Recent developments in payment cards and innovative electronic payment procedures

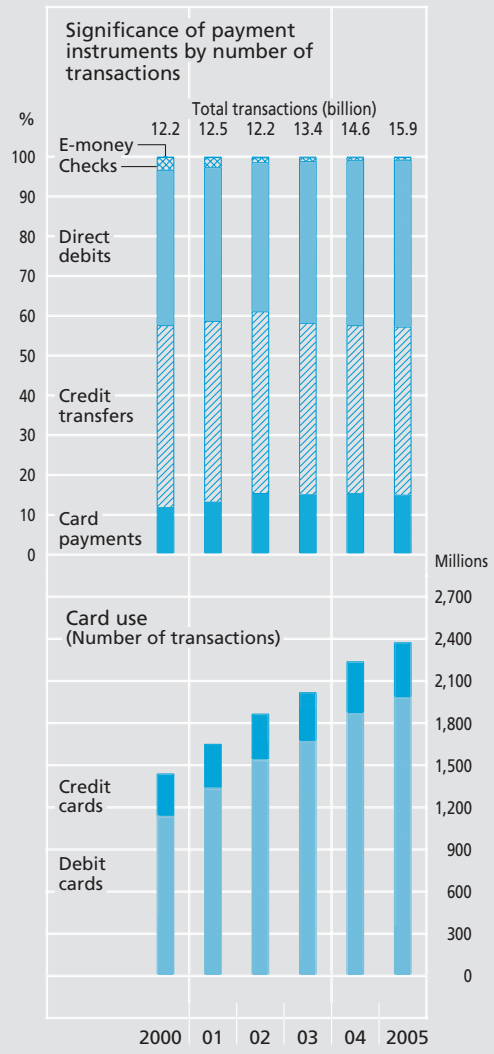
The cashless payments landscape in Germany today is still shaped by the predominance of traditional payment instruments, namely credit transfer and direct debit. Nevertheless, in recent years the significance of card payments has grown considerably. Influenced by technological advances and the possibilities offered by the internet, various forms of electronic payment procedures have also emerged. At the forefront are access procedures to payment instruments with authorisation via mobile telephone, landline or internet and recent developments in electronic money. Moreover, advancing European integration is proving a driving force behind structural changes in the EU payments environment, especially in the card market. The Bundesbank is monitoring the efficiency and security of these developments as part of its statutory responsibility for cashless payments. The aim of this article is to highlight new trends, drawing attention to special aspects of security, standardisation and regulation.

Trends in payment procedures in Germany

Significance of card payments

Even though credit transfers and direct debits still dominate the cashless payment scene in Germany, payment cards, which now account for 15% of transactions, have become an established payment instrument.

Pattern of use of payment instruments



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Debit cards in Germany

The German card market is characterised by debit cards, which are generally directly linked to the cardholder's bank account. When a card payment is made, this results in an immediate debit to the account. In 2005, approximately 91.6 million debit cards were in circulation in Germany. These were almost entirely cards issued by German credit institutions for the electronic cash card payment scheme. In this scheme – developed by the German banking industry – the payment is guaranteed by the card-issuing bank following successful authorisation, which includes a cover and validity check. For security reasons, the customer proves his identity during the payment transaction using his personal identification number (PIN). Debit cards can be used to withdraw cash from automated teller machines (ATMs) and to pay at electronic payment terminals. A total of roughly 53,000 ATMs and 570,000 payment terminals were available in 2005. In Germany, debit cards can also be used to generate electronic direct debits.[1]

Growth in electronic cash

The number of card payments in the retail sector is rapidly increasing. In the past few years, there has been substantial growth in electronic cash. This is due in part to the decision by large discount chains to accept electronic cash cards. It is also probable that, given the risk of fraud, merchants are now placing increasing importance on the payment guarantee provided by electronic cash. The EHI Retail Institute[2] has established that card payments in the retail sector rose from roughly 6.2% of turnover in 1994 to approximately 32.9% in 2005. Debit cards were used for 26.9% of the retail turnover in 2005, while credit cards accounted for only 5%. Of the payments made by debit card, unguaranteed payments (eg electronic direct debits) were slightly more common at 15.4% of retail turnover. However, a significant 11.5% of the sales volume was settled using

1 Electronic direct debiting is a procedure developed by the retail industry which generates a direct debit on the basis of the card details (direct debit authorisation via signature without PIN or payment guarantee).
2 See EHI Retail Institute, 2005 annual survey.

Breakdown of payment procedures by time of payment stream to the payment service provider

Pay before	Pay now	Pay later
Purchases in retail outlets		
GeldKarte Credit-balance-based card	Debit card – electronic cash [2] – electronic direct debit [3]	Credit card
Purchases on the internet		
GeldKarte Credit-balance-based card E-money (server-based) [1]	Payment on delivery Credit transfer – conventional – online banking (internet) – mobile banking (mobile telephone) – Giropay Direct debit via the internet	Credit card (internet) Billing procedure [4] – traditional settlement [5] – telephone bill – mobile telephone bill [6]

1 Authorisation via internet or mobile telephone. — **2** Procedure with payment guarantee operated by the German banking industry. — **3** Known in German as ELV (Elektronisches Lastschriftverfahren). — **4** Generally, periodical (eg monthly) settlement of accrued payment amounts. — **5** Settlement by direct debit, credit card etc. — **6** Payment may be made using, for example, a PIN, which is transmitted via mobile telephone at a charge.

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the guaranteed electronic cash procedure or was attributable to the use of foreign debit cards (Maestro payments).[3]

Credit cards in Germany

A distinction is to be made between credit cards with monthly payment of the cumulative card transactions and those with a credit function. The latter are equipped with a specific credit facility, which is independent of an overdraft facility on the giro account. The roughly 21 million credit cards issued in Germany are used far less often than debit cards. This is due partly to the higher charges for the card holder and the merchant. In addition, the low usage of revolving credits provided by the cards is likely to be the routinely higher interest charged in comparison with personal credit lines on giro accounts. A recent development in the German market involves credit cards allocated to a specific card account which is invariably maintained on a credit-balance basis. In some cases, the card account may be topped up. Like gift cards, these credit-balance-based cards are usually offered to a specific target group.

Payment procedures on the internet

The growing use of the internet to purchase goods and services is also reflected in payments. The vast majority of purchases made on the internet are settled using traditional payment procedures, for example, direct debit or credit card. Alongside payment on delivery, credit transfers – for instance, as advance payment or upon receipt of invoice – continue to play a significant role. This is un-

3 Maestro is a debit card procedure from MasterCard International, which is generally used for cross-border debit card payments.

doubtedly due in part to the increasing popularity of online banking. At the end of 2005, there were approximately 33.3 million online accounts in Germany while in 2001 the figure was 19.1 million. Roughly 1.1 billion credit transfers in 2005 were initiated via the internet (compared with approximately 0.5 billion in 2001).

Giropay

Payment procedures which allow the secure, comfortable and efficient payment of goods and services without the exchange of data media hold particular potential for electronic trade. Thus, in February 2006 a large section of the German banking industry introduced Giropay,[4] an online banking portal designed specifically for payment transactions on the internet. According to Giropay, it can be used by roughly 17 million online banking customers at participating banks in Germany. At the end of a purchase transaction on the internet, the customer is redirected within Giropay straight to his bank's website where he authorises a fully prepared credit transfer order. Once the customer has authorised his bank to make the payment, the merchant receives direct confirmation and payment guarantee from the customer's bank.

Billing procedures

Providers of internet-based billing procedures enable the collection of payment amounts occurring in connection with internet transactions. Authorisation may be made using, for example, passwords (following registration) or transaction numbers transmitted via mobile telephone. Billing procedures consolidate the individual amounts into a single transaction sum. This is then collected either at regular intervals (for example, once a month) or once a certain minimum amount has been reached. Collection is generally made using traditional payment instruments, such as direct debit or credit card. Providers with an existing business relationship with the customer (for instance telecommunication companies) add the accrued payment sums to the customer's monthly invoice. Owing to the aggregation of individual transactions, billing procedures are very efficient especially for small payment amounts.

Electronic money

Pursuant to the Electronic Money Directive (2000/46/EC) from the year 2000, e-money constitutes a monetary value as represented by a claim on the issuer which is stored on an electronic device. E-money is issued on receipt of an amount that is not less in value than the stored monetary value. Another defining feature is that the stored e-money is accepted as a means of payment by undertakings other than the issuer. A licence[5] from the Federal Financial Supervisory Authority (BaFin) is required in order to issue e-money in Germany. A distinction can be made between various forms of e-money according to the different storage devices – card or server.

Card-based e-money

In the case of card-based e-money, the monetary value is stored directly on the card – as is the case for the "GeldKarte" of the Central Credit Committee (CCC) in Germany. The GeldKarte function is usually integrated into the bank card in addition to the debit function. At the end of 2005, over 64 million GeldKarte cards were in issue and 172,000

4 See www.giropay.de.
5 Section 1 (1) No 11 of the Banking Act (Gesetz über das Kreditwesen).

merchant terminals were equipped for payment by GeldKarte. A total of 37.8 million payment transactions were made using GeldKarte.[6] Until now, GeldKarte has been used mainly at vending machines to purchase tickets and cigarettes, for example, and in car parks. It can also be used to make payments on the internet. Increasingly, the age of the cardholder has also been stored in the GeldKarte chip. This enables providers to check the customer's legal capacity to enter into transactions, or to block access to offers with a minimum age restriction, for instance. Additional functions, such as electronic ticketing (e-tickets), bonus programmes, time and access checks, and electronic signatures, offer further possibilities for using GeldKarte. The new generation of chip cards issued by the banking industry now supports contactless interfaces as required by German public transport companies for additional applications of this kind.

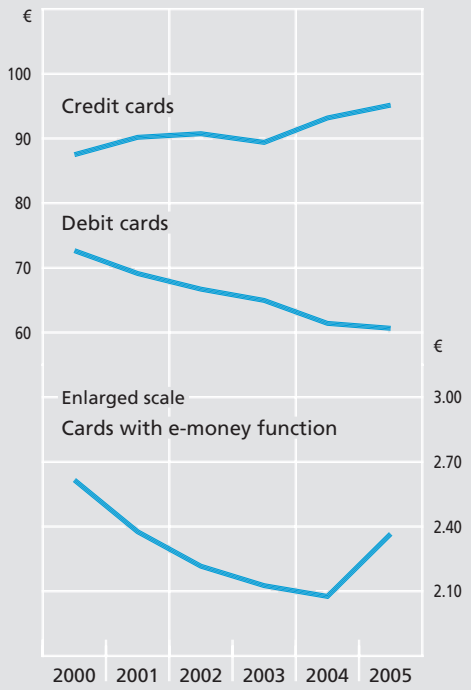
Average payment amounts with GeldKarte, debit cards and credit cards

The average payment amounts in German card-based payments still constitute a vertical market segment in this area.[7] As a rule, credit cards are used to pay larger amounts and GeldKarte tends to be used for micro-payments. In recent years, the average debit card transaction amount has fallen in comparison with that of the credit card, reflecting the increasing popularity of the debit card for day-to-day purchases.

Server-based e-money

The European Commission's definition of e-money also includes electronic monetary values stored on a server. Server-based e-money can be accessed, for example, via mobile telephone, internet or infrastructures

Average transaction amounts



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for payment cards. PayPal (Europe) Ltd, which is licensed as an electronic money institution by the British Financial Services Authority, has intensified its activities in Germany, too. PayPal enables individuals and businesses to transfer server-based balances over the internet.

Trends in the European card market – SEPA for cards

Opportunities and challenges

The Single Euro Payments Area (SEPA) is intended to overcome the current national fragmentation of the payments landscape. The European banking industry, represented

6 www.geldkarte.de
7 See Deutsche Bundesbank, Recent developments in electronic money, Monthly Report, June 1999, p 47.

Options under the SEPA Cards Framework (SCF)

The SCF describes three options for further European development. Combinations of options are also expressly permitted.

Option 1 envisages the replacement of a national debit card scheme by an international debit card scheme (for example, MasterCard's "Maestro" and Visa's "V-Pay"). This option could, however, result in international card schemes dominating the European card market, meaning that broad-based competition would not be achieved. Banks should also consider such a strategy carefully, not least in view of the ensuing dependencies on non-European card schemes. In the light of the above, establishing at least one further European approach would seem to make sense.

A European solution could be achieved with SCF option 2, both in the form of the pan-European expansion of various national card schemes and as a cooperative venture between various schemes. The technical feasibility of cooperation of this kind has been confirmed by the Berlin Group, which began its work developing standards for the bilateral authorisation and settlement of card transactions in October 2004 and now consists of more than 14 large players in the euro-area card market. [1] Building on the Berlin Group's preparatory work on standardisation, the Euro Alliance of Payment Schemes (EAPS) was set up in 2006 with aim of interlinking the participating national debit card schemes. Among the founding members of the EAPS are the German electronic cash system, providers from Italy, Portugal, the United Kingdom and Spain, and EUFISERV. [2] The first pilot phases have already begun within the EAPS. Furthermore, as early as September 2005 the German banking industry announced plans to extend access to electronic cash throughout Europe.

SCF option 3 foresees cooperation between national and international card schemes provided that all the schemes fulfil the SCF requirements. This practice known as "co-branding" (the trademarks of all the participating card schemes are displayed on the card) is already common in many countries. However, this harbours the risk that existing national access restrictions and standards will be maintained and the cross-border competition which the SEPA aims to promote will not be achieved.

1 See www.berlin-group.org. — **2** EUFISERV (European Savings Banks Financial Services Company) is a joint venture by the European savings banks and provides cashless payment services, in particular, the processing of transactions at ATMs.

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by the European Payments Council (EPC), is currently focusing on the implementation of SEPA credit transfers and SEPA direct debits and on establishing a SEPA cards framework (SCF). Debit card procedures, which in many cases dominate the national card segment, are particularly affected by SEPA developments. While the relevant national debit card scheme is used to process domestic transactions, cross-border transactions are processed via the networks of the large international card companies.

SEPA for Cards

The Eurosystem has produced a report describing its current view of the card market to the public.[8] According to this report, the challenge in implementing the SEPA lies in ensuring the successful transition to an integrated card market with a high degree of efficiency and low fees in Europe. The migration to the SEPA must not lead to a deterioration in the conditions for cardholders or merchants. Rather, the Eurosystem's objective behind the SEPA card market is to enable cardholders in the future to use their payment cards anywhere in the euro area as easily and cheaply as in their home country. According to the EPC's plans, the banking industry is to have fulfilled the requirements for the launch of SEPA-compatible payment schemes by 2008.[9] The Eurosystem's report gives concrete shape to the EPC's requirements for the SEPA card market as presented in the SCF, which are still rather general. The Bundesbank expressly advocates approaches which promote competition and, through interoperability, maintain the high level of efficiency of the current national card schemes with a view to establishing Europe-wide use and acceptance of payment cards. This requires the technical standardisation of all interfaces, for example.

Clearing card transactions in the SEPA

It has yet to be decided how card transactions will be cleared in the SEPA. In Germany, the infrastructures in place for the clearing and settlement of direct debits are currently being used. From an efficiency and cost aspect, it might well make sense if card transactions were cleared and settled through the infrastructures that are to be set up for SEPA direct debits. In this way, card payments could also contribute towards achieving the critical mass for the new SEPA infrastructures.

Security aspects for payment cards

Ensuring an appropriately high level of security

New technologies enable new forms of attack on IT systems and mean continuously changing requirements for ensuring an appropriately high level of security. This requires the ongoing monitoring and assessment of developments, also in the field of payments, and the timely implementation of necessary adjustments.

Migration from magnetic strip to chip

In the case of payment cards, for example, the situation is now such that the magnetic strips containing the cardholder's bank sort code and account number can be copied with little technical effort. The technical possibilities for reading the magnetic strip and illicitly identifying the PIN have also increased significantly. Switching from magnetic-strip-

8 See ECB, The Eurosystem's view of a "SEPA for Cards", November 2006.
9 See EPC, SEPA Cards Framework, March 2006.

based procedures to chip cards, in which the relevant data are safely stored in a chip implanted in the card, can help prevent this abuse. This changeover is planned with the introduction of the EMV standard[10] in Europe. Once payment cards with EMV chips have been introduced, there will be a sharp increase in PIN use worldwide, and this will largely replace signature-based authorisation. According to the EPC's plans, the migration to EMV chip technology should be completed as part of the work towards the SEPA by the end of 2010 at the latest.[11]

PIN security

In the Eurosystem's view, payment schemes in the Single Euro Payments Area should be at least as secure and efficient as the best-performing national payment schemes of today.[12] The European Commission also emphatically recommends that the payment industry guarantee the highest possible economically viable level of security for electronic payments. This implies that the highest existing security level among the national card schemes should be used as the benchmark for European harmonisation. In cooperation with various standardisation initiatives, in which card organisations and providers are involved, the EPC is planning to define common standards and security requirements for Europe. In the Bundesbank's view, all the technical interfaces of a card payment procedure must be included in the harmonisation process. For example, chip cards, data exchange protocols and terminals should all be fitted with the appropriate security features and cryptographic protection mechanisms to ensure the continuous integrity and authenticity of data and components, and to effectively protect the secrecy of identification data (PIN etc). These requirements are in some cases already fulfilled today.

Availability and contingency provisions

Major factors determining the acceptance of a payment procedure by merchants are the time required to process a single transaction and the consistent stability of the system even on days with a large transaction volume. Thus, close attention should continually be paid to availability aspects and contingency provisions. In Germany, a number of service and technical network providers operate concurrently. This decentralised structure undoubtedly contributes towards the robustness of the infrastructure. In addition to this, it is important that appropriate contingency mechanisms are in place to ensure the necessary performance of the schemes even on days with particularly large transaction volumes.

Security of cross-border card payments

Security issues are particularly relevant in the case of cross-border transactions with payment cards because these use components and infrastructures from diverse card schemes and settlement providers. One of the things which the Eurosystem advocated in the fourth SEPA Progress Report was the development by the end of 2007 of a comprehensive strategy to reduce card fraud especially in the

10 The EMV standard was developed for chip cards by Europay (now MasterCard Europe), MasterCard and Visa and is named after these companies. The standard aims to create worldwide interoperability between chip cards and terminals.
11 See EPC, SEPA Cards Framework version 2, March 2006.
12 See ECB, Towards a Single Euro Payments Area – Third progress report, December 2004.

international context.[13] The growth in cross-border fraud with "cloned" magnetic strip cards, which are produced after illicitly reading the original card data, is a cause for concern here. Thus, it is to be hoped that card authorisations for European chip cards within Europe will be processed using only EMV chip technology as soon as possible.

Liability shift not applicable worldwide

As an incentive for card issuers and merchants to introduce EMV chip cards and terminals, on 1 January 2005 MasterCard and Visa created a liability shift which means that, in the event of a counterfeit or copied card being used, liability is borne by the party which has not yet switched to chip technology. If the magnetic strip on a chip card is copied to another card and the copied card is used at a merchant terminal which does not support chip technology, the merchant is liable for the ensuing damages. Conversely, if the merchant has already equipped his terminal with chip technology and transactions are processed with magnetic strip cards which the issuer has not fitted with a chip, the card issuer is liable. The liability shift does not yet apply worldwide.

Security aspects of innovative payment procedures

Phishing and pharming

Attacks on the internet to fraudulently acquire electronic identification and authorisation data, known as phishing and pharming attacks,[14] are current examples of cross-border fraud seen worldwide.

Make attempted identity theft a punishable offence

In order to combat this type of fraud, it would seem reasonable to unequivocally declare the attempt to fraudulently acquire data for electronic identification and transaction authorisation a punishable offence worldwide, thus abolishing the current legal uncertainties surrounding this issue. In the context of combating identity theft, the idea of a single emergency telephone number has been discussed in Europe to report compromised electronic data of all kinds quickly and simply. In mid-2005, an emergency telephone number[15] (116 116) was introduced in Germany for this purpose. The aim is to provide a single telephone number for blocking electronic authorisations, such as payment cards, mobile telephones and access data to internet providers.

Continuous adjustment of security measures

Aside from the issues of criminal liability, prosecution and customer information campaigns, it is essential that providers of payment procedures and online banking adapt their security measures appropriately and rapidly to meet the changing risk situation surrounding identity theft. Although German online banking provides a relatively high level of protection thanks to a dual authentication feature which requires the user to enter a PIN and a specific transaction number (TAN), this alone is unlikely to provide sufficient protection in the future. It is therefore to be welcomed that sections of the banking industry

13 See ECB, Towards a Single Euro Payments Area – Fourth progress report, February 2006.
14 In phishing attacks, an attempt is made - usually by counterfeit e-mail - to redirect the recipient to a fake website and to persuade him to disclose the relevant data. In pharming attacks, the internet user is directed straight to a fake website to persuade him to compromise his data.
15 See www.sperr-notruf.de.

have already responded to the growing threat from phishing by introducing more complex TAN procedures. Nevertheless, for the future it might be worth considering options where the data on the instruction to the bank (transaction data) are directly included in the security measure. In the medium term, the security level should be further increased by employing electronic signatures. The chip cards issued by the German banking industry to its customers are increasingly technically equipped to produce electronic signatures.

Future developments

Dynamic developments in card business

In the future, a further increase in card-based payment procedures can be expected in Germany, particularly in the light of the relatively low level of use at present in comparison with the EU average and with non-European countries (see chart on this page). At the same time, as the SEPA approach competition in the card market is increasing, which is likely to lead to further consolidation.

Possibilities of technological progress

The performance capacity of payment schemes is continuously increasing, which will further reduce the time required to process, for example, credit transfers and card payments. Mobile terminals and chip cards which support contactless transmission technology are likely to play a particular role here. Providers of internet-based innovative payment procedures could extend their range of services at merchant terminals if both the customer and the merchant had (mobile) internet access at the point of sale. Then, even low-value payments could be settled online at the merchant terminal at a reasonable cost and with only short waiting periods. Such a development would reduce the current efficiency advantage of cards with an e-money function for low-value payments. Ultimately, greater competition among products owing to increasingly overlapping business lines is likely to lead to consolidation, which may reduce the variety of products currently available. The first steps in this direction have already been taken by credit card organisations, such as MasterCard and Visa, which have been offering contactless credit cards in the USA since 2002. More recent developments, in Japan, for example, have shown that contactless chip card technology can be integrated into mobile communication devices without any difficulty.

Changes in regulatory setting

The forthcoming regulatory changes under the EU Payment Services Directive are likely to have a major impact. The directive aims to create a common legal framework for the Single Euro Payments Area. Current planning envisages the introduction of a new type of provider in the field of payments known as a "payment institution". These institutions will be able to offer almost all payment services, in particular, giro business which, in Germany, is currently restricted to banks. Consequently, they could compete with credit institutions without being subject to the same strict supervisory standards even though the risk involved is similar. This may intensify competition between payment service providers.

European Commission e-money initiative ...

On 17 February 2006, the European Commission presented a report evaluating the E-Money Directive (2000/46/EC). According

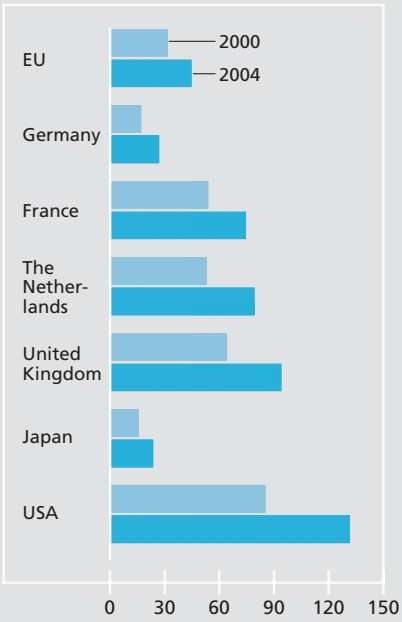
to this report, the e-money market in the EU has developed much more slowly than expected and is far from fulfilling its real potential.[16] Among other things, the report points to the restrictions and requirements imposed by the directive itself and draws attention to the different national interpretations and rules implementing the directive as well as the legal uncertainty surrounding the scope and applicability.

... should not lead to a general relaxation of rules

However, this should not lead to the conclusion that the rules concerning the issue of e-money should generally be relaxed. On the contrary, the requirements set out in the ECB's report on electronic money[17] regarding the issue of e-money from a monetary policy perspective continue to apply. These requirements specify a refund obligation, the possibility of imposing a minimum reserve for e-money and statistical reporting requirements for issuing institutions. Against this backdrop, a possible integration of the E-Money Directive provisions into the forthcoming Payment Services Directive should be viewed critically. The electronic payment procedures currently under discussion in connection with the Payment Services Directive merely constitute a means of access to payment instruments. By contrast, e-money is an independent means of payment which may also be regarded as a special form of the traditional bank deposit business. Thus, issuing e-money is an activity with its own special characteristics, which justify it having a legal basis of its own.

International comparison of card transactions per capita

Number of transactions per year



Sources: BIS and ECB.

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16 European Commission, Subject of Request for Payment Services: Evaluation of the E-Money Directive (2000/46/EC), 17 February 2006, p 2.
17 See ECB (1998), Report on electronic money.