EUROPEAN CENTRAL BANK

REPORT
ON
ELECTRONIC MONEY

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SUMMARY AND POLICY CONCLUSIONS

1. In 1993 the EU central banks studied the phenomenon of electronic money, which at that time only involved prepaid cards. The results of their analysis were published under the aegis of the EMI in May 1994. In that report the central banks welcomed the development of electronic money products, as these could, in principle, improve efficiency in payment operations for all parties involved, but recommended that, for a number of reasons, only credit institutions should be allowed to issue multi-purpose prepaid cards.

2. Since 1993, not only has the number of multi-purpose prepaid card projects greatly increased, but the use of software-based electronic money products (and card-based products) for payments via computer networks has also started to develop. In order to deepen the 1994 analysis and to extend it to the new forms of electronic money products, the EMI, with the assistance of its Working Group on EU Payment Systems and Monetary Policy Sub-Committee, conducted a new study in 1997 and early 1998. As a result, an Opinion of the EMI Council on the issuance of electronic money was published as an annex to the EMI Annual Report 1997. The present report builds on the analysis conducted under the aegis of the EMI; however, it only commits the ECB and the central banks of the participating countries.

3. The issuance of electronic money is likely to have significant implications for monetary policy in the future. Above all, it must be ensured that price stability and the unit of account function of money are not endangered. A significant development of electronic money could also have implications for the monetary policy strategy and the control of the operational target.

4. A number of additional regulatory concerns, i.e. the efficient functioning of payment systems and confidence in payment instruments, the protection of customers and merchants, the stability of financial markets and protection against criminal abuse, also have to be taken into account.

5. Clear rules on the conditions under which electronic money can be issued need to be established. With respect to monetary policy effectiveness, level playing-field considerations and in order to address the regulatory concerns mentioned above, the ECB in particular regards it as essential that the following minimum requirements be fulfilled:

   Requirement 1: Prudential supervision

   Issuers of electronic money must be subject to prudential supervision.

   Requirement 2: Solid and transparent legal arrangements

The rights and obligations on the part of the respective participants (customers, merchants, issuers and operators) in an electronic money scheme must be clearly defined and disclosed. Such rights and obligations must be enforceable under all relevant jurisdictions.

Requirement 3: Technical security

Electronic money schemes must maintain adequate technical, organisational and procedural safeguards to prevent, contain and detect threats to the security of the scheme, particularly the threat of counterfeits.

Requirement 4: Protection against criminal abuse

Protection against criminal abuse, such as money laundering, must be taken into account when designing and implementing electronic money schemes.

Requirement 5: Monetary statistics reporting

Electronic money schemes must supply the central bank in each relevant country with whatever information may be required for the purposes of monetary policy.

Requirement 6: Redeemability

Issuers of electronic money must be legally obliged to redeem electronic money against central bank money at par at the request of the holder of the electronic money. The details of this requirement are to be specified.

Requirement 7: Reserve requirements

The possibility must exist for central banks (for the ECB in Stage Three of EMU) to impose reserve requirements on all issuers of electronic money.

6. In applying these minimum requirements, attention should be paid to the following three specific aspects:
   - Smaller schemes: Electronic money schemes which satisfy certain clear criteria may benefit from a lighter regulatory regime commensurate with the lower level of risk inherent in them;
   - Co-operation between oversight and supervisory authorities: In evaluating the integrity of electronic money schemes, central banks, in their capacity as overseers of payment systems, should co-operate closely with the competent supervisory authorities;
   - The cross-border supply of electronic money: Given the world-wide aspects of electronic money, in particular network money, which carries the risk of delocation, the ECB stresses the need for international co-ordination in this field.
7. In addition to the minimum requirements, the ECB has identified two further objectives which it deems to be desirable to pursue: (i) the interoperability of electronic money schemes; and (ii) the

adoption of adequate guarantee, insurance or loss-sharing schemes, aiming in particular to protect customers and merchants against losses and to preserve their confidence in the currency.

8. Against this background, and in line with the 1994 Recommendation of the EMI, the most straightforward solution would be to limit the issuance of electronic money to credit institutions, as this would avoid changing the existing institutional setting for monetary policy and banking business. More specifically, with a view to the transition to Economic and Monetary Union, the issuance of electronic money should be limited to "credit institutions as defined in Article 1 of the First Banking Co-ordination Directive" since Article 19.1 of the Statute of the ESCB, in its current wording, allows the ECB to impose reserve requirements only on these institutions in Stage Three of EMU.

9. At the same time, the ECB acknowledges that the definition of "credit institution" laid down in the First Banking Co-ordination Directive requires an institution to "receive deposits or other repayable funds from the public and grant credit for its own account".[1] The ECB would see great merit in pursuing an amendment to the First Banking Co-ordination Directive so as to include all issuers of electronic money in the definition of "credit institution" along with institutions which receive deposits or other repayable funds from the public and grant credit for their own account. This would provide a level playing-field, in particular as it would ensure that all issuers of electronic money would be subject to an appropriate form of prudential supervision and fall within the range of institutions potentially subject to ECB reserve requirements.

10. Yet, as a transitional provision until the First Banking Co-ordination Directive is amended, the ECB would accept a solution whereby those institutions already issuing electronic money, but which do not fall within the definition of "credit institution" laid down in the First Banking Co-ordination Directive, could continue to provide domestic payment services provided that they were subject to the regulations as defined in this report, excluding, however, reserve requirements.

11. The ECB will continue to monitor developments in the field of electronic money and to reassess its effects on monetary policy and the integrity of payment systems, and may have to define new policy conclusions, including, if necessary, the issuance of electronic money by the ESCB itself.

[1] The ECB also acknowledges that national definitions of "credit institution" differ across Member States and that in some countries issuers of electronic money currently exist which do not fulfil the respective national definition of "credit institution".

INTRODUCTION

In 1993, when the technological development of the new payment schemes was only just beginning, EU central banks analysed one form of what is now called electronic money, namely electronic money stored on chip cards (electronic purses). The results of their analysis were published in the "Report to the EMI Council on Prepaid Cards" in May 1994 (hereafter referred to as the "1994 Report"). Inter alia, the 1994 Report states that "if and when this new payment instrument develops, EU central banks will have to reassess its effects on the integrity of the payment system and they may have to define new policy conclusions, including, if really necessary, that they themselves issue electronic purses. Under the aegis of the EMI, EU central banks will continue to exchange information in this field and to monitor the development of this new payment instrument."

As intended, the EMI, with the assistance of its Working Group on EU Payment Systems and Monetary Policy Sub-Committee, conducted a new study in 1997 and early 1998 in order to deepen the 1994 analysis of prepaid cards and to extend it to new forms of electronic money products. Publications from, and discussions taking place in, other forums, such as the European Commission, the G-10 Committee on Payment and Settlement Systems (CPSS) and a working party mandated by the G-10 deputies, have been taken into account. The results of this analysis, which was finalised just before the ECB was established, are reflected in an Opinion of the EMI Council on the issuance of electronic money which was published as an annex to the EMI Annual Report 1997. The present report builds on the analysis conducted under the aegis of the EMI; however, it only commits the ECB and the central banks of the participating countries. It highlights, in particular, the kinds of measures required with regard to electronic money in order: (i) not to hinder the conduct of monetary policy; (ii) to maintain the integrity and stability of financial markets; and (iii) to encourage the efficiency and soundness of payment systems. Therefore, the report addresses: (i) central banks, which should set up an appropriate oversight regime; (ii) authorities in charge of establishing and implementing a prudential supervisory framework; and (iii) market participants, who should all take appropriate action to deal with the specific features of electronic money.

Chapter 1 defines electronic money and clarifies differences between this and other means of payment. Chapter 2 provides an overview of the experience gained since the publication of the 1994 Report. Chapter 3 lists the regulatory concerns stemming from the use of means of payment based on electronic money, discusses the implications of the development of electronic money for the conduct of monetary policy by central banks, and explains why the ECB sees a need for timely regulation. Chapter 4 provides a set of minimum requirements to be met by electronic money schemes and identifies further desirable objectives. Chapter 5 deals with the question of the status of the issuer of electronic money. Chapter 6 analyses the question of single-purpose and

limited-purpose/smaller schemes. Chapter 7 discusses the role of payment systems' oversight and prudential supervision in this field and Chapter 8 highlights potential issues stemming from the cross-border use of electronic money.

1. DEFINITIONS AND SCOPE

Electronic money is broadly defined as an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transaction, but acting as a prepaid bearer instrument. The 1994 Report focused its analysis on the multi-purpose prepaid card or "electronic purse" which was defined as a plastic card which contains real purchasing power, for which the customer has paid in advance (card-based products). A second form of electronic money products which employ specialised software on a personal computer, typically allowing the electronic value to be transferred via telecommunications networks, such as the Internet, has emerged since then (software-based products).

The main differences between card-based products and software-based products are certain aspects of the technical security features and the storage medium of the electronic money. However, there are also many similarities: in both cases the user has to pay in advance for the value stored as electronic money units, which can then be used for payment purposes. In the processor memories and during transfers between them, the electronic money is represented by an encrypted string of bits.

Moreover, many card-based products have the potential to be used not only for face-to-face payments but also for payments via telecommunications networks. Therefore, whenever electronic money is being transferred via such networks, the term "network money" can be used, regardless of the kind of product.

Electronic money differs from other existing forms of money in various ways. In comparison with cash, which uses only physical security features, electronic money products use cryptography to authenticate transactions and to protect the confidentiality and the integrity of data. Electronic money no longer needs to be physically exchanged like banknotes and coins, and thus can be more easily used for remote payments. In addition, unlike cash, in most schemes currently available, electronic money received by the beneficiary cannot be used again.

Stored-value products are generally prepaid payment instruments in which a record of funds owned by or available to the customer is stored on an electronic device in the customer's possession. The amount of stored "value" is decreased or increased, as appropriate, whenever the customer uses the device to make a purchase or other transaction, without necessarily involving a personal bank account. By contrast, "access" products typically involve a telephone or a standard personal computer, together with the appropriate software which allows customers to access their deposit accounts and to transfer the deposits therein via computer networks, such as the Internet or other telecommunications links.

The 1994 Report indicated the similarities, in economic terms, between sight deposits with the banking system, on the one hand, and value loaded on prepaid cards, on the other. Indeed, in both cases, the customer entrusts part of his/her belongings to an institution. Therefore, in many cases, electronic money comes into competition with traditional bank money, a situation which raises concern for the level playing-field. In the case of sight deposits, the available funds can be mobilised through various payment instruments, such as cheques, transfer orders, etc. In the case of electronic money, the available funds can only be mobilised with a specific payment instrument, which is the storage medium representing the purchasing power. Whenever the issuer of electronic money is a credit institution, electronic money becomes, in economic terms, a sub-set of bank money, although there are obvious practical and technical differences. For example, traditional bank money is not often used to purchase goods and services of very low value, because the processing costs via payment instruments which make use of it would represent too high a share of the transaction costs; conversely, electronic money might not be used for high-value transactions (at present average transactions via electronic money schemes generally remain below ECU 10) because the specific risks generally associated with electronic money (see Annex 2) would make it unlikely that the amount loaded on a card or on a PC would be high enough to permit such transactions.

2. EXPERIENCE GAINED SINCE THE 1994 REPORT

2.1 Current situation[2] and future prospects

Since the publication of the 1994 Report, a variety of different multi-purpose prepaid card (MPPC) schemes have been developed and launched in almost all EU Member States. Furthermore, there are several projects under way in the European Union in which prepaid payment services are offered on the Internet (BE, DE, FR, FI).

Whereas in some EU countries (BE, DK, LU, AT, PT, SE) only one MPPC scheme is in development/up and running at present, in other EU countries (DE, GR, ES, IT, NL, FI, UK) various schemes are already running or being tested. At present, several MPPC schemes are operating on a nation-wide basis (BE, DE, DK, ES, IT, NL, AT, PT, FI). Furthermore, there is only one scheme, operating on a limited scale until now, that allows customer-to-customer transactions.

Despite the relatively low volume of float outstanding so far in the existing schemes, the possibility of an exponential growth in electronic money cannot be ruled out. For prepaid cards, this is due mainly to the possibility of effecting very small payments without recourse to banknotes and coins; for network money, it is due essentially to the possibility of effecting small payments for services offered on the Internet.

The development of successful new payment instruments typically follows an S-shaped curve, i.e. after a period of exponential growth at the beginning, stabilisation takes place. This stems from the fact that the usefulness of any particular payment product to customers is dependent upon the number of individuals and service providers who already use and accept it for executing transactions. Growing familiarity over time with new payment products would tend gradually to reduce people's natural reluctance to trust in such innovative payment products. Furthermore, marginal cost pricing could make electronic money more attractive vis-à-vis traditional paper-based or online retail payment products and cash handling services. Economies of scale and possibly scope, which tend to be very large for those market phenomena where networking effects are important, are also likely to contribute to the growth of electronic payment media in a highly non-linear fashion. Finally, the unavailability of euro banknotes and coins for a period of three years after the start of EMU might provide a further incentive to launch and use electronic money products.

These arguments lead to the assumption that, in the long run, electronic money products may reach a non-negligible market share alongside other retail payment instruments such as cash, debit cards and credit cards. However, it is possible that advances in the technology used for access products may

[2] As of April 1998.

reduce the comparative advantages of electronic money products and, consequently, their growth rate.

On the basis of current market strategies, it is expected that electronic money products will be used primarily for low-value payments and thus have the potential to replace coins and low-value banknotes to a significant extent; a small proportion of debit card payments might equally be replaced, whereas the effect on credit card payments is expected to be marginal, since these are, in general, used for higher-value payments.

Since it is difficult to anticipate future developments, continuous monitoring of the spread and features of electronic money schemes is required and the ECB will therefore pay close attention to market developments in this field.

2.2 Implementation of the 1994 Recommendation concerning the issuance of multi-purpose prepaid cards

A major policy conclusion in the 1994 Report was that only credit institutions should be allowed to issue electronic purses. Issuing means receiving funds in exchange for value distributed in the system and being obliged to pay or redeem the customer's transactions and unused funds. The central banks agreed that this policy conclusion should be implemented at the national level.

Nine EU countries have already carried out a legally binding implementation of the 1994 Recommendation by means of either: (i) the application of existing laws; or (ii) a change in the law or the passing of a special act or regulation.

- In eight EU countries (AT, DE, ES, FR GR, IT, NL, PT) the issuer of electronic money in the form of multi-purpose prepaid cards is legally required to be a credit institution. Of these eight countries, five countries (AT, DE, FR, IT, NL) also legally confine the issuance of electronic money in the form of software-based products to credit institutions.
- In Denmark non-banks may also issue multi-purpose prepaid cards, provided that they meet a range of specified conditions. This is in line with the 1994 Report.[3]

However, in six Member States (BE, IE, FI, LU, SE, UK) existing laws have not been adapted so as to restrict the issuance of electronic money to credit institutions, as proposed by the 1994 Recommendation. In Belgium no initiative was taken to adapt the existing legislation because the issuance of electronic money was de facto restricted to credit institutions.

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[3] The 1994 Report states that in some circumstances (e.g. in the case of schemes already in operation before the policy conclusions of this report were drawn up), the local central bank may agree that electronic purse issuers do not have to be fully-fledged credit institutions provided that:
(i) they provide only domestic payment services;
(ii) they are subject to appropriate regulations, in particular with respect to liquidity requirements; and
(iii)they are supervised by the institution which supervises credit institutions.

Although the legal environment is heterogeneous, in practice the issuers of electronic money in all EU countries, with the exception of Denmark and Finland, are credit institutions. A clear distinction has to be made between the developers of electronic money schemes and the issuers of electronic money. On the EU market, several non-banks have developed electronic money products. However, the experience so far has been that such developers have left the issuance of electronic money to credit institutions.

3. A CASE FOR REGULATION

This chapter lists the regulatory concerns which are related to the development of electronic money (see Section 3.1). Moreover, it discusses implications arising from electronic money for the conduct of monetary policy by central banks (see Section 3.2) and concludes in favour of timely regulation (see Section 3.3).

3.1 Regulatory concerns

This section first describes the fundamental monetary policy concerns related to the development of electronic money: the need to preserve price stability and the need to preserve the unit-of-account function of money. In addition, it lists a number of other factors which also support the introduction of some form of regulation of electronic money issuers. Some of these elements are based on the equivalence, in economic terms, of the issuance of electronic money and deposit-taking. While, for the issuer, both represent a source of funds, the customer can use traditional deposits as well as electronic money for payment purposes.

3.1.1 Fundamental monetary policy concerns

If electronic money is issued through the conversion of banknotes or sight deposits, it does not change the money supply and price stability is not endangered. However, if electronic money is issued as a consequence of credit, private issuers have incentives to supply additional amounts of electronic money as long as the difference between the interest charged on the credit and the one paid on electronic money covers the credit risk premium, the provision of the payment service, and possibly also the cost of refinancing if redeemability is required. Given the low marginal cost of producing electronic money, its issuance could in principle proceed until the interest rate charged on the credit extended for the provision of electronic money is equal to the credit risk premium. This, by lowering the level of interest rates, could in turn endanger the maintenance of price stability.

The risk of overissue would be limited by two factors which increase the costs of issuing electronic money, thereby limiting its supply: first, in a competitive environment, electronic money balances could be remunerated; second, and more importantly, a redeemability requirement could oblige the issuer to possess central bank money. An even stronger measure, which could be considered in the light of future developments in electronic money, would be to introduce a coverage requirement on electronic money, i.e. to request issuers of electronic money to cover part or all of their liabilities with base money. Another way to limit the risk of overissue would be to require rapid clearing of electronic money balances in central bank money.

Thus, it appears that there are several reasons to assume that the risk of overissue of electronic money can be contained. However, as discussed in Section 3.2 below, the issuance of electronic money may have an impact on the conduct of monetary policy.

The question of overissue of electronic money is also related to the question of whether electronic money could endanger the unit-of-account role as incorporated in central bank money. If, in the absence of any regulation, certain electronic money products were to spread at a rapid rate, market views about the creditworthiness of issuers could be affected and electronic money products from different issuers could start to be traded at varying exchange rates. Therefore, the need to preserve the unit-of-account function of money is another argument for imposing a redeemability requirement on electronic money. Such a requirement would guarantee that the role of money in providing a common financial denominator for the whole economy will be maintained.

Against this background, the ECB is of the opinion that electronic money is likely to have significant implications for monetary policy in the future, and thus regards it as important to establish clear rules on the conditions under which electronic money can be issued.

3.1.2 Efficient functioning of payment systems and confidence in payment instruments

Another fundamental issue is that the development of electronic money should not endanger the smooth functioning of payment systems. Electronic money offers a technology which permits efficiency gains in the use of payments media to be made. However, this advantage can only be realised if sufficient safeguards are in place to ensure that electronic money is a reliable product accepted by all its users. In particular, float mismanagement, intrusion of counterfeit value, major technical failure and ultimately the failure of an issuer of electronic money could have a negative impact on the credibility of various electronic money products and possibly even on other card-based payment products. In addition, the possible increase in the use of electronic money schemes may lead banks to reduce the capacity of their existing conventional payment systems. In such circumstances, the failure of a major issuer could lead to a decline in confidence in electronic money schemes, while it might no longer be possible to revert immediately to more traditional means of payment.

3.1.3 Protection of customers and merchants

In principle, in a market economy, it is the task of the creditor to assess the creditworthiness of his/her debtor. As regards credit institutions, most customers cannot assess the quality of these institutions due to the asymmetric availability of information and a lack of understanding of the technical security features of the payment systems they offer. This is one of the reasons why a prudential supervisory framework is applied to credit institutions.

Electronic money represents liabilities on the balance sheet of the issuer, created against the provision by customers of cash or scriptural money, which are payable at par to the entities accepting electronic money as payment (the merchants). Therefore, these liabilities represent an asset for the customers which can be used for payment purposes. As with deposits, prepayments made to the issuers of electronic money are not left idle but are invested in order to obtain asset returns. As is the case with the value of bank deposits, the value of electronic money could diminish, or even disappear, if the liabilities of the issuer are higher than the value of the assets. Thus, the financial integrity of the issuer would be jeopardised if the investment policy it pursued was not adequately sound. The risks for the issuer are more likely to be triggered by liquidity strains (if assets are liquidated with heavy losses) than by credit risk. Since the issuance of electronic money amounts in economic terms to deposit-taking, the application of a prudential supervisory framework to electronic money issuers would also be justified.

In addition, central banks could be subject to moral hazard problems if economic agents were wrongly to assume that they might support issuers of electronic money financially in order to protect the public's confidence in the currency. It is also possible that some customers will not see clear differences between the protection they receive with traditional bank deposits and the protection they will receive (if any) with prepayments to electronic money issuers.

In the near future it seems unlikely that customers and merchants will hold a large part of their wealth in the form of electronic money, owing, for instance, to the risk of theft or loss. Retailers are also likely to place their takings in a bank account at regular intervals. For these reasons it could be argued that the case for protecting customers and merchants is weakened.

On the other hand, electronic money is designed for everyday use as an alternative to banknotes and coins. If it came to be used widely, it would join cash and sight deposits as a major instrument for transaction purposes. In these circumstances, losses arising from the failure of an issuer might be relatively small for individuals, but quite large in aggregate.

3.1.4 Stability of financial markets

Since, in practice, customers are unable to assess adequately the creditworthiness of the issuers, there is a risk that customers will have excessive confidence in them until a crisis of confidence occurs, to which they might overreact, triggering bank runs. The history of banking has shown that bank runs are not just a problem for individual depositors and individual deposit-taking institutions, but that they may cause systemic disruptions and may even, ultimately, affect the real economy. Therefore, the avoidance of systemic risk and consequently the protection of the stability of financial markets have always been a main regulatory concern. Since electronic value loaded on prepaid cards and stored in computer memories is similar in economic terms to bank deposits, there is no reason

why the same concerns should not arise to a certain extent with regard to electronic money if it comes to be used in large quantities.

3.1.5 Protection against criminal abuse

The inadequate management of operational risk and a lack of technical security make an electronic money scheme vulnerable to counterfeit and fraud. If counterfeit money were able to be introduced into the scheme, it could lead to an increase in claims against the issuer which would no longer be backed by the available assets. Thus, the financial integrity of the issuer would be threatened. This vulnerability might be greater for software-based money schemes, which, in general, rely mainly on cryptography, whereas card-based schemes can also use the protection of a tamper-resistant chip.

In the fast developing technical world, the risk of counterfeit and fraud can hardly be excluded. Therefore, if a scheme lacks means detecting counterfeits and fraud, it will not be able to take appropriate counter-measures. This problem is less significant for schemes in which electronic money transactions are processed in a way similar to that in which sight deposits are handled by credit institutions. If the scheme is based on a book-entry principle, according to which each loading and, in the end, each payment operation triggers a debit or credit position in the account of the issuer(s), criminal attacks can be detected at an early stage and counter-measures can be taken.

By contrast, if electronic money units are transferable from customer to customer without these transactions being subsequently recorded by the issuer or a clearing system, the systems might entail a higher degree of operational risk, since it is not possible to have a complete audit trail of transactions at all times, and the source and exact quantity of any counterfeit electronic money or false value triggered by security deficiencies might not be known. Even those schemes which do not permit customer-to-customer transactions may truncate or amalgamate the data transferred to the issuer or clearing system, which would result in an incomplete audit trail.[4]

Another area of criminal abuse associated with electronic money schemes relates to money laundering and tax evasion. Should electronic money schemes offer the possibility of executing anonymous transfers of large sums of money, they could be increasingly used for such criminal purposes. In fact, it cannot be excluded that market forces alone might foster the development of those schemes whose features are more “attractive” for money laundering purposes (such as anonymity of transactions, the possibility of making customer-to-customer transactions, the impossibility of tracing individual transactions).

[4] For further details concerning the types of risk involved in electronic money schemes, see Annex 2.

3.1.6 Market failure

A further aspect for consideration is that electronic money issuers may not have sufficient market incentives to implement policies aimed at promoting their financial integrity. It is a commonly held view that the issuers have a clear commercial interest in avoiding failures, but at the same time they might be subject to a number of constraints, such as, for instance, the pressure on the part of the shareholders to obtain high returns and to reduce costs, which might induce them to implement inadequate investment policies and security measures. Therefore, regulation is seen as necessary to cushion the possible failure of market incentives.

3.2 Implications of the development of electronic money for the conduct of monetary policy by central banks

Two issues are emphasised in the following: (i) the implications for the conduct of specific monetary policy strategies by the central bank; and (ii) the implications for the central bank's balance sheet and the control by the central bank of its operational target. It is argued that the effects of electronic money in several respects do not differ fundamentally from some other forms of financial innovation (including electronic access products) that have occurred during the last few decades.

3.2.1 Implications for monetary policy strategy

The monetary policy strategy may be defined, in broad terms, as the set of procedures according to which a central bank decides how to act in order to achieve its final objective. Two possible strategies are monetary targeting and direct inflation targeting. However, in practice several variants integrating elements of both strategies exist.[5]

For the examination of the implications of electronic money for monetary policy strategy it is necessary to take into account that the development of electronic money is likely to affect the behaviour of monetary aggregates, as is the development of electronic access products. Three main effects can be distinguished.

First, electronic money and electronic access products have an impact on the range of assets which can be considered as close substitutes for central bank money in transactions. Electronic access technology might facilitate the use in transactions of financial products typically not included in the spectrum of assets that perform a medium-of-exchange function. In addition, to the extent that electronic money is issued by institutions outside the current definition of Monetary Financial

[5] See the EMI report entitled "The Single Monetary Policy in Stage Three - Specification of the operational framework", dated January 1997.

Institutions,[6] the range of institutions to be considered as belonging to the money-creating sector needs broadening. These effects of the new technologies have to be taken into account in the formulation of monetary policy and would advocate changing the definitions of monetary aggregates by incorporating any new assets to be considered as money which are not included in traditional monetary aggregates.

A second effect, mainly originating from electronic access products, is an increase in the velocity of deposits or other assets to which these products provide access.

Third, another effect would arise if electronic money were to bear interest and/or if electronic access products were to facilitate the use of interest-bearing financial assets for transaction purposes and were to replace non-interest-bearing assets to a large extent. In this case, the wedge between the interest paid on components of "money" and non-monetary assets would fall, thereby reducing the interest elasticity of money demand, as witnessed in previous episodes of financial innovation.

The above effects could render the pursuit of a monetary targeting strategy by a central bank more difficult, to the extent that these would have an impact on the stability of the demand for money and/or the controllability of the targeted monetary aggregate, even though an appropriate change in the definition of the target aggregate can alleviate these problems. Electronic money raises several potential problems for monetary targeting. First, even if a central bank were to define its monetary target appropriately, there would be reason to assume that a rapid development of electronic money or electronic access products could affect, for a transitory period, the stability of money demand, and that a stable relationship with prices and spending could only be re-established after the market for electronic money had reached a more mature stage. Second, as witnessed with previous forms of financial innovation, the development of electronic money may add to the difficulties of distinguishing monetary assets from non-monetary assets, thus blurring the borderline for the definition of monetary aggregates. Third, the controllability of the targeted monetary aggregate would be rendered more difficult by the potential increase in the weight of interest-bearing assets in the aggregate.

It should be emphasised that the above effects do not only concern a strategy of intermediate monetary targeting. They would also affect, for example, a strategy of direct inflation targeting, to the extent that such a strategy would pay need to monetary aggregates as indicator variables, and insofar as a change in the interest rate elasticity of money demand would affect the transmission

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[6] A Monetary Financial Institution is a credit institution or other financial institution whose business is to receive deposits and/or close substitutes for deposits from the public and which, for its own account (at least in economic terms), grants credit and/or makes investments in securities (see the EMI report entitled "The Single Monetary Policy in Stage Three - Specification of the operational framework", dated January 1997).

process of monetary policy. However, the effect on an inflation targeting strategy would be smaller than on a monetary targeting strategy.

Notwithstanding these considerations, as long as such difficulties do not prevent central banks from effectively pursuing their ultimate objective of price stability, it would not be appropriate to constrain the development of electronic money in general, especially if this would result in serious drawbacks for the efficiency of the economy. Subject to this broad principle, there is, however, a case for regulation in a way which would minimise or prevent problems for the monetary policy strategy.

3.2.2 Effects on the control of the operational target

The replacement of banknotes by privately-issued electronic money in retail payments implies a reduction of base money and the shrinking of the central bank's balance sheet, making it more difficult for a central bank flexibly to absorb a liquidity shock. The question has therefore arisen as to whether such a development could compromise the central bank's ability to control a short-term money market interest rate as its operational target.

The ECB is of the opinion that as long as there is a demand for central bank money and as long as the central bank has the position of a monopoly supplier, it will be possible for it to control a money market interest rate. Ceteris paribus, a reduction in the monetary base will imply a reduction in the (net) size of liquidity-providing operations by the central bank and it cannot be excluded that the policy leverage could diminish if the balance sheet were to fall below a certain "critical mass". However, this would not compromise the ability of the central bank to control money market conditions, for the following two reasons. First, as experience has shown, it is technically feasible for a central bank to steer money market conditions even in a position of surplus in the interbank market. For this purpose, the central bank can, for example, issue debt certificates or collect deposits in the interbank market. Second, if the central bank does not wish to operate permanently in a debtor position, e.g. for reasons related to tasks connected to the stability of the financial system, reserve requirements - possibly extended for electronic money - could be employed to compensate for the balance sheet effects of electronic money developments.

While the central bank thus has at its disposal instruments to steer short-term interest rates, the question also needs to be analysed as to whether there will continue to be a demand for central bank money in the interbank market. On this issue, the ECB is of the opinion that there are reasons to assume that the confidence factor of central bank money and the absence of credit risk are likely to ensure that central bank money will continue to be used as the medium for interbank settlements.

In addition, other, regulatory factors can ensure that a demand for central bank money continues to exist. For example, a redeemability requirement for electronic money would guarantee that central

banks continue to issue the final settlement medium in the interbank market. Similarly, maintaining a demand for central bank money could also be achieved by imposing a reserve requirement or even a total coverage on electronic money. At the same time, it needs to be taken into account that, given the growing possibilities for delocation, the imposition of reserve requirements on electronic money may not produce the desired effects.

All in all, the ECB is not concerned that the development of electronic money would, in the short to medium run, undermine the ability of the central bank to control its operational target. For this reason, it does not expect the development of electronic money to imply that money markets would be driven into the role of an interest rate taker from capital markets in the longer term. As long as the central bank can determine short-term interest rates, there is reason to assume that long-term interest rates will continue to be affected by market expectations of future central bank interest rate decisions. However, it has to be conceded that any balance sheet restructuring may have implications for the flexible use of monetary policy instruments. In this context, it needs to be legally and technically feasible for the central banks to impose measures such as reserve requirements and coverage on electronic money.

3.3 The question of timing

When assessing the need to establish further guidelines or rules, the competent authorities need to strike a balance between the risks of premature regulation and those linked to regulation which is effected too late.

The "wait and see" case could be argued for on several grounds. First, given the rather limited development of electronic money schemes witnessed so far, regulation could impose harmful costs and possibly discourage new innovation and new entry. Second, amounts owed to customers and systemic risk are not substantial at this stage. Finally, any regulation could quickly be overtaken by events, given the pace of technical innovation.

Nevertheless, the ECB is convinced that appropriate regulation at an early stage has a positive impact on innovation by reducing the likelihood of the failure of a scheme, which would damage the confidence of customers and merchants in the payment instrument. Moreover, if such a regulatory framework were only to be designed after a variety of products had already been developed, it might entail substantial changes to the products or restrictions on the parties involved and the related costs might endanger the business case for such products. In addition, the more electronic money schemes progress, the higher the risk that the absence of regulation may create "droits acquis", which would soon become impossible to challenge.

In deciding whether to regulate now or later, two points should be considered:

1. Over the past four years, the development of stored-value products does not appear to have been hampered by the 1994 Recommendation: in almost all EU countries there are one or more schemes in operation or under development and those developing these schemes have even been successful in selling them to various non-EU countries.
2. The 1994 Recommendation has sometimes been criticised for protecting the interests of the banking sector. However, it was obviously never intended to restrict the issuance of value loaded on prepaid cards (or electronic money) to existing credit institutions. EU banking legislation allows for co-operation between service providers and credit institutions. It would thus not prohibit non-financial institutions - such as major retailers, telecommunications, information technology or other companies - from participating in the development and issuance of electronic money products, provided that they co-operate with a credit institution or seek to obtain a banking licence.

Against this background, the ECB believes that it is not too early to define minimum requirements to be met by electronic money schemes (see Chapter 4).

4. MINIMUM REQUIREMENTS AND DESIRABLE OBJECTIVES

With respect to monetary policy effectiveness, level playing-field considerations and in order to address the regulatory concerns mentioned above, the ECB in particular regards it as essential that the minimum requirements defined in this chapter be fulfilled. In addition to the minimum requirements, the ECB has identified two further objectives which it deems to be desirable to pursue.

4.1 Minimum requirements[7]

- **Prudential supervision: issuers of electronic money must be subject to prudential supervision.**

Given the risks related to the issuance of electronic money and the regulatory concerns described above, it is of utmost importance that issuers of electronic money are subject to prudential supervision. In this regard, it is essential that the issuer: (i) complies with a number of specific initial requirements intended to ensure an adequate level of financial soundness; (ii) pursues a sound management of all the risks involved in the electronic money activity on an ongoing basis; and (iii) is subject to ongoing supervision by a competent authority. The current prudential supervisory framework defined for credit institutions is intended to adequately meet the need to promote the financial integrity of electronic money issuers.

- **Solid and transparent legal arrangements: the rights and obligations on the part of the respective participants (customers, merchants, issuers and operators) in an electronic money scheme must be clearly defined and disclosed. Such rights and obligations must be enforceable under all relevant jurisdictions.**

Given the variety of contractual arrangements that can be devised, the extent of the rights and obligations, as well as the financial exposures the parties have to each another at different stages of electronic money transactions must be clearly defined.

The aim should be to ensure that the nature of the obligations and risks is clearly defined and notified to all those concerned - both merchants and customers - and to ensure that the customer, in particular, is informed of his/her legal position in clear and precise terms.

The legal documentation should, in particular, address losses which may be allocated among scheme participants in the event of the failure of the issuer(s). The published terms and conditions shall provide explicit information on: (i) whether claims against the issuer(s) are covered by deposit insurance or other protection arrangements within the jurisdiction concerned; and (ii) dispute resolution arrangements, including the competent court, tribunal or other dispute resolution

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[7] Given the fact that the administrative function in an electronic money scheme might be carried out by a third party, the minimum requirements identified in the report also apply to administering institutions to the appropriate degree, taking into account the fact that the functions and consequently the risks of these institutions may differ in various ways.

mechanism in the event of disputes and the applicable procedural rules (such as rules on the burden of proof).

Where a scheme operates on a cross-border basis and under different legal systems, the need for an effective and well-defined legal structure is even more evident. The issuer of electronic money and the operator in an electronic money scheme must ensure that the legal characteristics of the scheme are examined with a view to assessing their consequences and enforceability under all relevant jurisdictions. Adequate information on the outcome of such an examination of the consequences and enforceability of the legal characteristics of an electronic money scheme, including the governing law for relations between contractual parties and the competent authorities for dispute resolution, should be provided by the issuer and/or the operator of the scheme.

- **Technical security: electronic money schemes must maintain adequate technical, organisational and procedural safeguards to prevent, contain and detect threats to the security of the scheme, particularly the threat of counterfeits.**

In August 1996 the Bank for International Settlements (BIS) published a report by the Committee on Payment and Settlement Systems and the Group of Computer Experts of the central banks of the G-10 countries entitled "Security of Electronic Money". This report provides a detailed description of product structure, functions and security risks, as well as an assessment of the security measures. The ECB agrees with the G-10 central banks' statement that "electronic money systems, particularly those implemented with hardware-based security, can be designed with an adequate level of security relative to other common forms of retail payment. However, there is no single security measure or set of measures that can be said to be sufficient for a particular product. It is the combination of measures, together with the rigour with which they are implemented, that will serve to reduce risk most effectively."

With respect to operational risk, electronic money issuers must ensure - even if the administrative function is carried out by a third party - that sound administrative and accounting procedures and adequate internal control procedures are put in place. Therefore, if the administrative function in an electronic money scheme is carried out by a third party, the arrangements between the issuer and the third party should provide for contractual rights allowing the issuer to properly monitor and control the operational risk incurred by the third party. In addition, whenever needed, the overseer/supervisor should have access to the activity of the administrator to verify whether this requirement has been met. The adequate handling of operational risk entails adherence to a number of commonly recognised principles, including: (i) the existence of effective control procedures, internal audit and other preventive measures; (ii) staff whose capabilities are commensurate with their responsibility; (iii) the development of information systems which provide timely, accurate and secure data; and (iv) the definition of contingency plans to ensure the continuity of vital operations.

Given the potential for counterfeiting and fraud, which could pose a significant financial risk to institutions issuing electronic money or any other participants, it must be in the interest of all the parties involved to achieve a high degree of technical security.

Therefore, the management function of electronic money schemes must explicitly formulate the security policies, follow their implementation closely and have them reviewed regularly, if necessary by independent experts.

In particular, electronic money schemes must have adequate systems and controls for the detection of false value at an early stage, allowing prompt remedial action to be taken. Schemes should, at least, be capable of monitoring the level of electronic value outstanding in the system against the amounts issued and redeemed. For this purpose, electronic money schemes should include adequate accountability and audit trails. Technical and operational systems and procedures should include adequate contingency arrangements in the event of a failure of those systems and procedures. Several courses of action could be taken in any system to limit the risks of counterfeits and fraud, such as ensuring a full audit trail, shadow balance-keeping and the limitation of transferability or behavioural analysis.

A full audit trail would consist in numbering each transaction, keeping records of identification data for all parties involved during the circulation of electronic value and entering such data into a shadow account. It would be the most effective means available to the issuer to check the transaction data, in order to detect counterfeit or duplicate value and to trace illegal electronic money to its origin at the moment when electronic value is presented to the issuer for redemption. However, for some types of electronic money schemes, such an audit trail would require a large amount of data to be processed and stored, and thus could create high costs in relation to the values transferred.

Alternatively, a shadow balance keeps a record of the electronic money issued for a specific device and keeps track of the accumulated transactions. It would be less expensive than a full audit trail since it is not necessary for all the transaction data to be processed and stored. Although this option does not allow all the parties involved in a transaction to be identified, it allows transactions made with a specific device to be compared with the shadow balance and it thus enables fraudulent transactions or the alteration of balances at a given point in time to be detected.

In systems which do not have a complete audit trail or shadow balances, adequate risk management measures need at least to be put in place, so as partly to alleviate possible problems; some examples are: (i) the establishment of purse-to-purse limits, which would reduce the business case for fraud; (ii) the storage of the last *x* transactions, which would enable the customer to verify and proof them; and (iii) “know your customer” procedures and the analysis of customer and retailer usage patterns, which would allow the issuer to detect “abnormal” amounts being presented for reimbursement.

Since technology evolves fairly rapidly, the potential to undermine the security features of an electronic money scheme increases over time. Therefore, there will be a need to update the technical security features of a scheme continuously in the light of the latest technological developments and to test them against new market practices and relevant international standards.

- **Protection against criminal abuse: protection against criminal abuse, such as money laundering, must be taken into account when designing and implementing electronic money schemes.**

The design and implementation of electronic money schemes should avoid creating opportunities/incentives for criminal abuse, such as money laundering and tax evasion, by, for example, maintaining an adequate audit trail so as to ensure compliance with current legislation on money laundering under each relevant jurisdiction. If electronic money schemes were to offer facilities for anonymous transfers of large sums of money, these schemes could become increasingly vulnerable to exploitation for criminal purposes, such as money laundering or tax evasion. As a result of the discussions held by the Financial Action Task Force on Money Laundering (FATF) at the end of 1996, it was concluded that important features of electronic money technologies, which may affect the degree to which they can be exploited by criminals, include value limits, transferability between individuals, record-keeping and the potentially changing role of intermediaries. The FATF also concluded that law enforcement authorities and regulators must anticipate and identify potential new issues and challenges.

- **Monetary statistics reporting: electronic money schemes must supply the central bank in each relevant country with whatever information may be required for the purposes of monetary policy.**

Information about the amount of money available in the economy is indispensable for the conduct of monetary policy by the central banks. Thus, there is a strong case for electronic money, as a substitute for fiduciary money, to be included in the monetary aggregates. For this reason, all issuers of electronic money must supply the central bank in each relevant country with whatever information may be required for the purposes of monetary policy.

- **Redeemability: issuers of electronic money must be legally obliged to redeem electronic money against central bank money at par at the request of the holder of the electronic money.**

In a scheme in which the issuer is only obliged to reimburse the retailer presenting electronic value, but refrains from redeeming the customer, a situation could arise in which the retailer only accepts electronic value below par, e.g. if the soundness of the issuer is at stake. In such circumstances, the private provision of the medium-of-exchange and store-of-value functions of money would no longer be consistent with the simultaneous public provision of the unit-of-account function of money.

Furthermore, without a close link to central bank money, there could potentially be an unlimited creation of electronic money, which could, in turn, lead to inflationary pressure.

Therefore, a legal requirement must be imposed that electronic money is redeemable at par, implying that issuers must be in a position to convert electronic money into central bank money at the request of the holder of the electronic money. This would help to ensure that the increased efficiency deriving from competition in the private provision of money (including electronic money) would not hinder the full exploitation of the externalities resulting from money's role as a unit of account.[8]

The commitment to redeem unspent money would be backed and made credible by an appropriate float investment.

- **Reserve requirements: the possibility must exist for central banks to impose reserve requirements on all issuers of electronic money.**

The possibility must exist for central banks (for the ECB in Stage Three of EMU) to impose reserve requirements on all issuers of electronic money, in particular in order to be prepared for a substantial growth of electronic money with a material impact on monetary policy. Such a requirement would be one way to limit the risk of unrestricted growth in electronic money and thus to help to maintain price stability. It is also necessary in view of the need for equal treatment as compared with issuers of other forms of money, which are already subject to reserve requirements.

4.2 Desirable objectives

- **Interoperability**

Central banks have a general interest in promoting the efficiency of payment systems. This requires a certain degree of co-operation between service providers in order to avoid the unnecessary duplication of investments and also to facilitate interoperability, in particular through the use of common standards.

The degree of interoperability should be sufficient to widen the choice for customers, avoid unnecessary costs for merchants and enhance overall efficiency, while at the same time safeguarding effective competition and product innovation. In particular, it is felt that the compatibility of standards and the resulting interoperability could increase the freedom for customers and merchants to switch from one service provider to another and thus could enhance competition between various electronic money schemes.

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[8] The details of this requirement are to be specified. To avoid burdensome procedures, one may, for example, consider imposing a fee or a threshold on minimum amounts before redemption can be demanded by the holder of the electronic money instrument. In addition, logistical difficulties could possibly be overcome by allowing for redemption via bank deposits.

Although various attempts have been made to promote interoperability, most existing schemes are not yet interoperable.

- **Guarantee, insurance or loss-sharing schemes for electronic money products**

Appropriate regulation and supervision, as defined above, would limit the risks of failure of an electronic money scheme. However, in market economies, it should never be assumed, as with any private company, that private money issuers are immune to failure. Unless a regime is adopted which provides the merchants and the customers with an effective right to receive funds held by the issuer, or with adequate insurance or other protection arrangements, they will remain exposed to the risk of insolvency on the part of the issuer. Therefore, especially if the schemes were to grow, the adoption of appropriate guarantee, insurance or loss-sharing schemes would appear to be desirable, in order to protect customers and merchants against losses and to preserve their confidence in the currency.

At present, in six EU countries (AT, DE, ES, FR, IT, SE) the electronic money schemes which are currently operating are covered by national deposit-guarantee or insurance schemes, although cards without a link to a personal bank account are excluded in one of these countries (IT).[9] In the United Kingdom the funds paid to an issuer are not covered, unless the particular structure of the scheme means that those funds are legally equivalent to bank deposits.

[9] In Italy cards without a link to a personal bank account are considered as equivalent to bearer deposits which, in keeping with the Directive on deposit-guarantee schemes, are exempted from the application of the deposit-guarantee scheme.

5. THE QUESTION OF THE STATUS OF THE ISSUER OF ELECTRONIC MONEY

Against the background described above, and in line with the EMI's 1994 Recommendation, the most straightforward solution would be to limit the issuance of electronic money to credit institutions, as this would avoid changing the existing institutional setting for monetary policy and banking business. Moreover, it would ensure a level playing-field for all issuers of electronic money.

More specifically, with a view to the transition to Economic and Monetary Union, the issuance of electronic money should be limited to "credit institutions as defined in Article 1 of the First Banking Co-ordination Directive" since Article 19.1 of the Statute of the ESCB, in its current wording, allows the ECB to impose reserve requirements only on these institutions in Stage Three of EMU.

At the same time, the ECB acknowledges that the definition of "credit institution" in the First Banking Co-ordination Directive requires an institution to "receive deposits or other repayable funds from the public and grant credit for its own account".[10] The ECB would see great merit in pursuing an amendment to the First Banking Co-ordination Directive so as to include all issuers of electronic money in the definition of "credit institution" along with institutions which receive deposits or other repayable funds from the public and grant credit for their own account. This would provide a level playing-field, in particular as it would ensure that all issuers of electronic money would be subject to an appropriate form of prudential supervision and would fall under the range of institutions potentially subject to ECB reserve requirements.

Yet, as a transitional provision until the First Banking Co-ordination Directive is amended, the ECB would accept a solution whereby those institutions already issuing electronic money, but which do not fall within the definition of "credit institution" laid down in the First Banking Co-ordination Directive, could continue to offer domestic payment services, provided they were subject to the regulations as defined in Chapter 4 above, excluding, however, reserve requirements.

[10] The ECB also acknowledges that national definitions of "credit institution" differ across Member States and that in some countries issuers of electronic money currently exist which do not fulfil the respective national definition of "credit institution".

6. THE QUESTION OF SINGLE-PURPOSE AND LIMITED-PURPOSE/SMALLER SCHEMES

The recommendations made in the 1994 Report are only applicable to multi-purpose prepaid cards, which were defined as prepaid cards which can be used for a very wide range of purposes and which have the potential to be used on a national or international scale but may sometimes be restricted to a certain area. The report distinguished them from single-purpose and limited-purpose prepaid cards.

6.1 Single-purpose schemes

In single-purpose schemes, such as those relating to telephone cards, in which the issuer and the service provider (acceptor) are identical, the amounts stored by the customer can be considered as down payments for goods or services which the issuer/acceptor is expected to deliver at a later stage. Owing to the limited potential use of the value stored, the holder of the single-purpose prepaid instrument will only store limited amounts and will not consider the electronic value as a form of money. Thus, the risk of loss for the customer is limited and failure on the part of the issuer is not likely to affect confidence in the instrument. Therefore, the set of requirements specified in Chapter 4 does not apply to single-purpose schemes.

6.2 Limited-purpose/smaller schemes

The 1994 Report defined "limited-purpose prepaid cards" as prepaid cards which can be used only "*in a small number of well-identified points of sale within a well-identified location (a building, a corporation, a university…)"*. Whereas in 1994 those systems remainded outside the scope of the study, the ECB is of the opinion that these systems, too, are covered by the principles laid down in Chapter 5 of this report, which means that in principle only credit institutions should be allowed to issue electronic money for limited-purpose/smaller schemes.

However, it is recognised that these schemes entail lower levels of risk than multi-purpose schemes. Customers can be expected to store only limited value on their cards or in computer memories, given the restricted usability of the electronic money in such a scheme. Therefore, the risk of loss for each customer in the event of the failure of the issuer would be limited and some of the regulatory concerns described above would not fully apply. In addition, since the amounts of electronic money outstanding for which one issuer is liable would normally be relatively small, the failure of such an issuer would only have a limited impact on confidence in other payment instruments or systems, or in the currency in general.

Therefore, the ECB is of the opinion that limited-purpose/smaller schemes may benefit from a lighter regulatory regime. This means that although the minimum requirements defined in Chapter 4 do, in principle, apply to these schemes, specific aspects of the supervisory framework, such as the initial capital and own funds requirements, might be defined by the competent authorities in such a way as to reflect the lower risk inherent in these schemes. In any case, all electronic money schemes other than single-purpose schemes have to report to the competent authority.

It is important that the criteria determining smaller schemes are clearly defined. In this regard, it is difficult to decide whether a scheme which only enables the customer to make payments for two services (e.g. telephone charges and public transport) should be considered to be a limited-purpose scheme, because it cannot be used for a "very wide range of purposes", or whether it should be considered to be a multi-purpose prepaid card scheme, because the scheme makes use of a large number of points of sale. Therefore, it seems to be preferable to use objective criteria for the definition of smaller schemes which, - to the extent deemed appropriate by the competent authorities - might be subject to a lighter regulatory regime.[11]

[11] Criteria such as the maximum amount of electronic money which may be stored on a card or PC and the total amount of electronic money outstanding issued by a single issuer could be envisaged.

7. ROLE OF PAYMENT AND SETTLEMENT SYSTEMS' OVERSIGHT AND PRUDENTIAL SUPERVISION WITH REGARD TO THE MINIMUM REQUIREMENTS

Public authorities should ensure that the electronic money schemes meet the minimum requirements set out in Chapter 4. Two functions, notably payment systems' oversight and prudential supervision, will contribute to the pursuit of this objective.

It is generally recognised that payment systems' oversight and prudential supervision share a common objective: the reduction of systemic risk, which could undermine the stability of the financial system. However, the focus and therefore the instruments of the two functions differ: oversight attempts to ensure the smooth functioning of payment systems, focusing mainly on the systems rather than on the individual participants, whereas prudential supervision aims at promoting the sound management of individual credit and financial institutions.

It is commonly felt that co-operation between overseers and supervisors in the context of payment systems, including in the field of electronic money, is needed in order to avoid conflicting approaches in areas of possible overlap and to exploit synergies.[12] The BCCI Directive provides the legal framework for this kind of co-operation.

7.1 Oversight

As part of their oversight responsibility for payment systems, central banks will also assume the oversight function for electronic money schemes. This oversight function will seek to ensure that all relevant electronic money schemes comply with the specific minimum requirements set out in Chapter 4, which are intended to promote the overall reliability of the schemes under normal and exceptional circumstances. In particular, the oversight function will focus on: (i) the integrity of the scheme as a whole; (ii) the technical security features of the scheme; and (iii) the efficiency of the co-ordination mechanisms between the various operators of the scheme. In accordance with general practice to date, it will be left to the discretion of each national central bank as to how to organise the specific aspects of the oversight of electronic money schemes. In particular, the national central bank could entrust another authority with the careful monitoring of the schemes' security features.

So far, the oversight of electronic money schemes has been developed solely on a domestic basis. Given the potential for electronic money schemes to operate on a cross-border basis and the need to adapt to rapidly changing technology, regular meetings of central bank experts will be organised

[12] In the event that a scheme has only a single issuer, it is likely that the distinction between the two functions will become less evident. In this case, the supervision of the issuer might easily overlap with the field of oversight and vice versa.

under the aegis of the ECB so as to profit from the experience gained and to see whether the minimum requirements need to be amended.

If a scheme intends to operate on a purely domestic basis, it should consult the relevant domestic authority/authorities. If a scheme intends to operate on a cross-border basis, it should also contact the relevant supervisory/oversight authorities of those countries in which it wishes to operate. It is assumed that central banks should receive a minimum level of information from all electronic money schemes, apart from single-purpose schemes.

7.2 Prudential supervision

As mentioned above, the main division of competencies between oversight and prudential supervision is that supervisors retain the primary responsibility for supervising individual participants in electronic money schemes, whereas overseers focus on the overall reliability of the schemes.

Prudential supervision is based mainly on reporting duties and compliance with the supervisory requirements, and it makes use of the traditional set of tools at the disposal of supervisors (off-site examination, inspections, etc.). To the extent deemed appropriate and necessary, supervisors and overseers should exchange information to help each other to perform their duties. The monitoring of liquidity and operational risks is an area in which this co-operation could be beneficial.

8. CROSS-BORDER SUPPLY OF ELECTRONIC MONEY

8.1 Types of cross-border use

Two main types of cross-border use of electronic money can be foreseen. First, customers could use electronic money to make payments to merchants located abroad, either by using prepaid cards while travelling or by purchasing goods or services in foreign countries via a computer network. In this case, the customer and the issuer may be located in one country, while the merchant is located in another. Second, issuers established in one country may implement electronic money schemes by which they offer electronic money in another country, presumably in the customer's home currency.

8.2 Potential legal, supervisory and oversight implications

So far, the cross-border supply of electronic money represents a limited phenomenon. However, it is already apparent that the development of the cross-border supply of electronic money, which might increase after the introduction of the euro, is crucial from many perspectives.

From a legal point of view, the cross-border use of electronic money may result in a complex set of rules governing the contractual relationships among the different parties. Cross-border electronic money schemes may affect the application of national laws and regulations and create uncertainties as regards the forum to be used in the event of any dispute. In a multi-currency electronic purse scheme which operates in several countries, the legal situation might be even more complex and it might be still more difficult to ensure that the legal characteristics of the scheme are enforceable under all relevant jurisdictions. If such a scheme were organised as a multiple-issuer scheme, in which each currency is issued by an institution located in the home country of this currency, this would raise specific issues, such as the application of different insolvency laws and the allocation of risks among the issuers should one of them become insolvent. Moreover, it may be the case that the implementation of cross-border electronic money schemes would lend itself to criminal activities as it renders the investigation and prosecution of suspicious activities more complex.

From a prudential supervisory and oversight perspective, the main cause for concern is associated with the cross-border supply of electronic money via telecommunications networks. Such schemes do not require the issuer to be present in the country of supply. An increasing number of institutions make use of such network systems (e.g. the Internet) for the supply of electronic money in addition to traditional banking services (information on bank accounts, trading transactions, etc.). These providers are not only traditional credit institutions, but also institutions which operate exclusively via networks. The use of electronic networks makes it difficult for supervisors and overseers to determine the jurisdiction to which a particular activity is most closely connected. The issuer of the electronic money could be established under one jurisdiction, it could process data in another and solicit customers in a third. In addition, electronic money used in computer networks might spread

more easily than other payment instruments requiring a physical presence in the country of supply owing to the use of computer networks, some of which already operate globally without physical limitation. However, it is also possible that the cross-border supply of electronic money could occur with electronic purse schemes. In the case of a multiple-issuer scheme, with the issuers located in different countries, each issuer would be subject to prudential supervision by the supervisory authority of the country in which it is located. Thus there might be a need for close co-operation between the supervisory authorities involved.

These aspects assume particular relevance for issuers of electronic money which are located in third countries with a more lax regulatory framework and for the possible use of the instrument for illegal purposes. Against this background, the ECB stresses the need to study, also in co-operation with other international bodies, whether and, if so, how it could be possible to prevent institutions located outside the EU from offering electronic money products, especially via telecommunications networks, on the EU market without meeting the set of minimum requirements.

ANNEX 1

GLOSSARY

Acceptor: any trading or service establishment that accepts, on its own behalf or on behalf of its network, the payment of goods or services via an electronic money instrument.

Access products: payment instruments that allow customers to access their deposit accounts and to transfer the deposits therein. Examples include electronic funds transfers at the point of sale and home banking facilities.

Accountability: record-keeping of electronic money transactions.

Acquirer: the entity or entities that hold deposit accounts for card acceptors (merchants) and to which the card acceptor transmits the data relating to the transaction. The acquirer is responsible for the collection of transaction information and settlement with the acceptors.

Acquiring technical operator: the party providing the technical facilities for each acquiring entity to accept the data relating to each transaction.

Audit trail: a sequential record of events having occurred in a system.

Auditability: auditability is understood to mean that it is possible to establish whether a system is functioning properly and, thereafter, that it has worked properly. One aspect of auditability is to provide sufficient knowledge about the system and its structure, functions, controls, etc. by means of appropriate documentation. Another important aspect of auditability is to make visible all integrity-related modifications to the system and its data. Logging data should make it possible to answer the questions “who?”, “what?” and “when?”.

Authentication: the methods used to verify the origin of a message or the identity of a participant connected to a system.

Card-based products: electronic money products which provide the customer with a portable, specialised computer device, typically an IC card containing a microprocessor chip.

Chip card: also known as an IC (integrated circuit) card. A card containing one or more computer chips or integrated circuits. The card and the integrated circuit may be used for a wide variety of purposes, such as identification, data storage, the validation of personal identification numbers (PINs), the authorisation of purchases, the verification of account balances and the storage of personal records.

Clearing: the process of transmitting, reconciling and, in some cases, confirming payment orders or security transfer instructions prior to settlement, possibly including the netting of instructions and the establishment of final positions for settlement. Sometimes the term is used (imprecisely) to include settlement.

Clearing and settling institution: an institution which transmits information and funds through a payment system network. It may operate as an agent or a principal.

Clearing system: a set of procedures whereby financial institutions present and exchange data and/or documents relating to funds or securities transfers to other financial institutions. The procedures often also include a mechanism for the calculation of participants' bilateral and/or multilateral net positions, with a view to facilitating the settlement of their obligations on a net basis.

Confidentiality: the quality of being protected against unauthorised disclosure.

Credit card: a card indicating that the holder has been granted a line of credit. It enables the holder to make purchases and/or withdraw cash up to a prearranged ceiling; the credit granted can be settled in full by the end of a specified period or can be settled in part, with the balance taken as extended credit. Interest is charged on the amount of any extended credit and the holder is usually charged an annual fee.

Credit institution: the definition given to a "bank" in the European Union. The First Banking Co-ordination Directive defines it as an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account.

Credit transfer: a payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary. Both the payment instructions and the funds described therein move from the bank of the payer/originator to the bank of the beneficiary, possibly via several other banks as intermediaries and/or more than one credit transfer system.

Cryptography: the application of mathematical theory to develop techniques and algorithms that can be applied to data to ensure goals such as confidentiality, data integrity and/or authentication.

Customer-to-customer transfer: see transferability.

Debit card: a card enabling the holder to access his/her deposit account online. The card is often used to charge purchases directly at the point of sale (POS) and withdrawals at automated teller machines (ATMs) to the deposit account.

Distributing institution: an institution which distributes (as an agent) or sells (as the issuer or an underwriter) the electronic money to the customer.

Electronic money: electronic money is broadly defined as an electronic store of monetary value on a technical device that may be widely used for making payments to undertakings other than the issuer without necessarily involving bank accounts in the transaction, but acting as a prepaid bearer instrument.

Electronic purse: a reloadable multi-purpose stored-value card which may be used for retail or other payments.

Encryption: the use of cryptographic algorithms to encode clear text data (plain text) into cipher text in order to prevent unauthorised observation.

Face-to-face payment: a payment carried out by the exchange of instruments between the payer and the payee in the same physical location.

Home banking: banking services which a retail customer of a financial institution can access using a telephone, television set, terminal or personal computer as a telecommunications link to the institution's computer centre.

IC card: see chip card.

Internet: an open world-wide communications infrastructure consisting of interconnected computer networks, which allows access to remote information and the exchange of information between computers.

Interoperability: a situation in which payment instruments belonging to a given scheme may be used in other countries and in systems installed by other schemes. Interoperability requires technical compatibility between systems, but can only take effect where commercial agreements have been concluded between the schemes concerned.

Issuing institution (issuer): the institution receiving funds in exchange for value distributed in the system and, in principle, being obliged to pay or redeem the customer's transactions and unused funds which are presented to it. It is normally the institution which invests the float.

Large-value payments: payments, generally of very large amounts, which are mainly exchanged between banks or between participants in the financial markets and usually require urgent and timely settlement.

Loading operator: the entity providing the technical infrastructure for loading transactions.

Money laundering: the attempt to conceal or disguise the ownership or source of the proceeds of criminal activity and to integrate them into the legitimate financial systems, in such a way that they cannot be distinguished from assets acquired by legitimate means. Typically, this involves the conversion of cash-based proceeds into account-based forms of money.

Multi-functional cards: a card which, in addition to a stored-value card function, may include other payment facilities such as a debit or credit card function and/or non-payment facilities.

Multi-purpose prepaid card: a stored-value card which can be used for a very wide range of payment purposes and which has the potential to be used on a national or international scale but may sometimes be restricted to a certain area.

Multi-purpose prepaid card scheme: a scheme in which at least three parties are involved: the issuer, the cardholder and the acceptor of the card. (Where one acceptor currently exists, it must be possible for other legally distinct acceptors to join the scheme.)

Multiple issuer scheme: a scheme in which more than one institution acts as issuer.

Network money: electronic money which is transferred via telecommunications networks such as the Internet.

Offline: in electronic money schemes, a transaction in which no direct connection is made between the device(s) involved in the transaction and a centralised computer system for the purpose of authenticating or otherwise authorising the transaction before it is executed.

Online: in the context of payment and settlement systems, this term may refer to the transmission of transfer instructions by users, through such electronic means as computer-to-computer interfaces or electronic terminals, that are entered into a transfer-processing system by automated means. The term may also refer to the storage of data by a transfer-processing system on a computer database such that the user has direct access to the data (frequently in real time) through input/output devices such as terminals.

Open network: a telecommunications network to which access is not restricted.

Payment: the payer's transfer of a monetary claim on a party acceptable to the payee. Typically, claims take the form of banknotes or deposit balances held at a credit institution or at a central bank.

Payment card company: a company which owns trademarks of payment cards (credit, debit or prepaid cards) and may also provide a number of marketing, processing or other services to institutions issuing its cards.

Payment instrument: any instrument enabling the holder/user to transfer funds.

Payment system: a set of instruments, banking procedures and, typically, interbank funds transfer systems that facilitate the circulation of money.

Prepaid card: typically an integrated circuit card on which a representation of value is stored, for which the cardholder has paid the issuer in advance, enabling the cardholder to effect transactions.

Prepaid card acceptor: the party agreeing to deliver goods or services against payments made with a prepaid card.

Prepaid cardholder: the customer associated with the prepaid cardholder's identification on the card or the customer owning the card in the case of anonymous card products not related to any account.

Privacy: in the context of a payment system, the fact that no information which might permit the determination of transactions may be collected without the consent of the counterparties involved.

Provider: operator who establishes the hardware and software conditions for the conduct of transactions with electronic money, without necessarily being the issuer of the electronic money units.

Remote payment: a payment carried out through the sending of payment orders or payment instruments (e.g. by mail) from a remote location.

Retail payments: this term describes all payments which are not included in the definition of large-value payments. Retail payments are mainly customer payments of relatively low value and urgency.

Seigniorage: in a historical context the term seigniorage was used to refer to the share, fee or tax which the seignior, or sovereign, took to cover the expenses of coinage and for profit. With the introduction of paper money, large profits could be made because banknotes cost far less to produce than their face value. When central banks became monopoly suppliers of banknotes, seigniorage came to be reflected in their profits.

Settlement: an act that discharges obligations in respect of funds or securities transfers between two or more parties.

Settlement system: a system used to facilitate the settlement of transfers of funds.

Single-purpose prepaid card: a stored-value card for which the card issuer and merchant (card acceptor) are identical, thus representing a prepayment for specific goods and services delivered by the issuer. See prepaid card.

Smart card: an integrated circuit card with a microprocessor that is capable of performing calculations.

Software-based products: electronic money products which employ specialised software on a personal computer and which can typically be used to transfer the electronic value via telecommunications networks such as the Internet.

Systemic risk: the risk that the failure of one participant in a transfer system, or in financial markets generally, to meet its required obligations will cause other participants or financial institutions to be unable to meet their obligations (including settlement obligations in a transfer system) when due. Such a failure could cause significant liquidity or credit problems and, as a result, might threaten the stability of financial markets (with subsequent effects on the level of economic activity).

Tamper-resistant: the capacity of devices to resist physical attack up to a certain point.

Traceability: in electronic money systems, the degree to which value-transfer transactions can be traced to the originator(s) or the recipient(s) of the transfer.

Transferability: in electronic money systems, the degree to which an electronic balance can be transferred between devices without interaction with a central entity.

ANNEX 2

TYPES OF RISK INVOLVED IN ELECTRONIC MONEY SCHEMES[13]

QUANTIFIABLE RISKS

Credit risk is the risk that a counterpart will fail to perform on an obligation to the institution. It is the most common risk relating to banking activity. It is incurred by the issuing institution (vis-à-vis the issuer of the instruments in which the float is invested, vis-à-vis the customer for delay in receiving payments), by the distributing institution acting as an underwriter (vis-à-vis the issuer of the electronic money), by the redeeming institution acting as a principal (vis-à-vis the issuer) and by the clearing/settling institution acting as a principal (vis-à-vis the issuer).

Liquidity risk is the risk that the institution is temporarily unable to meet its payment obligations as they fall due without incurring losses. This risk is mainly incurred by the issuing institution, since some investments of the float may not be easily converted to meet redemption demands without bearing heavy costs. In addition, the redeeming and clearing/settling institutions may incur liquidity risk when they act as principal.

Interest rate risk is the risk that movements in interest rates might adversely affect an institution's financial conditions. This risk is borne by the issuing institution insofar as it holds a portfolio of investments to provide a pool of funds to redeem its outstanding electronic money. The redeeming and the clearing/settling institutions acting as a principal might also incur this type of risk.

Foreign exchange risk is the risk that fluctuations of foreign exchange rates might adversely influence the financial conditions of the institution. It arises when the issuing institution is ready to accept foreign currencies in payment for electronic money, it invests the float in assets denominated in currencies other than that of the liabilities or when the structure of the electronic money scheme allows the acceptance of multiple currencies.

Other risks could become relevant depending on the nature of the investment of the float. In particular, equity price risk - notably the risk that movements in equity prices might adversely affect the financial conditions of an institution - or other price risks associated with the variation of the price of specific categories of commodities might play a role.

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[13] The analysis draws on a letter from Jimmy F. Barton, Chief National Bank Examiner, Office of the Comptroller of the Currency; 10 September 1996.

NON-QUANTIFIABLE RISKS

Strategic risk is the risk that the strategic objectives of an institution, the business strategies developed and the resources devoted to achieving these objectives as well as the quality of its implementation might not be consistent. This risk is commensurate with the complexity of a project, and the design, development and implementation of an electronic money scheme is a very complicated process. In this context, particular emphasis should be placed on the adequate planning of system development. Strategic risk is mainly incurred by the issuing institution.

Operational risk is the risk that deficiencies in internal controls and information systems might result in unexpected losses for the institution. This risk is normally associated with inadequate procedures and controls, information system failures and human error. Inadequate operational procedures and internal controls expose the institution to potential fraud, counterfeiting and costly disruptions in operations. Given the particular nature of the electronic money product (liabilities in the form of cash), the risk of fraud being perpetrated by employees, customers and merchants is particularly high. The reliability of the information system is also crucial to the functioning of the electronic money scheme. Failures in this system affect the integrity of data, which is necessary to prevent malfunctions and errors and, in the worst case scenario, may lead to business interruption with huge possible losses for the issuer. Furthermore, low performance by staff might increase the risk of human error, which may require the issuer to compensate for losses. Operational risk is incurred in different forms by all the institutions involved in electronic money schemes.

Compliance risk is the risk associated with non-compliance with laws, rules, regulations, prescribed practices or ethical standards. Given the particular nature of electronic money schemes, compliance with regulations on information disclosure assumes special relevance. These regulations normally stipulate that the issuer and other institutions involved in electronic money schemes must provide customers with information about the risks involved in the use of electronic money products. This risk is borne by the issuing, distributing and transaction-archiving institutions.

Reputation risk is the risk that the reputation of an institution might deteriorate following specific events. In the context of electronic money schemes, the emergence of malfunctioning or security breaches in the system, the inability to solve problems with customers and adverse media coverage are all elements which might negatively affect the reputation of an institution. This kind of risk is mainly incurred by the issuing institution.

Legal risk is the risk that an institution might be adversely affected by uncertainties surrounding the legal framework governing its operation. This could occur, for instance, in the event that commercial laws are not sufficiently explicit to settle disputes between the issuer and the customer. Legal risk may be incurred by all participants in electronic money schemes insofar as contractual obligations are involved.

RISKS INCURRED BY PARTICIPANTS IN ELECTRONIC MONEY SCHEMES

INSTITUTION	FUNCTION	RISKS INCURRED
Issuing institution	The institution receives payment in exchange for value distributed in the system and may be obligated to pay or redeem the customer's transactions and unused funds which are presented to it	Risks associated with the development, implementation and operation of the electronic money scheme: - *strategic risk* - *operational risk* - *compliance risk* - *reputation risk* Risks associated with the liability vis-à-vis the electronic money holder: - *credit risk* - *liquidity risk* - *interest rate risk* - *foreign exchange risk*
Distributing institution	The institution distributes electronic money. This can be accomplished in three ways: (a) by the issuer (it markets the electronic money directly to the customer)	 - *operational risk* (i.e. errors in the distribution process) - *compliance risk* (i.e. linked to disclosure rules) - *credit risk* (for delays in receiving payments) - *liquidity risk* (for delays in converting payments)
	(b) by a marketing agent (it markets the electronic money on behalf of the issuer)	- *operational risk* - *compliance risk*
	(c) by an underwriter (it purchases the electronic money from the issuer and markets it on its own account)	- *operational risk* - *compliance risk* - *credit risk* (vis-à-vis the issuer)

INSTITUTION	FUNCTION	RISKS INCURRED
Redeeming institution	The institution receives the electronic money from the merchant for redemption. It may act as:	
	(a) a collecting agent (it collects and submits the requests for payment to the issuer and transfers the funds to the merchant)	- *operational risk* (linked to the obligation to present proper information to the issuer) - *credit risk* (vis-à-vis the merchant insofar as the latter receives provisional credit from the institution)
	(b) a principal (it purchases the electronic money from the merchant and redeems it to the issuer)	- *credit risk* (vis-à-vis the issuer) - *liquidity risk* - *interest rate risk* - *foreign exchange risk*
Clearing and settling institution	The institution transmits both information and funds via a payment system network. It may act as:	
	(a) an agent (it does not acquire title to the electronic money in the clearing process)	- *operational risk*
	(b) a principal (it owns the electronic money in the clearing process)	- *operational risk* - *credit risk* - *liquidity risk* - *interest rate risk* - *foreign exchange risk*
Transaction-archiving institution	The institution keeps records of the transactions. Each transaction may be recorded in two ways: (i) on a card-by-card basis; or (ii) on a merchant-by-merchant basis	- *operational risk* (linked to data integrity) - *compliance risk* - *reputation risk*