up and pursuit of the business of credit institutions and on money laundering.

Minimum reserves

ELMIs can be obliged to hold minimum reserves.

Redeemability

In principle, the bearer of e-money may ask the issuer to redeem it at par, free of charges.

Initial and ongoing capital

A minimum of EUR 1 m; capital requirements are set on an ongoing basis.

Limitation of investments

ELMIs must invest an amount not less than their outstanding financial liabilities related to e-money in highly liquid assets.

Derivatives may only be used for the purpose of hedging market risks.

Verification

Fulfilment of the requirements for initial and ongoing capital, limitations on investments and market risks must be verified by the competent authorities not less than twice per year.

Management

Sound and prudent operation in respect of management, administrative and accounting procedures, and adequate internal control mechanisms.

Application of a waiver

National authorities may grant ELMIs a waiver of the provisions of the e-money directives* in specific cases.

Revision

The waiver clause and the measures to protect the bearers of e-money may be revised. The Commission is to present a report together with a proposal for any necessary revisions by spring 2005.

Sources: ECB, DBR

institutions (ELMs). For the EMU member countries, the ECB has been recording the supply of e-money issued within the euro area in its monetary and banking statistics since 1998. E-money is included in the definition of the money supply. Since the beginning of 1999 the e-money issued by banks has been subject to the ECB’s minimum reserve requirements. In the EU member states and EMU, foundations have therefore been laid which should allow monetary policy to remain effective.

But the need for regulation in connection with e-money issuance goes beyond ensuring that the central banks are able to take the necessary monetary-policy action. The supervisory framework should aim to underpin the efficient functioning of the overall payment system and the stability of the financial markets by limiting systemic risks in e-money schemes (see box). In addition, the interests of the users of e-money schemes must be covered by consumer protection rules. Finally, the authorities must also take measures to prevent and to combat criminal activities, particularly counterfeiting, money laundering and fraud. ELMIs and other financial institutions should all be subject to the same legal treatment to ensure that competition is not distorted by any of the necessary regulatory measures.

The EU’s regulatory framework also takes account of these criteria. Only banks and ELMIs are permitted to issue e-money. To a large extent, ELMIs are subject to the same supervisory obligations as the banking sector. The framework contains requirements specifically for ELMIs regarding initial and ongoing capital, and regulates their investment activities. ELMIs are also obliged to ensure sound and prudent operation in respect of management procedures. The EU regulation is thus extensively in line with the ECB’s minimum requirements for ELMIs (see box) and, from a current perspective, represents a stable basis for effective supervision and oversight of e-money systems.

Most other industrial countries, including the USA and Japan, have not yet passed any legislation that focuses specifically on e-money schemes. Primarily, this reflects the fact that most countries currently see no urgent need for action because e-money is still so little used. There is also concern in many quarters that if regulation were introduced in an early phase of the development cycle for e-money media, progress and competition might be constrained unnecessarily. In most industrial countries, though, the competent national authorities continue to investigate developments relating to e-money to determine the need for regulation.

In addition to activities at the national level, cross-border cooperation between the relevant authorities is extremely important in the monitoring of e-money schemes. If schemes can handle several currencies and are interoperable, then e-money units can be used in cross-border payments. While this enhances efficiency in international payment flows, it creates additional difficulties for the authorities in the fight against fraud, money laundering and the counterfeiting of e-money. It is also possible that independent e-money schemes that are not directly linked to a national currency and national jurisdiction

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### Types of risk of e-money schemes

**Credit risks** for the issuer, e.g. regarding the user and investment of the float in the financial markets.

**Liquidity risk** for the issuer when selling investments to meet redemption demands.

**Interest-rate, exchange-rate and price risks** on float investments.

**Strategic and operational risks** of the issuer from implementation of business strategy, e.g. regarding optimal use of company resources.

**Compliance and legal risks** from non-observance of laws, ordinances, procedures or ethical rules.

### E-money policy of the Eurosystem*)

**Minimum requirements**

- Issuers of e-money must be subject to prudential supervision.
- Rights and obligations of participants in e-money schemes must be clearly defined.
- E-money schemes must maintain adequate technical, organisational and procedural safeguards.
- Protection against criminal abuse must be taken into account when designing and implementing e-money schemes.
- E-money schemes must supply the relevant central bank with any information required.
- Issuers of e-money must be legally obliged to redeem e-money against central bank money at par at the holder’s request.
- It must be possible for the ECB to impose reserve requirements on all issuers of e-money.

**Desirable objectives**

- Interoperability of e-money schemes.
- Guarantee, insurance or loss-sharing schemes for e-money products.

*) According to Opinion of the ECB, January 18, 1999.

Source: ECB, DBR

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4 E-money is included in the ECB’s monetary and banking statistics under “Overnight Deposits”. As yet, only the e-money units issued by the monetary financial institutions (MFIs) are recorded in the statistics. But e-money issued by non-MFIs is reported to the ECB by the national central banks in the Eurosystem.
might spread across computer networks and, over time, become established as parallel currencies. It is essential that such developments be monitored under the auspices of international bodies – the BIS above all – and that authorities cooperate on a cross-border basis. These activities will have to be intensified in the future.

Conclusion
E-money has the potential to make payment transactions more efficient and cheaper, especially in the case of smaller amounts. Companies and end-consumers will often benefit from transaction costs being lower than those in existing payment systems. In the long run, widespread use of e-money will probably reduce the use of cash for face-to-face payments and of credit cards for remote payments.

Issuers of e-money have not yet succeeded in having their schemes adopted widely and used intensively. The main obstacles are the upfront costs, the fact that the technology is still in the process of development, and the payment habits of potential users.

But despite the small scale on which e-money has been adopted so far, its development potential is obviously enormous. The consequences which this could possibly have for monetary policy and for the monetary system as a whole should not be under-rated. In order to safeguard the efficiency of monetary policy and the integrity of the official monetary regimes, central banks and regulatory authorities must be provided as early as possible with the necessary legal basis to enable them to take appropriate action if and when necessary. If prudently regulated, a stable e-money infrastructure should enhance the efficiency of the existing payment systems and, by extension, the goods markets and financial markets as well.

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Further reading
BIS, Implications for Central Banks of the Development of Electronic Money, Bank for International Settlements, Basle, October 1996


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