BANCO CENTRAL DO BRASIL

Report on the Brazilian Retail Payment System

Department of Banking Operations and Payment Systems
Division of Payment Systems

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Statistical conventions:

>   … data not available
>   - nil or non-existence of the event considered
> 0 or 0.0 less than half the final digit shown
>   * preliminary data

Hyphen (-) between years (1970-1975) indicates the years covered, including the first and the last.
Bar (/) between years (1970/1975) indicates the average for the whole period, including the first and the last year.

Minor discrepancies between the sum of data and the total are due to rounding.

There are no references to sources in tables and graphs originated in the Banco Central do Brasil.

Contents

Executive Summary

This report describes and analyzes the Brazilian retail payment system in order to establish some guidelines for its modernization. For the purpose of this report, modernization means increasing use of electronic payment instruments vis-à-vis paper-based instruments. In this sense, a retail payment system modernization process should reach a composition of payment instruments in which electronic instruments preponderate.

The report is focused on aspects that can contribute to improve the Brazilian retail payment system, mainly those relating to:

a) interoperability in ATM and POS networks ;
b) clearing and settlement infrastructures;
c) pricing of payment instruments;
d) access to payment instruments;
e) innovation in payment instruments; and
f) legal and regulatory framework.

Retail payment systems and related payment instruments have been in the agenda of central banks in several countries, since technological developments have had impacts on the way end users make their payments. With these developments, electronic payment instruments have become feasible and effective alternatives to paper-based instruments.

Efficient use of payment instruments -- in their different forms -- is relevant both to maintain public confidence in the currency and to promote economic development in market economies. To reach these objectives, the overall design of the retail payment system plays a fundamental role.

Replacement of paper-based instruments is a trend observed in many countries where retail payment systems have experienced some kind of modernization process. This happens mainly because electronic payment instruments are typically more efficient than paper-based ones. Some studies have showed that costs of electronic payment instruments are usually 1/3 to 1/2 of those related to paper-based instruments. According to the same studies, complete migration to electronic payment instruments in a given country would result in annual cost reduction equivalent to 1% to 3% of its GDP (Humphrey, Pulley and Vesala, 1996; Robinson, 1995; Swartz, 2004).

The report is based on information got through interviews with, and questionnaires answered by, banks, payment service providers, some real economy representatives, and banking associations. To get information on international experience, texts and reports published by international organizations, central banks and research institutions were considered. In addition, technical visits have been made to foreign central banks and retail payment clearing and settlement systems of the following countries: Germany, Belgium, Spain, the United States, Finland, France, the Netherlands, Italy, Portugal, the United Kingdom, Sweden and Switzerland.

As compared to other countries considered in this report, the Brazilian retail payment system presents some peculiar features: (i) paper-based instruments (mainly cheque) are still used in large scale; (ii) retail payment clearing and settlement infrastructure is fragmented; (iii) there is low level of interoperability in ATM and POS networks.

Regarding payment instruments, even though use of electronic ones has increased in the last years (mainly debit and credit cards), cheque remains the main non-cash payment instrument in Brazil in number of transactions. Compared to other countries considered in the report, Brazil is second among those where cheque is more intensively used. In the period observed, most countries presented a strong reduction in the use of this instrument (in some countries its use has almost been eliminated).

Another feature highlighted in this report is the low level of cooperation among payment service providers regarding development and operation of shared or interoperable networks. This interoperability refers essentially to the distribution channels of payment services relating to debit and credit card networks, and ATM networks as well. In the payment card networks, interoperability is restricted to some pilot-projects and reaches few POS terminals. The low level of interoperability imposes some additional costs to commercial establishments which, to accept payment cards from different brands, have to handle costs related to more than one POS terminal.

The existence of a variety of clearing and settlement systems also contributes to make the overall retail payment system less efficient, making it difficult the exploitation of both economies of scale and positive externalities of network services, and generates overlapping of costs and controls for the financial institutions and payment service providers. The multiplicity of systems, with different compositions in the structures of control and governance, may also hinder the innovation process. While in Brazil there are six retail payment clearing and settlement systems, in many countries this infrastructure is concentrated in a single system, which carries out the clearing and settlement process and, additionally, adds other services that guarantee straight through processing. As a result, in these countries the retail payment system is more efficient and safer.

Payment instrument pricing structure based on cross-subsidies and gains of float is other feature pointed out in this report. Under this model, the prices of payment instruments are not transparent for end users, which may hinder the choice of the payment instrument that presents the best cost-benefit relation.

Fundamentally, the report underlines that low level of cooperation among financial institutions, payment service providers and settlement system operators, with multiple governance structures, entails a fragmented arrangement that does not benefit from economies relating to networks services. Moreover, this governance model, with low level of cooperation, may hinder innovation and the adoption of interoperability standards, as well as makes investments less rational. In this sense, the report points out that market forces, to reach the objectives of efficiency, may need some appropriate stimulus in order to have payment system participants and operators acting cooperatively.

The report contains five chapters. The first one describes the features of the payment instruments, as well as the related distribution channels (ATM and POS networks). Chapter 2 describes the clearing and settlement systems for retail payment instruments, and points out their main features, risk management instruments, and statistics. Chapter 3 is focused on the use of payment instruments and related distribution channels in the period 1999-2004. This chapter deals with subjects like relative use of payment instruments, profile, size and geographical distribution of ATM networks, and makes comparisons with other countries. Chapter 4 considers some relevant issues for development of retail payment system, such as interoperability in distribution channels, clearing and settlement infrastructure, access to, and pricing of, payment instruments, and legal and regulatory framework. In this chapter, each subject is divided into three topics: in the first, relevant fundamental concepts are presented; in the second, other countries' experiences are considered; and in the third, the Brazilian case is analyzed and compared with other countries in order to identify possible differences and similarities, and also to evaluate its compliance with international organization' recommendations. Chapter 5 presents the main conclusions of the report.

1. Payment instruments and distribution channels

1.1 Payment instruments

A payment can be described as a funds transfer from the payer to the payee by means of a payment instrument, which can be categorized as a debit order or a credit order. In a debit order, the beneficiary initiates the payment, while in a credit order it is initiated by the payer. Cheque is an example of debit order, since the beneficiary initiates the settlement process. In Brazil, TED (Electronic Funds Transfer) and DOC (Credit Document) are examples of credit orders.

Retail payments are mainly characterized by the value of the transaction. Typically, they present the following features:

   a) huge number of low value transactions, which are generally related to purchases of goods and services;

   b) diversity of payment instruments in comparison to those used for large value transfers; and

   c) intensive use of private-owned systems, mainly for clearing and settlement purposes.

Infrastructures to access retail payment systems vary among countries – or even inside a country – due to regional, cultural or geographic peculiarities. This diversity, however, has decreased in the last years since the national retail payment systems have converged to a model based on shared infrastructures, as well as on replacement of paper-based instruments for electronic instruments (BIS, 2001).

Paper-based payments encompass mainly those carried out through cheques or in cash, which involve costs of production, transportation and physical processing, while electronic payments are carried out through electronic instruments. Use of electronic payment instruments requires the existence of distribution channels, which are infrastructures for capturing and processing transactions. Typically, distribution channels encompass banking branches, automated teller machines (ATMs), POS terminals that are used for capturing payment card transactions, as well as channels for remote access (personal computers, telephone, etc). This infrastructure can be supplied and operated by financial institutions, payment service providers, and commercial establishments.

Payment instrument users can be charged either directly by means of fees or indirectly in the context of their relationship with the financial institutions and payment instrument providers. The use of a certain payment instrument implies some considerations, both by individuals and firms, on its costs and associated risks (fraud, for instance), as well as on other factors such as convenience, availability, settlement lag, acceptance by third parties, and possibility of substitution.

Merchants will accept a certain payment instrument if there is an adequate level of its use by consumers -- or, at least, an expectation of increasing use. On the other hand, consumers will use this payment instrument if it presents a good level of acceptance by merchants. This necessity of compatibility of decisions can slow down the process of innovation, and also the adoption of a new payment instrument until it reaches a level of use/acceptance that makes its adoption by consumers/merchants more advantageous or at least indifferent.

Security has a fundamental role regarding the use of a payment instrument. Consumers and merchants will adopt a new one only if the related operational risks (including fraud risk) are lower than those associated with traditional payment instruments.

On the supply side, an important factor to be considered is the level of cooperation among financial institutions, payment service providers, and clearing and settlement system operators in developing and operating shared networks that provide access to payment instrument distribution channels, and to settlement systems as well[1].

Another factor influencing the supply of payment instrument is the legal and regulatory environment that underlies its use. Legal and regulatory framework should be robust and consistent to allow innovation and development of the payment system, by means of enhancing efficiency and security of payment instruments, and, at the same time, stimulating competition and free entrance of new participants in the retail payment

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[1] Interoperability and shared networks are addressed in Chapter 4.

market. Likewise, the legal and regulatory framework should be appropriate to contain the undue use of payment instruments, as well as frauds involving them[2].

Five instruments are typically used to make retail payments, which have different features regarding transaction nature, parties involved, settlement lag and clearing procedures:

a)   cash;

b)   cheque;

c)   credit transfer;

d)   direct debit and credit; and

e)   payment cards – debit, credit, prepaid or private label.

1.1.1   Cash

Cash payments (banknotes and coins) are usually associated with low value transactions. In spite of the increasing use of other instruments, cash payments still have good acceptance due to their exclusive features:

a) legal tender;

b) transactions do not demand further identification;

c) there is no credit risk; and

d) immediate and final settlement of payment, without intermediation.

In Brazil, currency in circulation corresponds to some 3.5% of GDF (2004), which is similar to indices observed in some countries[3] as France (2%), the Netherlands (2.1%) and Germany (3.3%), while other countries present a higher level as Japan (13.1%) and Switzerland (8.7%).

Despite the costs relating to transportation and security, cash payments continue to be advantageous to commercial firms, since these costs are lower than the ones associated with the use of another payment instruments, mainly those relating to defaults in the case of cheques, and fees in the case of payment cards. From the consumers' point of view, the use of cash implies no direct cost, and its use becomes increasingly convenient for them as ATM networks develop. However, for the issuer, typically central banks, these costs are high and encompass production, storage, custody and distribution costs, as well as costs to combat forgeries.
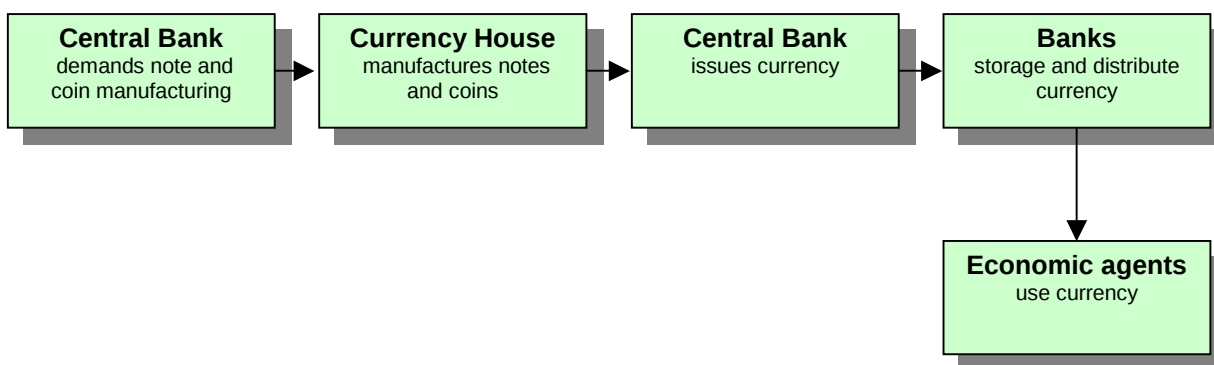
In Brazil, the central bank is the exclusive issuer of currency (banknotes and coins). Its manufacturing and distribution involve the following entities:

a) *Casa da Moeda do Brasil – CMB* (Currency House): manufactures currency (banknotes and coins);

b) *Banco Central do Brasil – BCB* (Central Bank of Brazil): issues, storages and distributes currency;

c) custody institution[4]: custodies and distributes currency on behalf of BCB;

d) banking institutions: deposit money in, and withdraw money from, BCB or the custody institution;

e) firms, individuals, and government bodies (public in general): use currency and make it to circulate within the country through their transactions.

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[2] Legal basis is addressed in Chapter 4.

[3] Data refer to 2003.

[4] In the case of Brazil, only Banco do Brasil acts as custody institution.

Diagram 1: Manufacturing and use of currency (notes and coins)

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│  Central Bank   │   │ Currency House  │   │  Central Bank   │   │     Banks       │
│ demands note and│ → │ manufactures    │ → │ issues currency │ → │ storage and     │
│ coin manufactur-│   │ notes and coins │   │                 │   │ distribute      │
│ ing             │   │                 │   │                 │   │ currency        │
└─────────────────┘   └─────────────────┘   └─────────────────┘   └─────────────────┘
                                                                           │
                                                                           ▼
                                                                  ┌─────────────────┐
                                                                  │ Economic agents │
                                                                  │  use currency   │
                                                                  └─────────────────┘
```

1.1.2 Cheque

Cheque is a paper-based debit order from the drawer to the bank in which he maintains his account (the drawee bank) to pay a specified sum to the drawer or to a third party (the payee). In volume of transactions, cheque is the non-cash payment instrument most used in Brazil, even though its use decreased in the period 1999-2004[5]. This instrument has a well-founded legal and regulatory framework, which contributes towards its use and acceptance.

Regarding clearing and settlement, there are some differences in procedures adopted in the countries considered in this report. However, it is possible to identify some patterns and trends. One of them, clearly identified in almost all countries, is the use of multilateral netting to settle cheques, usually through a single system. Some countries set a limit-value above which cheques should be settled one by one, usually through a real-time gross settlement system (RTGS system). Bilateral netting is adopted in some countries, as well as settlement through correspondent banks[6].

Payment through cheque usually involves the following parties:

  a) drawer: individual or firm ordering the payment;

  b) beneficiary: individual or firm to whom the payment should be made, and that presents the instrument directly to the drawee or deposits it in the bank in which he/it has an account (depository bank) to be collected;

  c) depository bank: bank in which the cheque is deposited in order to be collected;

  d) drawee: bank being ordered to make the payment;

  e) clearing system: system netting related obligations;

  f) settlement system: system settling related obligations.
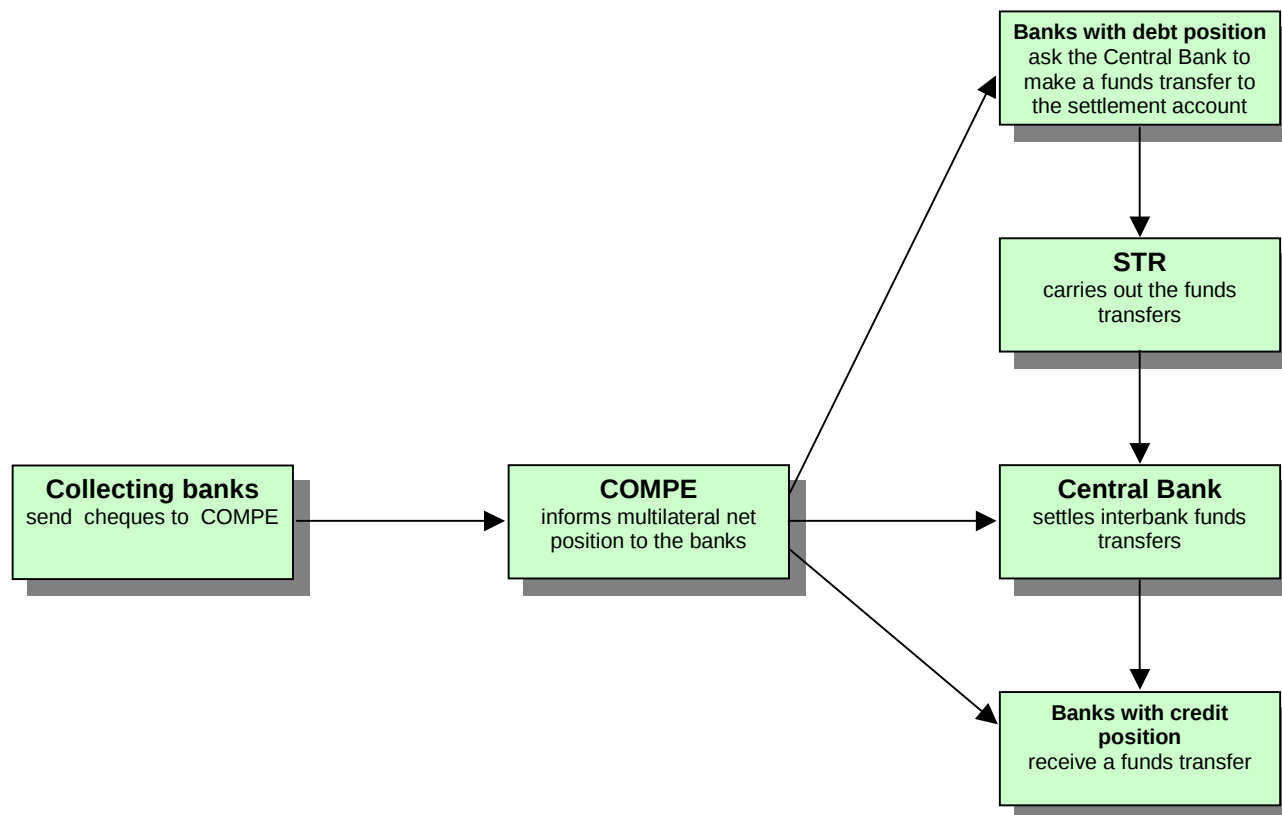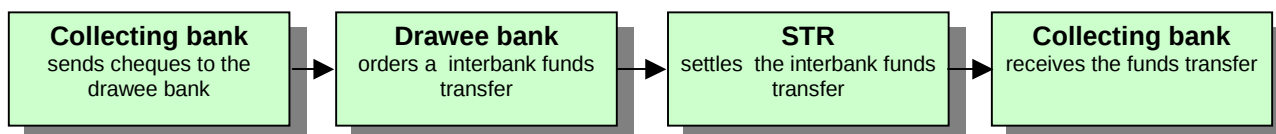
New processes for cheque interbank clearing and settlement such as electronic processing, truncation and image exchange have eliminated, in many countries, physical presentation of the document, speeding up its settlement and, just in case, its return (BIS, 2001).

In Brazil, from February 2005 on, settlement of cheques presenting value lower than R$ 250 thousand is carried out through COMPE (Centralizer Clearance for Cheques and Other Documents[7]). Two settlement cycles are carried out on a daily basis, and in each one a single multilateral net position is calculated for each participant. These net positions are settled through *STR – Sistema de Transferência de Reservas* (Reserve Transfer System) on the following business day. On the other hand, cheques presenting value equal to or larger than R$ 250 thousand are settled bilaterally in aggregated values through STR as well (see Diagrams 2 and 3).

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[5] See Chapter 3.

[6] Bank contracted to act on behalf of other bank in a clearing and settlement system.

[7] This system is operated by Banco do Brasil.

Diagram 2: Cheque with value lower than R$ 250 thousand

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                                          ┌─────────────────────┐
                                          │ Banks with debt     │
                                          │ position            │
                                          │ ask the Central Bank│
                                          │ to make a funds     │
                                          │ transfer to the     │
                                          │ settlement account  │
                                          └─────────────────────┘
                                                    │
                                                    ▼
                                          ┌─────────────────────┐
                                          │        STR          │
                                          │ carries out the     │
                                          │ funds transfers     │
                                          └─────────────────────┘
                                                    │
                                                    ▼
┌──────────────┐     ┌──────────────┐     ┌─────────────────────┐
│ Collecting   │     │    COMPE     │     │   Central Bank      │
│ banks        │ ──▶ │ informs      │ ──▶ │ settles interbank   │
│ send cheques │     │ multilateral │     │ funds transfers     │
│ to COMPE     │     │ net position │     └─────────────────────┘
└──────────────┘     │ to the banks │               │
                     └──────────────┘               ▼
                                          ┌─────────────────────┐
                                          │ Banks with credit   │
                                          │ position            │
                                          │ receive a funds     │
                                          │ transfer            │
                                          └─────────────────────┘
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Diagram 3: Cheque with value equal to or larger than R$ 250 thousand

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┌──────────────┐   ┌──────────────┐   ┌──────────────┐   ┌──────────────┐
│ Collecting   │   │ Drawee bank  │   │     STR      │   │ Collecting   │
│ bank         │──▶│ orders a     │──▶│ settles the  │──▶│ bank         │
│ sends cheques│   │ interbank    │   │ interbank    │   │ receives the │
│ to the       │   │ funds        │   │ funds        │   │ funds        │
│ drawee bank  │   │ transfer     │   │ transfer     │   │ transfer     │
└──────────────┘   └──────────────┘   └──────────────┘   └──────────────┘
```

1.1.3 Credit transfer

Credit transfer is a payment order transferring funds from the payer's account to the payee's account at the same or at another bank. In the second case, interbank payment instructions are sent from the payer's bank (sending bank) to the beneficiary's bank (receiving bank) by means of an interbank funds transfer system.

As for value, credit transfer is the most used payment instrument in Brazil[8], where interbank credit transfers can be made by means of both *DOC-Documento de Crédito* (Document of Credit) – limited to the value of R$ 5 thousand – and *TED-Transferência Eletrônica Disponível (*Electronic Funds Transfer*)*. Moreover, there are credit transfers relating to "bloquetos de cobrança".

TED and DOC are typical credit transfers, while those relating to "bloquetos de cobrança" depend on the existence of a contract between the payee and its bank. If this contract exists, the payer will be allowed to pay its debit in any bank. DOC (from February 2004 on) and credit transfers relating to "bloquetos de cobrança" presenting individual value lower than R$ 5 thousand (from February 2005 on) are settled by multilateral net positions, in T+1, at a system operated by *CIP-Câmara Interbancária de Pagamentos* (Interbank Payments Clearinghouse), that is, through *SILOC-Sistema de Liquidação Diferida de Ordens de Crédito Interbancárias* (Deferred Settlement System for Interbank Credit Orders). In the case of DOC, credit into the beneficiary account is posted on the settlement date. Regarding "bloquetos de cobrança", credit into the beneficiary

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[8] See Chapter 3.

account is posted from the settlement day on, according to the bilateral contract between the beneficiary and his bank.

From February 2005 on, credits transfers relating to "bloqueto de cobrança" presenting individual value equal to or larger than R$ 5 thousand are settled bilaterally between involved financial institutions by means of STR. In the case of TED, financial institutions have the option to settle it through either *STR or SITRAF – Sistema de Transferência de Fundos* (Funds Transfer System). The former is a real-time gross settlement system operated by the Banco Central do Brasil, and the later is a hybrid settlement system operated by CIP. In any case, credit into the beneficiary account will be posted on the same day.

The following diagrams show the processing flows of credit transfers in Brazil, which involve:

   a) sending party (payer): individual or firm transferring the funds;

   b) sending bank (payer bank): bank receiving the order to make the credit transfer;

   c) receiving bank (payee bank): bank to which the credit transfer is made;

   d) beneficiary (payee): individual or firm receiving funds;

   e) settlement system: system settling interbank credit transfers.

Diagram 4: Settlement of credit transfers relating to TED
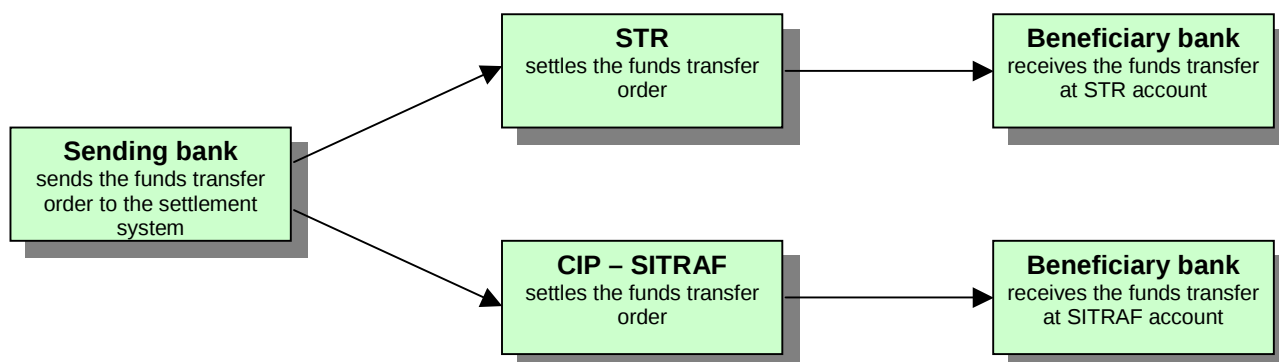
Diagram 5: Settlement of credit transfers relating to "bloqueto de cobrança" with value equal to or larger than R$ 5 thousand
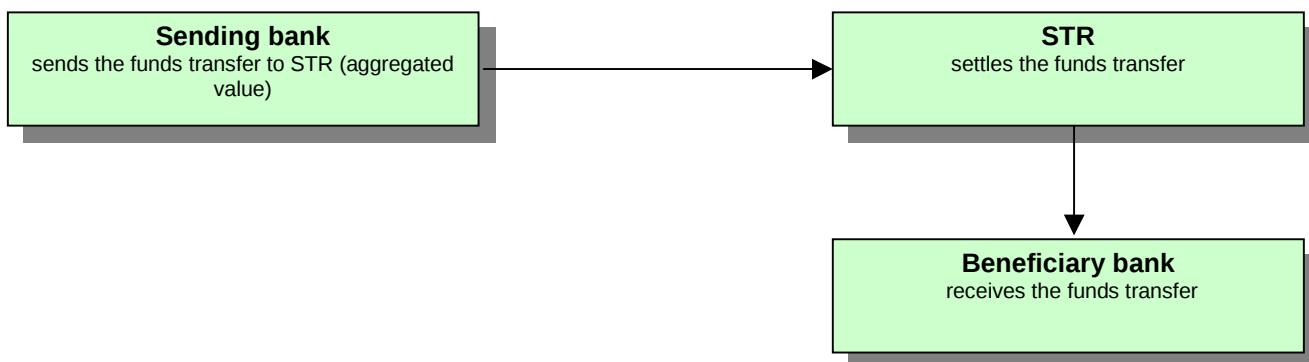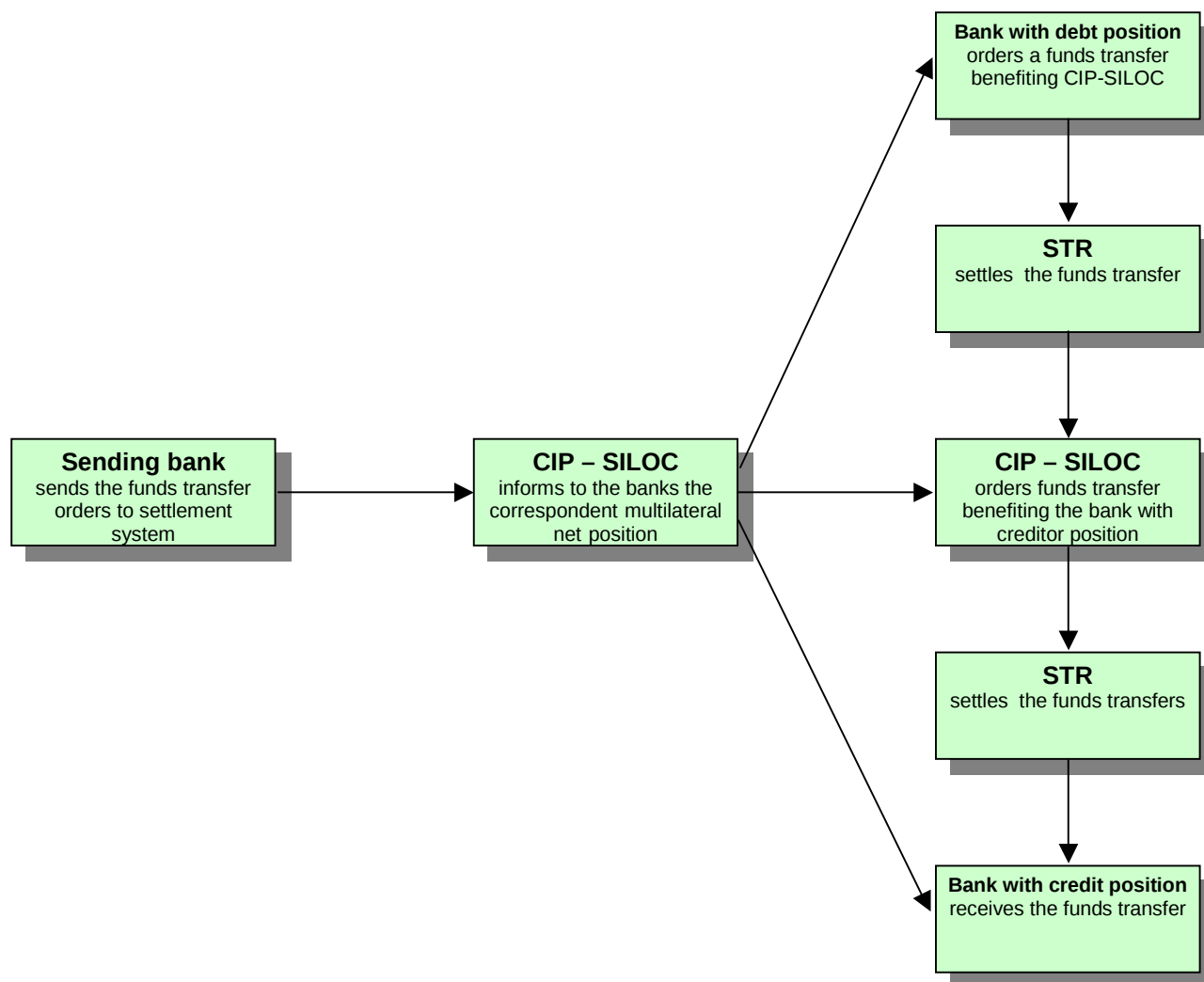
Diagram 6: Settlement of credit transfers relating to DOC and "bloqueto de cobrança" with value lower than R$ 5 thousand

```
                                              ┌─────────────────────────┐
                                              │  Bank with debt position │
                                              │  orders a funds transfer │
                                              │  benefiting CIP-SILOC    │
                                              └────────────┬────────────┘
                                                           │
                                                           ▼
                                              ┌─────────────────────────┐
                                              │         STR             │
                                              │  settles the funds      │
                                              │  transfer               │
                                              └────────────┬────────────┘
                                                           │
                                                           ▼
┌───────────────────┐    ┌─────────────────────┐   ┌─────────────────────────┐
│  Sending bank     │───▶│   CIP – SILOC       │──▶│    CIP – SILOC          │
│ sends the funds   │    │ informs to the banks│   │ orders funds transfer   │
│ transfer orders   │    │ the correspondent   │   │ benefiting the bank with│
│ to settlement     │    │ multilateral net    │   │ creditor position       │
│ system            │    │ position            │   └────────────┬────────────┘
└───────────────────┘    └─────────────────────┘                │
                                                                 ▼
                                              ┌─────────────────────────┐
                                              │         STR             │
                                              │  settles the funds      │
                                              │  transfers              │
                                              └────────────┬────────────┘
                                                           │
                                                           ▼
                                              ┌─────────────────────────┐
                                              │ Bank with credit position│
                                              │ receives the funds       │
                                              │ transfer                 │
                                              └─────────────────────────┘
```

1.1.4 Direct debit

Direct debit is a payment instrument through which the payer authorizes his bank to make a periodic debit into his account according to instructions sent by the payee (directly or through its bank). It is a debit order (the transfer is initiated by the beneficiary) typically related to recurrent payments.
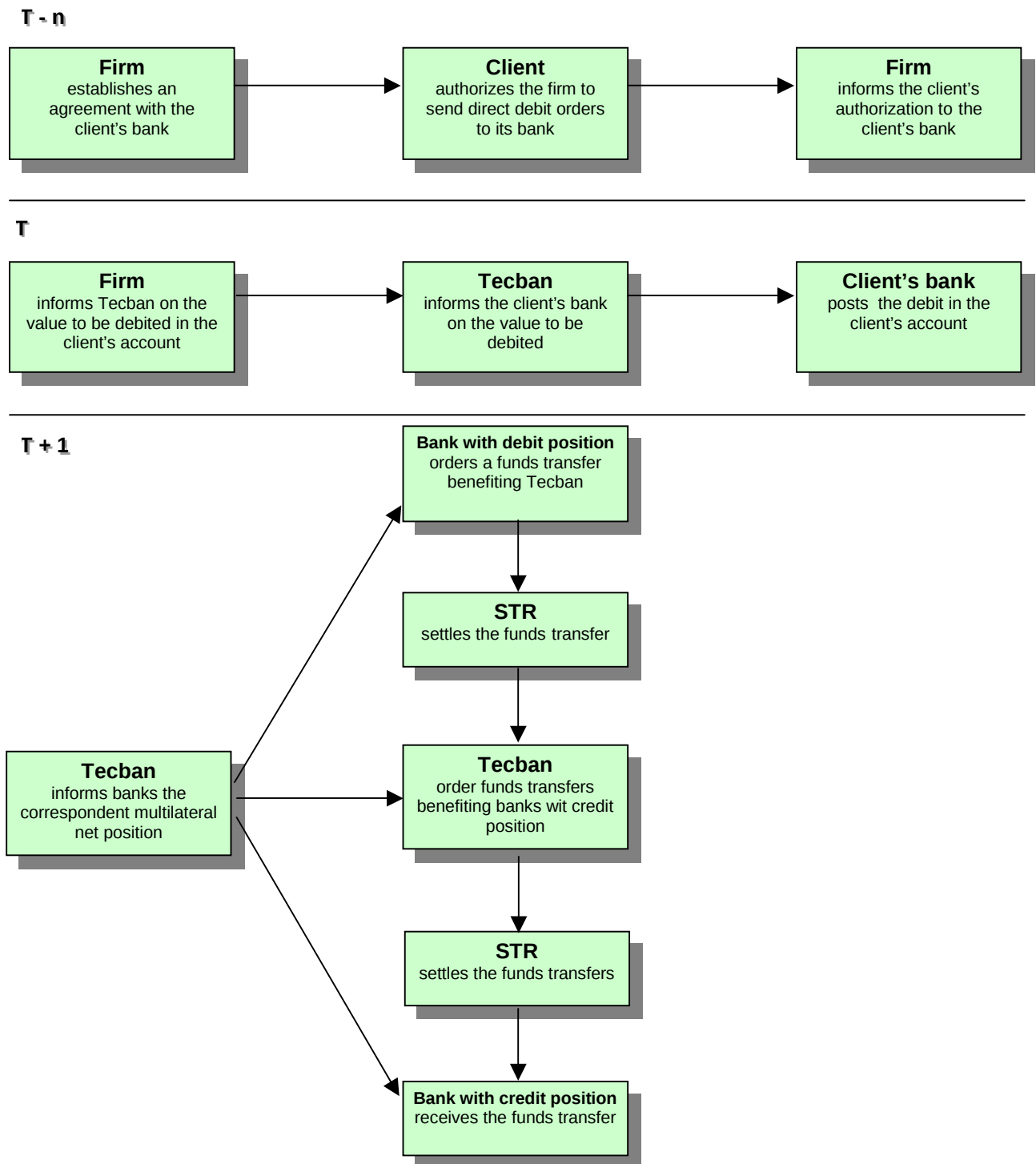
In Brazil, most payments through direct debits are carried out in intrabank environments (the sending bank is at the same time the receiving bank), in which case there is no interbank settlement. *Tecban – Tecnologia Bancária* (Banking Technology Corporation) offers interbank direct debit service to its participants, but its use is low.

These are the parties involved in an interbank direct debit:

a) beneficiary (payee): firm supplying goods or services, to which payment is owed;

b) payer (customer): individual or firm using services or purchasing goods and who authorizes his bank (payer's bank) to make the payment through a direct debit into its account;

c) payer's bank (drawee bank): bank sending funds to the bank in which the beneficiary maintains its account (payee's bank);

d) payee's bank (beneficiary bank): bank receiving funds/crediting beneficiary account;

e) settlement system: system settling interbank direct debits.

Interbank direct debit operational flow is shown at the following diagram.

Diagram 7: Interbank direct debit

T - n

Firm establishes an agreement with the client's bank	→	**Client** authorizes the firm to send direct debit orders to its bank	→	**Firm** informs the client's authorization to the client's bank

T

Firm informs Tecban on the value to be debited in the client's account	→	**Tecban** informs the client's bank on the value to be debited	→	**Client's bank** posts the debit in the client's account

T + 1

Bank with debit position orders a funds transfer benefiting Tecban

STR settles the funds transfer

Tecban informs banks the correspondent multilateral net position

Tecban order funds transfers benefiting banks wit credit position

STR settles the funds transfers

Bank with credit position receives the funds transfer

1.1.5 Payment cards

There is a number of payment cards in the market and, among them, debit cards and credit cards are the most used. Other payment cards, such as e-money cards, private label cards, and pre-paid cards, will also be considered.

- **Debit card**

Debit card is the instrument that allows the holder to make a payment at the point of sale through a debit into his banking account. The issuer is always the institution where the payer maintains his account and it can be used at any commercial establishment that has an agreement with the relevant acquirer.

The acquirer network (POS network[9]) links commercial establishments to issuing banks. Typically, in large establishments POS terminals are linked to other systems that process cash flow, stocks and taxes. The following parties are involved in a debit card transaction:

   a) issuing bank (payer's bank): financial institution issuing the card, which post the debit into the account of the cardholder (payer) according to his order;

   b) cardholder (payer): individual or firm maintaining the account at the issuing bank, and who authorizes de debit;

   c) acquirer: party entering into agreement with merchants. It is also responsible to operate the POS network. In Brazil, the acquirer is also responsible for calculating banks' multilateral net positions for settlement purpose;

   d) brand administrator: party having all rights and obligations relating to the use of the brand. It can also be an issuer;

   e) commercial establishment (merchant): firm supplying goods or services, which have entered into agreement with the acquirer. It is able to receive payments through debit cards using for this purpose devices needed to make electronic capture of transactions (POS terminals), and to send related information to the issuing bank through the acquirer's network;

   f) receiving bank (payee's bank): financial institution where the commercial establishment maintains its account, into which the payment will be credited;

   g) settlement system: system settling interbank obligations relating to debit card transactions.

In Brazil, interbank settlement of payments carried out through debit cards is typically made on the following business day. The acquirer calculates banks' multilateral net positions, which are settled through STR. Hence, credit into the account of the merchant can be made from the business day following the transaction day on.

Debit transaction capture, clearing and settlement occur according to the following steps:

   a) in making the payment, the cardholder presents its debit card to the merchant, who uses the POS terminal to read the card data and register the value of the transaction. All data are transmitted to the payer's bank;

   b) the payer's bank checks payer's personal identification number (PIN), as well as if there is enough balance in the payer's account, and authorizes the transaction;

   c) in getting the payer's bank authorization, the acquirer sends this information to the merchant so that he will be able to finish the transaction. At this moment, data are captured to allow interbank settlement of the transaction, as well as to post the debit into the cardholder's account;

   d) if transaction is not approved, the merchant will receive this information;

   e) on the following business day, the acquirer calculates and informs banks on their respective multilateral net positions;

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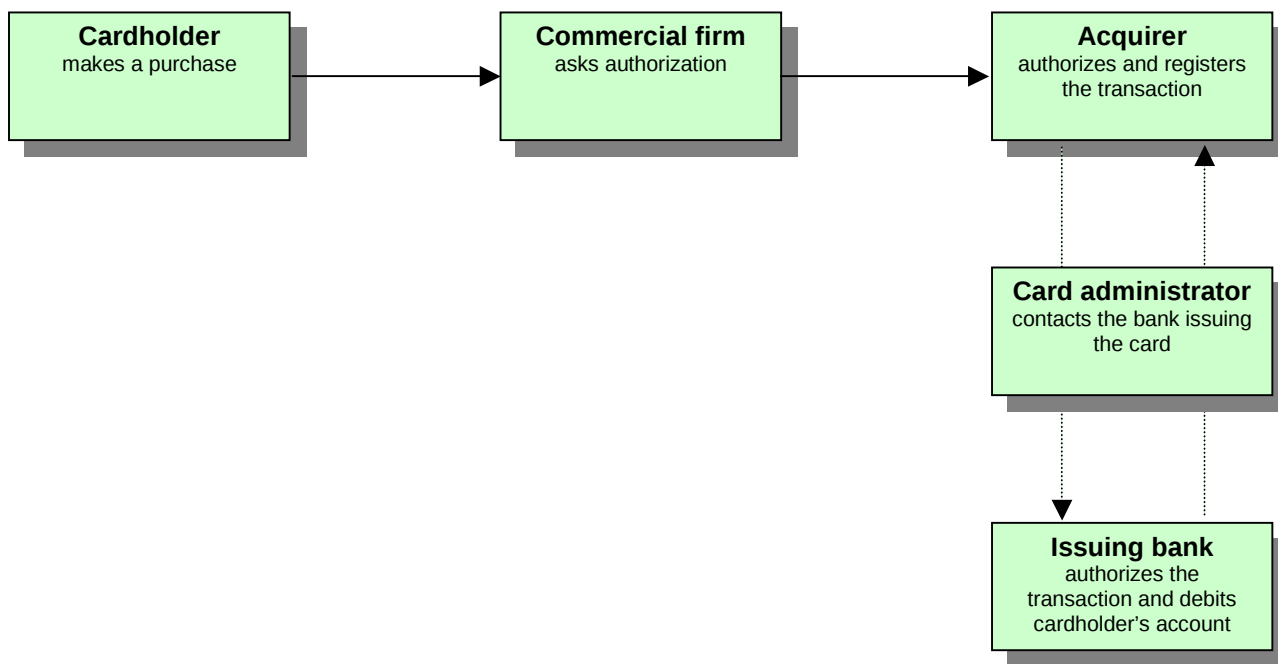
[9] See Chapter 3.

f) at the time set for this, banks having debit net positions make funds transfers to banks having credit net positions.
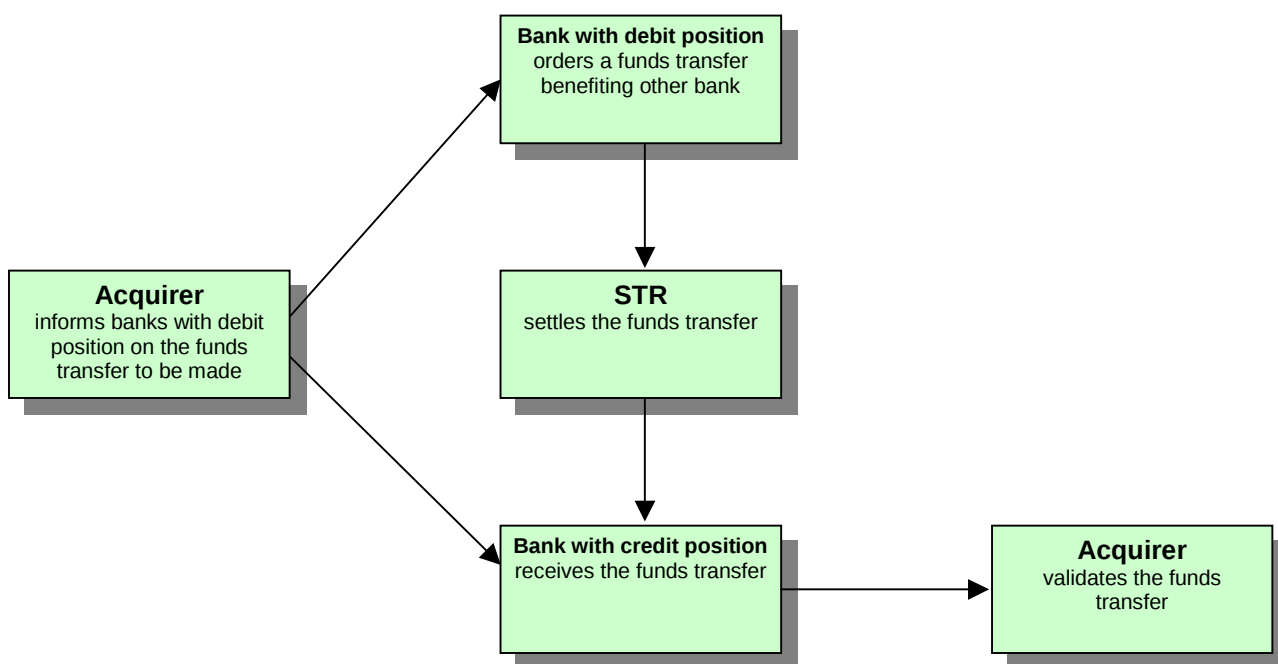
The following diagram shows the operational flow to settle debit card transactions.

Diagram 8: Debit card

T+0

Cardholder		Commercial firm		Acquirer
makes a purchase	→	asks authorization	→	authorizes and registers the transaction

Card administrator
contacts the bank issuing the card

Issuing bank
authorizes the transaction and debits cardholder's account

T + 1

Bank with debit position
orders a funds transfer benefiting other bank

Acquirer
informs banks with debit position on the funds transfer to be made

STR
settles the funds transfer

Bank with credit position
receives the funds transfer

Acquirer
validates the funds transfer

● **Credit card**

Credit card is a payment instrument that allows the holder to make purchases and also to withdraw cash from ATMs, provided a preset limit is observed. In general, banks issue credit cards under an agreement with the respective brand administrator. The issuing bank typically sells the card, delivers it to the purchaser (cardholder), and charges the respective monthly invoice. Also the brand administrator can directly issue the card.

The juridical relationship between the issuer and the cardholder is regulated by an adhesion contract. In assessing an application for a credit card, a score methodology is used mainly to value the applicant's payment capacity. Based on this assessment, issuance of the card will be approved or not, and, if so, the respective credit limit will be established.

Monthly, the cardholder receives a statement detailing all expenses he has made, and he has the option either to pay the overall value without paying interest or to make a partial payment – provided a minimum value is paid -- and finance the remaining balance (revolving credit).

At the moment of the purchase, besides the alternatives the cardholder has to pay the monthly invoice, he has the following options to pay:

a) by the overall value of the transaction, which will be charged/paid according to criteria mentioned before;

b) through an agreed number of installments and subject to preset interest rates, according to rules set by the card administrator; or

c) through an agreed number of installments set by the merchant itself, usually without interest payment.

If the purchase is paid in installments, the cardholder's credit limit will be reduced either by the overall value or by the individual value of each installment depending on the bank issuing the card. As for withdrawals, they are subject to a fixed fee and daily interest, which will be charged on the following invoice. If repayment is made previously the following invoice, interest will be charged/paid proportionally.

These are the parties involved in a credit card transaction:

a) issuer: an institution, usually a bank, issuing the credit card. The issuer charges the cardholder and receives the respective payment;

b) cardholder: individual or firm holding the credit card;

c) acquirer: party entering into agreement with merchants. It is also responsible for operating the network through which transactions are captured;

d) brand administrator: party having all rights and obligations relating to the use of the brand. It can also be an issuer;

h) commercial establishment (merchant): firm supplying goods or services, which have entered into agreement with the acquirer. It is able to receive payments through credit cards using for this purpose devices needed to make electronic capture of transactions (POS terminals), and to send related information to the issuing bank through the acquirer's network;

i) receiving bank (payee's bank): financial institution where the commercial establishment maintain its account;

j) settlement system: system through which interbank obligations relating to credit card transactions are settled.

Credit card transactions can be authorized either on-line or off-line. For an on-line transaction, the following procedures are observed:

a) the transaction is captured through a POS terminal located at the merchant's premises;

b) the cardholder registers its PIN (in the case of a chip-based card);

c) the transaction is informed to the issuer;

d) the issuer checks both the card validity and the credit limit;

e) if there is no impediment, the credit limit will be reduced by the value of the transaction and it will be authorized;

g) the approval is communicated to the merchant through the acquirer's network;

h) in the case of a magnetic strip card, a document will be printed to be signed by the cardholder;

i) when the issuer informs the authorization, the acquirer captures the transaction and schedules the correspondent credit to the merchant, and the correspondent debit to the issuing bank.
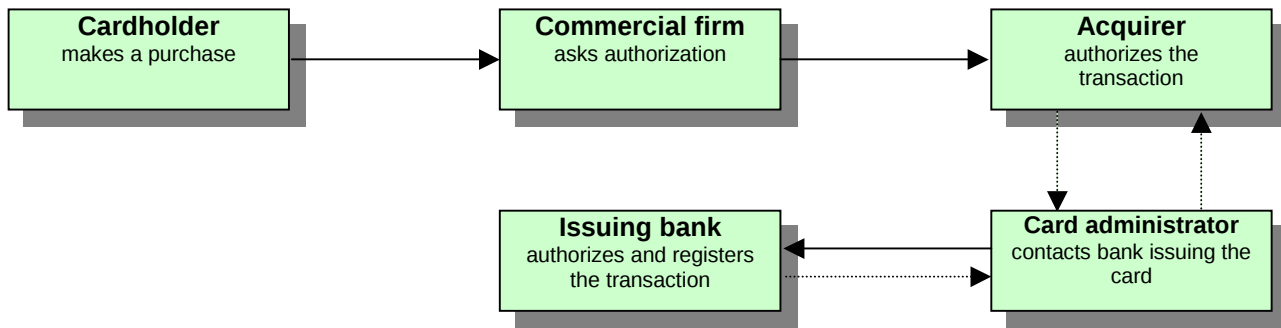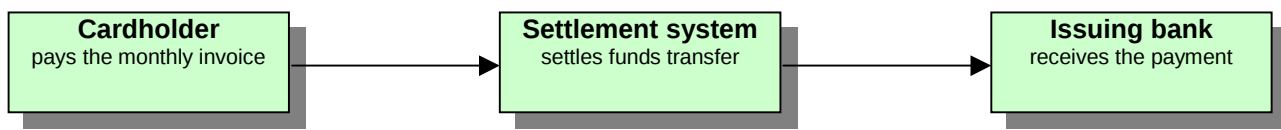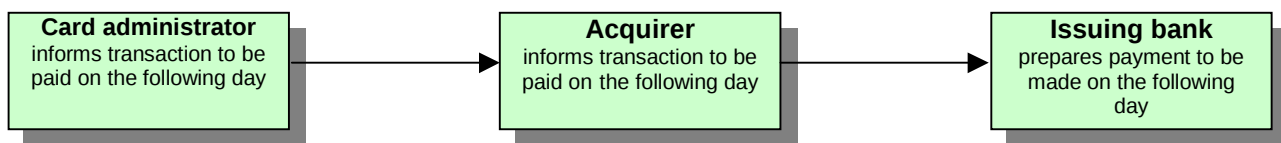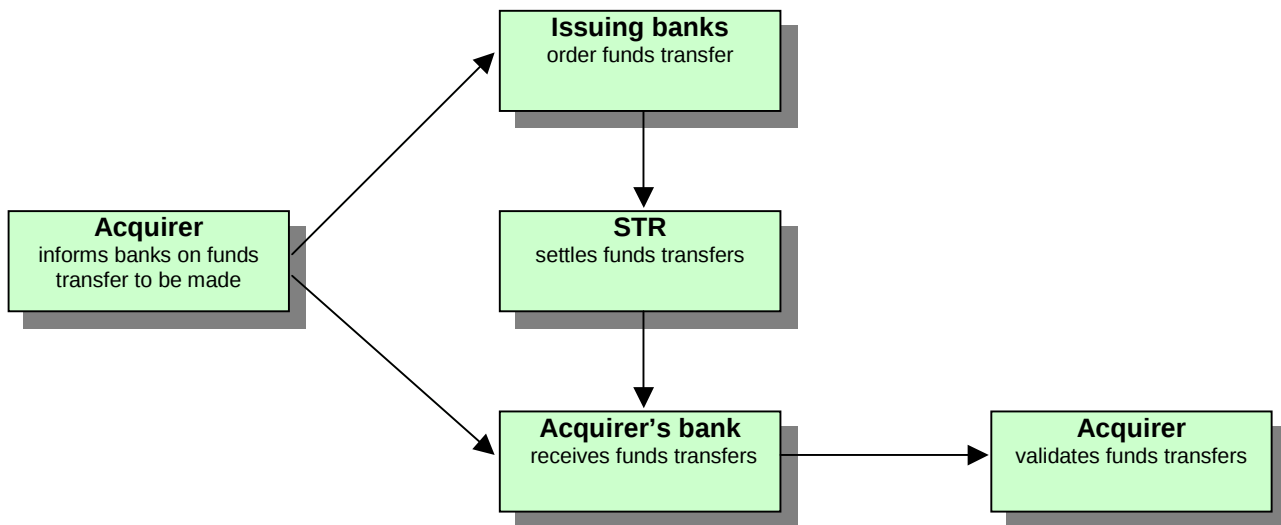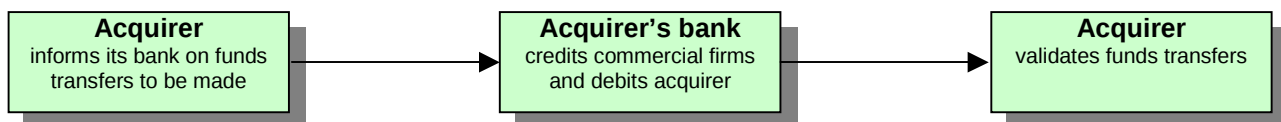
In the case of off-line transaction, these procedures are observed:

a) the credit card data (number of the card, name of the cardholder, validity date, etc) are mechanically printed on a paper document to serve as prove of the transaction;

b) by telephone, the merchant enters into contact with the acquirer, which accesses the issuer's system;

c) after checking card validity and if there is enough limit, the issuer will inform the acquirer the authorization code, which will be informed to the merchant so that it can conclude the transaction.

Withdrawal transactions are made on line since they need to have the cardholder's PIN checked. Each withdrawal is deducted from the credit limit, as well as from the limit for new withdrawals.

On a daily basis, the acquirer informs the brand administrator about all transactions carried out. Close to the date in which the payment is due, the cardholder receives the statement detailing all transactions carried out, and further information such as the overall value and the minimum value to be paid according to the cardholder's decision, together with a "bloqueto de cobrança" that will allow him to pay the invoice in any bank.

The following diagram shows the operational flow of a credit card transaction in Brazil:

Diagram 9: Credit card

T+0

Cardholder makes a purchase	→	Commercial firm asks authorization	→	Acquirer authorizes the transaction

Issuing bank authorizes and registers the transaction	←	Card administrator contacts bank issuing the card

T + m ("m" is usually lower than "n")

Cardholder pays the monthly invoice	→	Settlement system settles funds transfer	→	Issuing bank receives the payment

T + (n − 4)

Card administrator informs transaction to be paid on the following day	→	Acquirer informs transaction to be paid on the following day	→	Issuing bank prepares payment to be made on the following day

T + (n − 3)

Issuing banks order funds transfer

Acquirer informs banks on funds transfer to be made	STR settles funds transfers

Acquirer's bank receives funds transfers	→	Acquirer validates funds transfers

T + n ("n" is usually equal to thirty days)

Acquirer informs its bank on funds transfers to be made	→	Acquirer's bank credits commercial firms and debits acquirer	→	Acquirer validates funds transfers

- **Others**

Payment card market have experimented a number of innovations mainly regarding e-money card, private label card, and prepaid card.

E-money

E-money was launched in the mid-90s in Belgium and the United Kingdom, and since then it has been experimentally used in many countries, including Brazil. E-money is essentially a card in which a certain value is registered by electronic means, which is deducted each time it is used to pay a transaction. As compared to debit and credit card, e-money card differs for not requiring individual authorization each time it is used. Also, differently from prepaid cards, it is not to be used for specific purchase.

There are two types of e-money: one based on card, and other based on software product. In the case of card, the value is stored in a built-in chip or integrated circuit. A reader machine is used to make funds transfer from the cardholder to the merchant. As for software-based products, the value is stored at the user's computer to be transferred to the merchant through communication networks, such as internet, each time it is used to pay a transaction.

Private label card

Private label card works basically as a credit card that can be only used at the establishment to which it is tied. These cards are typically issued by large shop chains (supermarket chains; department shops; etc).

Prepaid card

Prepaid cards are used to purchase specific products or services. They are cards with a pre-stored value. As examples, there are telephone cards, food cards, etc.
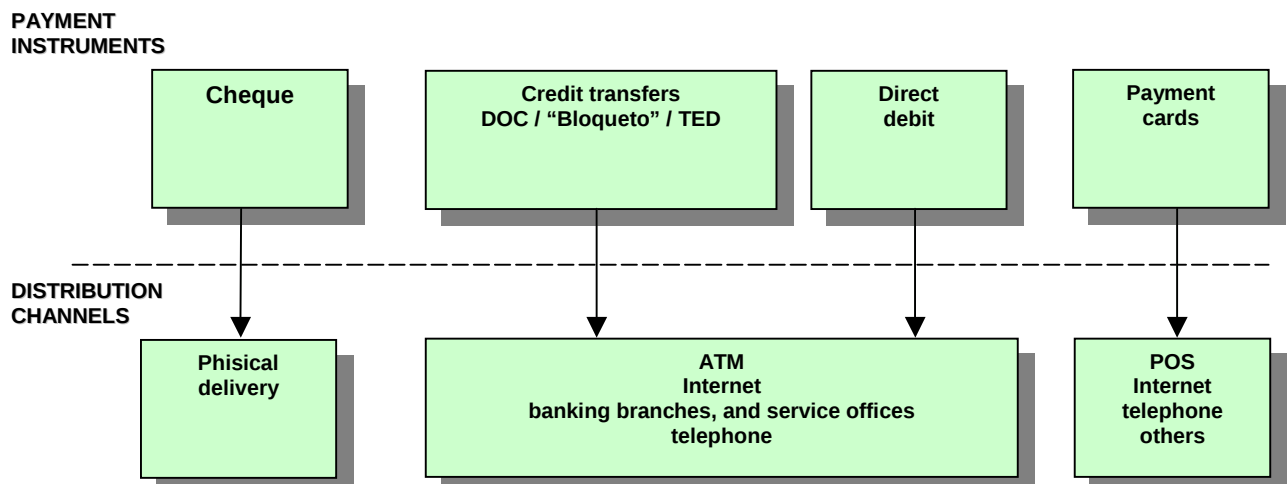
1.2 Distribution channels

Distributions channels are mechanisms and devices allowing the use of payment instruments, and also banking transactions such as withdrawals, deposits, payments, credit transfers, etc. The main payment instrument distribution channels are banking branches, ATM and POS networks, and equipments used to access banking services (personal computers, telephones, etc).

Concerning the use of payment instruments, banking branches and "correspondentes bancários" (banking correspondents) are distribution channels for cheques and credit transfers. ATM networks carry out the same function regarding credit transfers and direct debits. POS networks allow use of payment cards.

In Brazil, financial institutions, payment card administrators, and banking technology firms supply distribution channel services as it is shown bellow.

Diagram 10: Distribution channels

1.2.1   ATM terminals

ATM terminals are electro-mechanical equipments allowing their users, by means of cards, carry out withdrawals, payments, and credit transfers among other banking transactions. They are usually installed at banking branches, commercial centers, airports, etc. Each financial institution or service provider has its own strategy to deploy its equipments on the national territory. They consider such aspects as costs, profitability, and business opportunities.

1.2.2   POS terminals

POS terminals are electronic equipments used by merchants in order to ask authorization and register on line transactions carried out through payment cards. Essentially, these equipments read cards based on either magnetic tracks or chips, allowing exchange of information/data between merchants and card issuers regarding authorization and register of transactions. Some merchants still use mechanic devices to capture transactions.

1.2.3   Remote access

In this report, remote access means the use of equipments owned by the users to access banking services such as fixed or mobile telephone, personal computers, etc. Services offered through this channel, which evolves all the time, are structured according to the strategy of each institution. At the moment, most institutions allow their clients to make payments through this channel, among other services.

2.   Payment clearing and settlement infrastructure

Payment clearing and settlement infrastructure is essential to have the national payment system and economy functioning well. Its efficiency is determinant to get effectiveness in settlement of obligations. This infrastructure can be defined as a set of clearing and settlement systems, payment service providers and financial institutions, which are involved in different stages of the payment process – transmission, confirmation, clearing and settlement.

Clearing and settlement arrangements should observe core principles relating to efficiency and safety such as:

   a)   low cost;

   b)   appropriate risk management;

   c)   adequate velocity of processing;

   d)   accessibility and convenience for users;

   e)   reliability;

   f)   precision.

These factors strongly influence the choice of a certain payment instrument either by users, merchants, financial institutions, or payment service providers. Another factor influencing payment system infrastructure efficiency and safety is the segregation -- or not -- of critical or large value payments from retail payments. In many countries, this segregation occurs through the use of different fees according to the kind of payment. In general, deferred net settlement (bilateral or multilateral) is used in clearinghouses processing low values (ACH), and real time gross settlement (RTGS) systems and hybrid systems are used to settle critical payments.

2.1   Clearing and settlement systems

An important feature of the Brazilian clearing and settlement arrangement is the existence of a number of systems, each one settling a different payment instrument or product. This kind of arrangement can influence the performance of the system as a whole, mainly in aspects relating to efficiency, standardization, interoperability, safety and costs[10]. In the countries considered in this report, there is a trend towards the use of a single system to clear and settle all retail payments. Where there is more than one system, segregation is usually based on the kind of payment instrument: paper-based instrument x electronic payment instrument.

The Brazilian payment clearing and settlement infrastructure is composed of the following systems:

   a)   STR;

   b)   CIP-SITRAF;

   c)   CIP-SILOC;

   d)   Tecban;

   e)   COMPE;

   f)   Redecard; and

   g)   Visanet.

Some countries, such as Portugal and Spain, have established (or are studying the possibility of establishing) a limit-value from which all individual payments should be settled through a RTGS system. In Brazil, from February 2005 on, all cheques which value is equal to or larger then R$ 250 thousand, as well as all funds transfers relating to "bloquetos de cobrança" which value is equal to or larger than R$ 5 thousand, are settled bilaterally in aggregated value through STR, which is the Banco Central do Brasil's RTGS system.

Funds transfer systems considered systemically important are those in which the volume or nature of trades, at sole discretion of the Banco Central do Brasil, can pose risks to the robustness and normal functioning of

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[10] Implications from this arrangement are discussed in Chapter 4.

the financial system. The Banco Central do Brasil's rules establish criteria to designate a system as systemically important, based on individual and aggregated value of funds transfers which are settled in the system. Thus, a system is considered systemically important if any one of these referential values is surpassed:
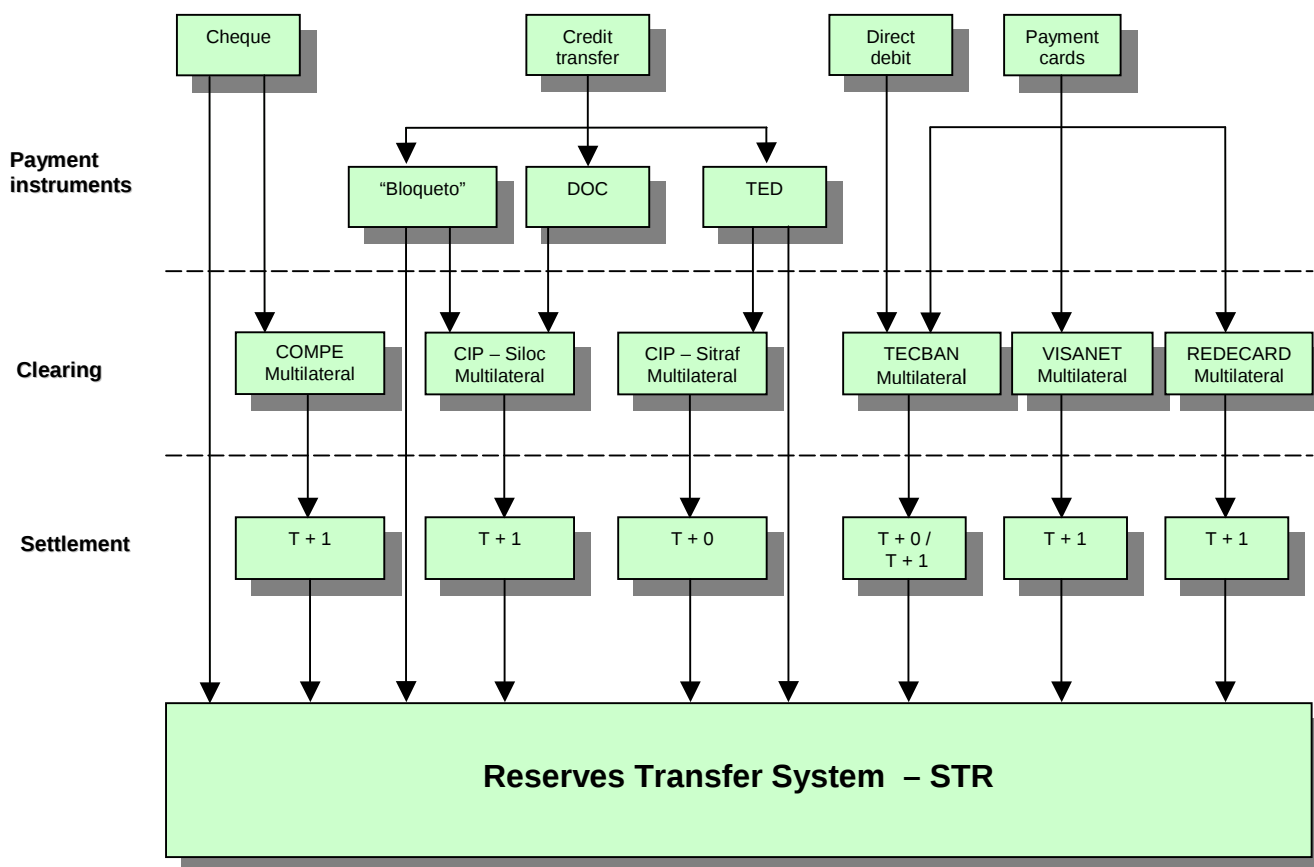
a) individual value: R$ 10 million (calculation considers the arithmetic mean of funds transfers presenting, on each day, the largest individual value in a period of six months; only the largest thirty observations are considered);

b) aggregated value: R$ 5 billion (calculation considers the arithmetic mean of daily aggregated values in a period of six months; only the largest thirty observations are considered).

However, it should be highlighted that the Banco Central do Brasil can consider a system as systemically important in an assessment case by case, even if these referential values are not surpassed. In this case, aspects relating to risk management would be focused.

STR is used to settle all clearinghouses' net positions. For this purpose, settlement accounts hold by the clearinghouses and respective participants at the Banco Central do Brasil are used. The following diagram shows the Brazilian payment clearing and settlement infrastructure.

Cheques with an individual value lower than R$ 250 thousand are cleared through COMPE (multilateral net positions are settled through STR on T+1). The so-called TED is settled either directly through STR on a gross basis or through CIP-SITRAF. In the later system, settlement is also on T+0 but multilateral netting is used. In the case of DOC, as well as funds transfers relating to "bloquetos de cobrança" which value are lower than R$ 5 thousand, settlement is on T+1 through CIP-SILOC and multilateral netting is used. In their turn, interbank direct debits are cleared through Tecban with multilateral netting, and settled on T+1 through STR. Multilateral netting is also used in the case of payment cards through Visanet, Redecard and Tecban, according to the brand of the card. In any case, settlement is on T+1 through STR.

Diagram 11: Clearing and settlement infrastructure

2.1.1 Reserves Transfer System (Sistema de Transferência de Reservas – STR)

STR is a funds transfer system offering intraday finality. These funds transfers can be made by participant banks[11] on their own or on behalf of their clients, and the beneficiary can be the receiving bank or a client of it. There is no limit of value. All net positions relating to payment and securities clearing systems are settled through STR.

2.1.2 Interbank Payments Clearinghouse (Câmara Interbancária de Pagamentos - CIP)

CIP was created in 2001 to clear interbank funds transfers. It operates two systems: SITRAF (Funds Transfer System) and SILOC (Deferred Settlement System for Interbank Credit Orders).

SITRAF is a hybrid system since it combines features of DNS systems[12] and RTGS systems. Continuous net settlement is used, and at the beginning of each day all participants make a pre-deposit into the CIP's settlement account held at the Banco Central do Brasil, which value is calculated considering the historical data of each participant. In the SITRAF environment, each participant is credited by the pre-deposit made, and during the day participants' accounts in SITRAF will be credited and debited according to the funds transfers received and sent, respectively. Participants can make complementary deposits during the day. SILOC is a multilateral netting system that settles interbank credit transfers. Final settlement occurs over a specific settlement account held by the clearinghouse at the Banco Central do Brasil.

2.1.3 Tecban's Clearinghouse (Câmara de Compensação da Tecban)

Tecban clears funds transfers related mainly to payments made through debit cards, ATM withdrawals, and direct debits. Related multilateral net positions are settled through STR over settlement accounts held by the participants at the Banco Central do Brasil.

Apart from clearing, Tecban:

a) captures the electronic transactions carried out by associated financial institutions' clients in shared networks, Tecban's ATM terminals (Banco24Horas), or in associated commercial establishments (POS terminals);

b) approves transactions verifying in real time both the clients' account balance and, just in case, the limit established either by participant banks or by Tecban itself;

c) manages related settlement risks.

There are two settlement cycles each day, and in each cycle two multilateral net positions are calculated per participant: a position for guaranteed transactions, and other for non-guaranteed transactions. This approach allows Tecban to offer same day settlement for related payments, which implies low settlement risk.

2.1.4 Centralizer Clearance for Cheques and other Documents (Centralizadora da Compensação de Cheques e Outros Papéis – COMPE)

COMPE, which is operated by Banco do Brasil S.A., settles cheques which value is lower than R$ 250 thousand. Two clearing cycles are carried out daily, and in each one of them a single nationwide multilateral net position is calculated per participant. All cheques received in a certain day will be settled on the next business day through settlement accounts held by participants at the Banco Central do Brasil.

2.1.5 Visanet and Redecard

In November 1995, Visa International and some Brazilian banks created Visanet aiming to manage operations relating to the Visa System, which previously were under responsibility of participant banks. Redecard was created in 1996 and is the acquirer for operations relating to the Mastercard Group.

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[11] Participation in STR is open to all financial institutions holding a reserve account, as well as to clearinghouses holding a settlement account.

[12] Multilateral netting allows liquidity saving since transfers are made in net values.

Besides contracting commercial establishments and supplying related network services, Visanet and Redecard:

a) capture data relating to commercial transactions carried out by credit and debit card holders;

d) approve transactions verifying in real time both the clients' account balance and the limit established by the bank issuing the payment card;

e) calculate participants' multilateral net positions;

f) inform participants on their multilateral net positions to be settled;

g) monitor the settlement of these positions;

h) guarantee interbank settlement with own funds if a participant defaults.

2.2   Risk management

STR settles in real-time with intraday finality. In the case of SITRAF, which offers intraday finality as well, there is no credit risk exposure since the clearinghouse does not allow overdraft in participants' accounts. Payments are released only if there is enough balance. Regarding SILOC, defaulting participant is excluded and unwinding is carried out (the clearinghouse calculates new multilateral net positions for all other participants).

Even though Tecban, Visanet and Redecard are not considered systemically important clearing systems, they adopt risk management mechanisms and guarantee settlement if a participant bank defaults. It should be pointed out that this is very important to maintain the confidence of people in electronic payment instruments – debit cards, credit cards, pre-paid cards and credit transfers.

Tecban demands participants to post federal government securities as collateral, and a limit for each participant is set according to collateral effectively posted. This limit is monitored each time a transaction is carried out. Regarding non-guaranteed transactions, defaulting participant will be excluded and all multilateral net positions will be re-calculated. Exclusion also occurs if a participant does not meet requirement to post further collateral. In this case, new transactions of the defaulting participant will not be accepted. Unwinding is also used in COMPE.

In systems that adopt unwinding (COMPE, SILOC, and Tecban non-guaranteed transactions), the participants face credit and liquidity risk. However, since related financial turnover is relatively low, this risk is very small.

Apart from establishing operational limits and demanding collateral, the clearinghouses, in order to control risk, may adopt:

a) internal controls mechanisms;

b) external audit;

c) assessment of entities applying to participate in the system;

d) settlement insurance;

e) monitoring of commercial establishments and cardholders' transactions.

To control operational risk, these other procedures can be adopted:

a) maintenance of a secondary center in a way that operations could be restarted in less than two hours in case of primary center fail;

b) maintenance of auxiliary equipment to be used in case of energy supply fail;

c) establishment of different competences to approve transactions;

d) segregation of functions;

e) periodic revision of systems; and

f)   continuous monitoring of networks, systems and software in order to realize occasional fails.

2.3   Distribution of payments between clearing and settlement systems

Table 1 and Graph 1 show the distribution of payments between the clearing and settlement systems. As for volume of transactions, reflecting the intensive use of cheques, COMPE accounted for more than half of all payments processed in 2004. In the same year, Redecard and Visanet together processed some 40% of the transactions.

Table 1: Clearing and settlement systems - Transactions in 2004

System	Volume		Value		Average
	(Millions)	%	(R$ millions)	%	(R$)
CIP – SITRAF [1]	25	0,5	1.768.392	31,9	71.459
CIP – SILOC	94	1,9	89.798	1,6	954
STR [1]	8	0,2	1.591.844	28,7	206.822
COMPE [2]	2.848	55,8	1.961.890	35,4	689
TECHAN	89	1,5	7.208	0,1	81
REDECARD	799	15,7	50.950	0,9	64
VISANET	1.251	24,5	71.852	1,3	57
Total	5.114	100,0	5.541.934	100,0	1.084
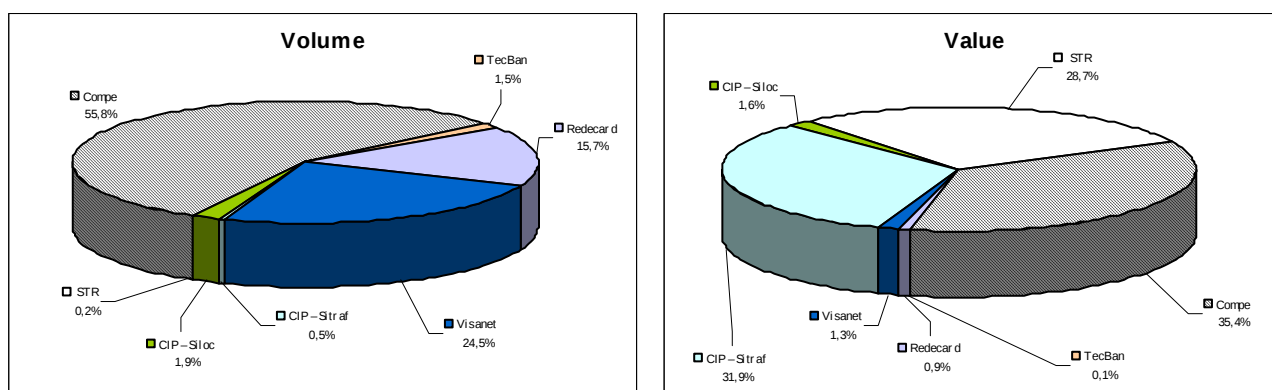
Source: Banco Central do Brasil and clearing and settlement system operators.

[1] Only client transactions are considered.

[2] Cheque, DOC (up to February 2004) and "bloqueto de cobrança" cleared at COMPE.

As for value of transactions, STR, CIP and COMPE accounted for some 97.6% of all payments. In the case of COMPE, cheques presented a large average value – some ten times the average value of other retail payment instruments –, which strongly influences the financial turnover.

Graph 1: Clearing and settlement systems – Relative participation in total of transactions (2004)

Source: Banco Central do Brasil and clearing and settlement system operators.

If only payments lower than R$ 5 thousand (Table 2, and Graphs 2 and 3) are considered, it is possible to observe in a better way the payment profile of each settlement system.
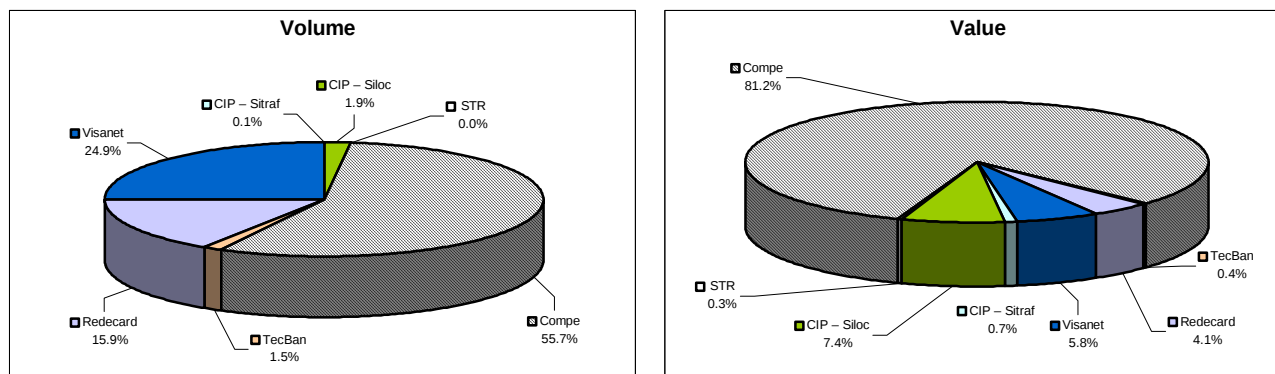
Table 2: Clearing and settlement systems – Distribution of transactions per value (2004)

System	Lower than R$ 5 thousand					Equal to or larger than R$ 5 thousand				
	Volume		Value		Average Value	Volume		Value		Average Value
	(Million)	%	(R$ million)	%	(R$)	(Million)	%	(R$ million)	%	(R$)
CIP – SITRAF[1]	4	0,1	8.885	0,7	2.423	21	27,6	1.759.507	40,8	83.466
CIP – SILOC	94	1,9	89.798	7,3	954	...	...	...	...	...
STR [1]	2	0,0	3.975	0,3	1.780	5	7,2	1.587.869	36,9	290.614
COMPE[2]	2.799	55,6	1.001.482	81,1	358	50	65,2	960.408	22,3	19.301
TECBAN	89	1,8	7.208	0,6	81	...	...	...	...	...
REDECARD	799	15,9	50.950	4,1	64	...	...	...	...	...
VISANET	1.251	24,8	71.852	5,8	57	...	..	...	...	...
Total	5.038	**100,0**	1.234.150	**100,0**	–	76	**100,0**	4.307.784	**100,0**	–
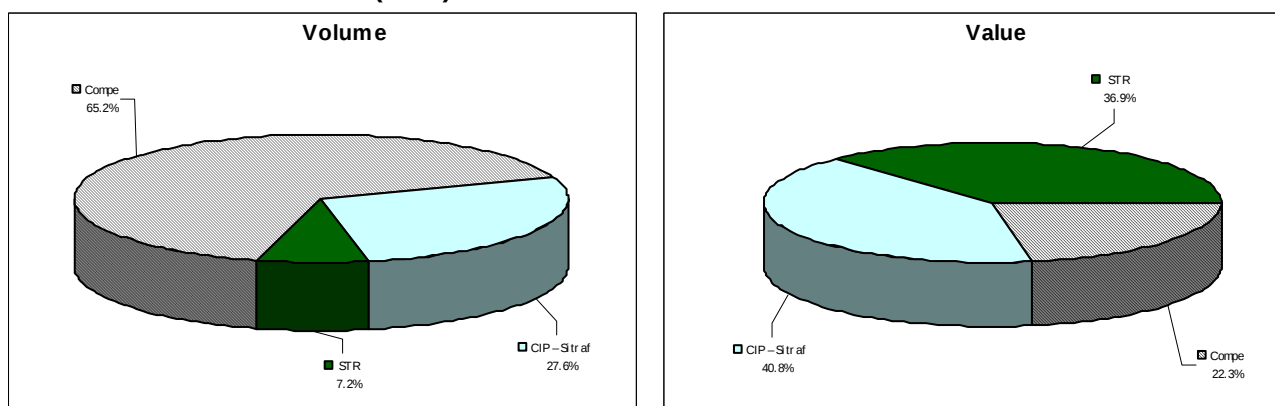
Source: Banco Central do Brasil and clearing and settlement system operators.
[1] Client transactions only.   [2] Cheque, DOC (up to February 2004) and "bloqueto de cobrança" cleared in COMPE.

Regarding payments lower than R$ 5 thousand, there is a strong concentration in COMPE both in volume (55.7%) and in value (81.2%). Redecard and Visanet – systems in which most of transactions are lower than R$ 5 thousand – account for some 40% and 10% of the transactions in terms of volume and value, respectively. As for payments equal to or larger than R$ 5 thousand, COMPE also accounts for most transactions in terms of volume. In terms of value, however, SITRAF and STR, together, account for 77.7% of payments.

Graph 2: Clearing and settlement systems - Percentage of transactions with value lower than R$ 5 thousand (2004)

Source: Banco Central do Brasil and clearing and settlement system operators.

Graph 3: Clearing and settlement systems – Percentage of transactions with value equal to or larger than R$ 5 thousand (2004)

Source: Banco Central do Brasil and clearing and settlement system operators.

3.   Quantitative analysis

In order to make a quantitative analysis of payment instruments and distribution channels, the Banco Central do Brasil have collected data from financial institutions, payment service providers, and clearing and settlement systems. Questionnaires were sent to these entities, encompassing the period 1999-2004. These questionnaires were based on publications from BIS/CPSS (Red Book) and European Central Bank (Blue Book). Regarding non-cash payment instruments, volume and value of the transactions relating to the following instruments were considered:

(a) direct debit[13];

(b) debit card;

(c) credit card;

(d) credit transfer[14]; and

(e) cheque[15].

As for distribution channels, the following data were considered:

(a) ATM networks: number of networks; level of interoperability between networks; types of access to networks; number of terminals per Brazilian state; volume and value of transactions per type of transaction (withdrawal, credit transfer, balance enquiry, etc);

(b) POS networks[16]: number of terminals; volume and value of transactions;

(c) remote access: volume and value of transactions per type of transaction.

3.1   Use of payment instruments

3.1.1   *The Brazilian case*

Table 3 end Graph 4 show that, in volume of transactions, cheque is still the most used payment instrument in Brazil, accounting for 35.4% of overall payments in 2004.

Table 3: Use of payment instruments – Volume

| Payment instruments							Million
	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Total:	4,011	4,461	4,812	5,003	5,419	5,812	44.9
Cheque [1/]	2,505	2,529	2,507	2,295	2,136	1,967	-21.5
Debit card	107	206	326	451	662	912	753.1
Credit card	553	706	825	970	1,084	1,253	126.4
Direct debit	219	322	386	438	627	657	199.5
Interbank credit transfer	626	698	768	849	912	1,023	63.5
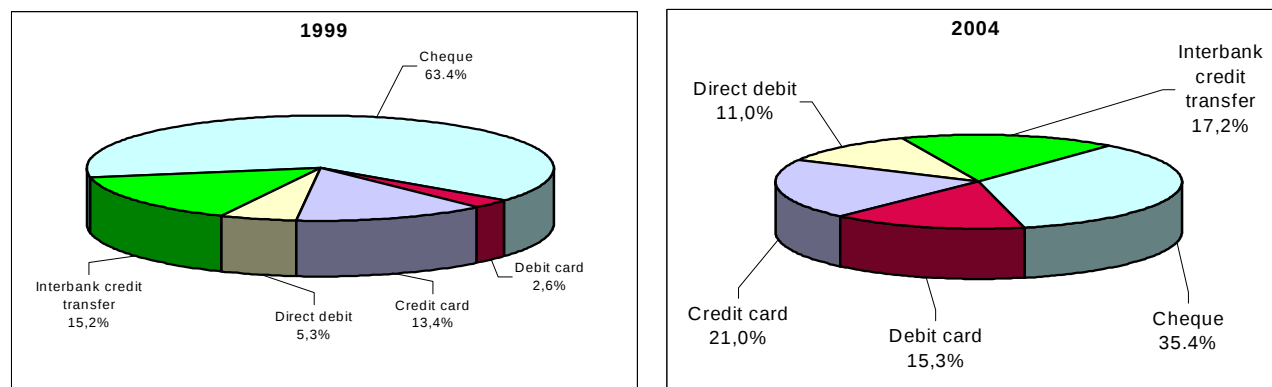
[1/] Excludes "on us" cheques.

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[13] In Brazil, banks offer intrabank direct debit services only.

[14] Encompasses funds transfers relating to TED, DOC and "bloqueto de cobrança".

[15] Excludes cheques "on us".

[16] Electronic Funds Transfer at the Point of Sale.

Graph 4: Relative use of payment instruments – Volume

Source: Banco Central do Brasil, banks, acquirers and card administrators.

Credit card and credit transfer are the most used electronic payment instruments, accounting for 21.0% and 17.2%, respectively, of overall volume of payments in 2004. In the period considered, debit card is the instrument that presented the larger increment of use, either in terms of relative use (increased from 2.6% in 1999 to 15.3% in 2004) or when the instrument is considered alone (753%).

Data show a clear increment in the use of electronic instruments. In 1999, cheque accounted for 63.4% of overall non-cash payments. In 2006, its participation was reduced to less than 50%, while electronic instruments accounted for more than 50%. In 2004, card payments (debit and credit) accounted for 36.3% of overall payments, surpassing cheque for the first time.

Table 4: Use of payment instruments – Number of transactions per inhabitant

Volume	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Total	24	27	28	29	31	33	33.7
Cheque [1/]	15	15	15	13	12	11	-27.6
Debit card	1	1	2	3	4	5	686.9
Credit card	3	4	5	6	6	7	108.9
Direct debit	1	2	2	3	4	4	176.2
Interbank credit transfer	4	4	4	5	5	6	50.8

[1/] Excludes "on us" cheques.

From 1999 to 2004, annual number of transactions per capita, encompassing all payment instruments, increased from 24 to 33. All instruments but cheque presented an increment in their use, especially debit card and direct debit. In the case of the former, annual number of transactions per capita changed from 1 to 5, while the same indicator changed from 1 to 4 in the case of the later instrument. In the same period, use of cheque reduced 27.6%.
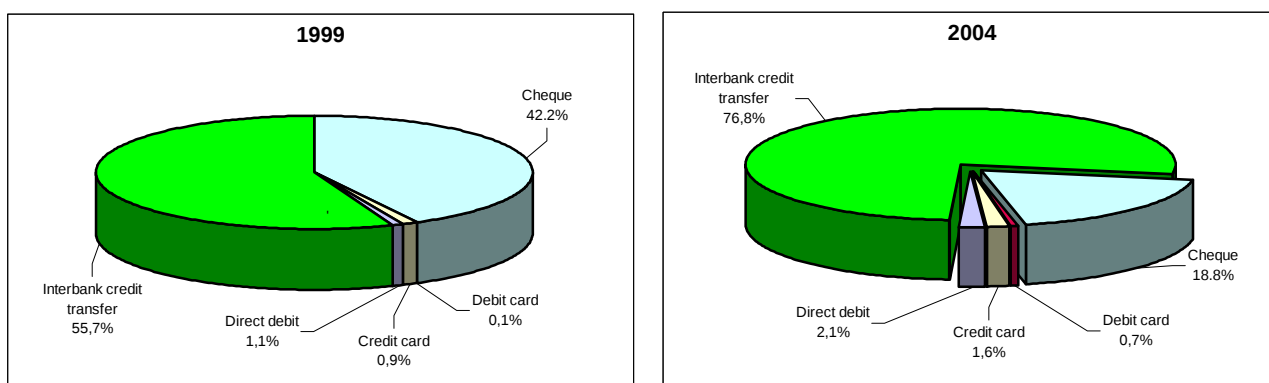
Table 5 and Graph 5 show that, in value, credit transfers and cheques are the most used instruments. However, these instruments showed different behaviors in the period considered. While use of cheque reduced 39.8%, from R$ 1.6 trillion to R$ 1.0 trillion, credit transfers increased 93.1%, from R$ 2.3 trillion to R$ 4.4 trillion.

Table 5: Use of payment instruments – Value of transactions

							R$ billion
Payment instruments	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Total	4,049	3,765	4,418	4,695	4,901	5,692	41
Cheque [1/]	1,667	1,728	1,809	1,605	1,027	1,003	-40
Debit card	5	9	14	20	30	42	740
Credit card	36	46	55	65	77	93	160
Direct debit	44	54	72	77	97	118	172
Interbank credit transfer	2,298	1,927	2,468	2,929	3,670	4,436	93

Source: Banco Central do Brasil, banks, acquirers and card administrators.

[1/] Excludes "on us" cheques.

Graph 5: Relative use of payment instruments - In value

Source: Banco Central do Brasil, COMPE, banks, acquirers and card administrators.

Average value per transaction of each instrument, showed in Table 6, explains the differences they present in terms of relative use in volume and in value. In 2004, the average value of each credit transfer was four times larger than the average value of each cheque. Table 6 shows that transactions with debit and credit cards, which are well used in terms of volume, are less important than transactions with direct debits in terms of value, since the average value of the later in 2004 (R$ 180) is much larger than the average value of transactions with credit card (R$ 74) and debit card (R$ 46).

Table 6: Use of payment instruments – Average value per transaction

							R$
Payment instruments	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Cheque [1/]	665	683	722	699	481	510	-23.4
Debit card	47	44	43	44	45	46	-1.6
Credit card	64	65	67	67	71	74	14.9
Direct debit	198	169	186	176	155	180	-9.2
Interbank credit transfer	3,672	2,762	3,214	3,450	4,026	4,336	18.1

[1/] Excludes "on us" cheques.

Table 7 and Graph 6 present the evolution of payment cards in Brazil, in 1999-2004. The number of debit cards and credit cards increased 128% and 121%, respectively. Even though payment cards typically present
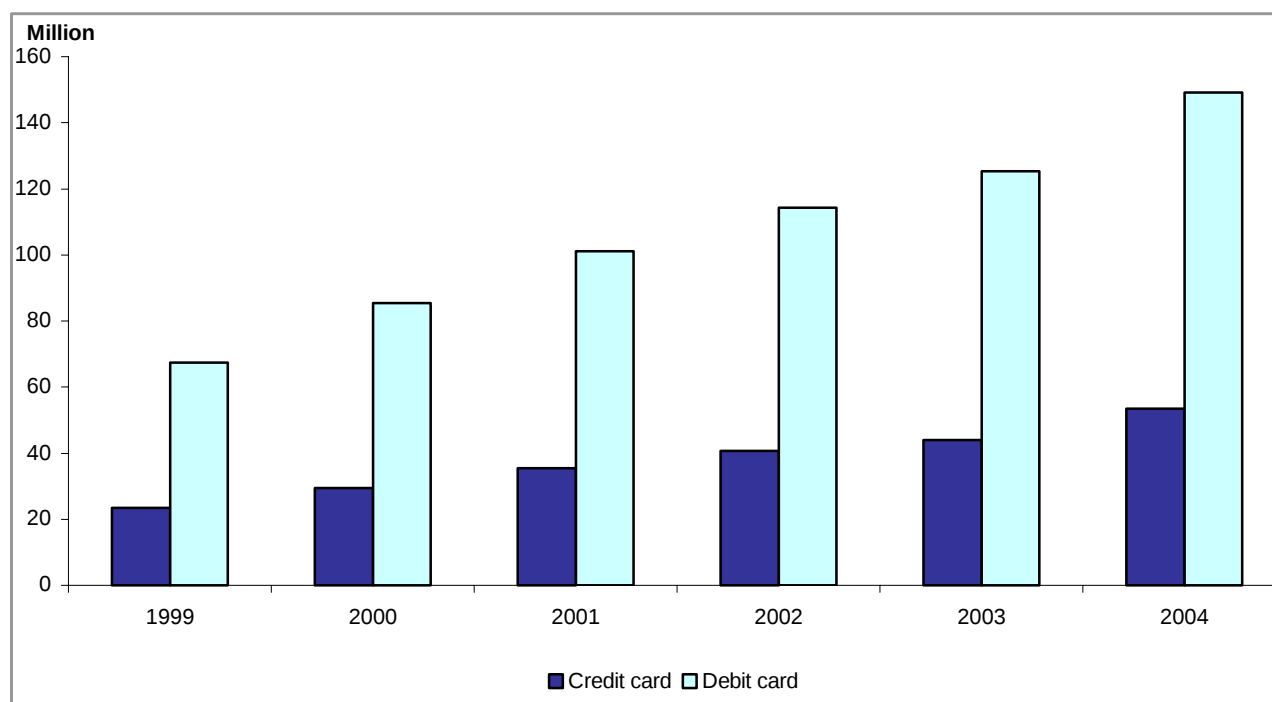
more than one function (debit, credit and withdrawal), that is, they are multiple-use cards[17], some of them, issued by banks, have debit function only, while others have credit function only, as is the case of those issued by American Express and Credicard.

Table 7: Number of payment cards in circulation

Payment cards	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
With credit function	23,432	29,400	35,377	40,761	44,036	53,499	128
Fluctuation (%)	–	25	20	15	8	21	–
With debit function	67,434	85,453	101,105	114,227	125,400	149,148	121
Fluctuation (%)	–	27	18	13	10	19	–

Source: Banks, acquirers and card administrators.

Graph 6: Evolution in the quantity of payment cards

Source: Acquirers and card administrators.

Table 8 presents a comparison between the number of deposit accounts and the number of payment cards issued. It is important to consider that the increment in the number of debit card per deposit account in the period considered (39%), together with the increment in the number of deposit accounts, meant an increment of 140% in the number of debit cards in circulation. In 2004, the number of payment cards (debit and credit) represented a little more than twice the number of deposit accounts, while the number of credit cards represented some 60% of the number of these accounts[18].

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[17] Usually, banks issue payment cards with debit and credit functions (credit function remains not activated until the cardholder uses this function for the first time).

[18] Number of debit cards is higher than the number of deposit accounts because, in accounts with more than one holder, each holder has its own card.

Table 8: Number of payment cards per deposit account

Item	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Deposit accounts (thousand)	56,891	63,654	71,451	77,279	86,984	90,240	58.6
Number of debit cards per deposit account	1.19	1.34	1.42	1.48	1.44	1.65	39.4
Number of credit cards per deposit account	0.41	0.46	0.50	0.53	0.51	0.59	43.9
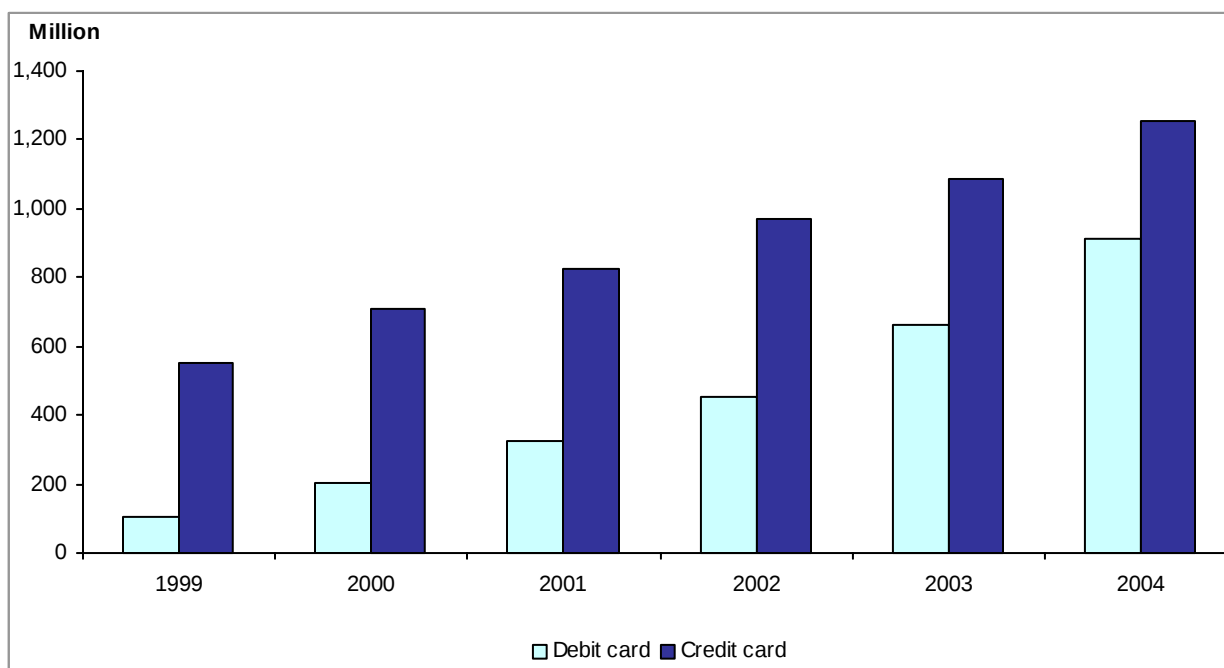
Source: Banco Central do Brasil, banks, acquirers and card administrators.

Table 9 and Graph 8 show the evolution of payment card transactions. Payments with credit card and debit card increased 126% and 754%, respectively. While the number of transactions per credit card, in 1999-2004, remained around 24 per year, regarding debit card this indicator more than trebled in the same period, even though the late instrument still presents a low annual number of transactions per card (6 in 2004).

Table 9: Payment cards: Volume of transactions

Item	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Cards with a credit function (thousand)	553,179	705,862	824,995	969,552	1,083,532	1,252,557	126
Fluctuation (%)	–	27.6	16.9	17.5	11.8	15.6	–
Transactions per inhabitant	3	4	5	6	6	5	52
Average number of transactions per card	24	24	24	23	25	23	-3
Card with a debit function (thousand)	106,914	205,784	326,175	451,302	661,612	913,373	754
Fluctuation (%)	–	92.5	58.5	38.4	46.6	38.1	–
Transactions per habitant	1	1	2	3	4	5	688
Average number of transactions per card	2	2	3	4	4	6	286

Source: Banks, acquirers and card administrators.

Graph 7: Payment cards – Evolution in volume of transactions

Source: Acquirers and card administrators.
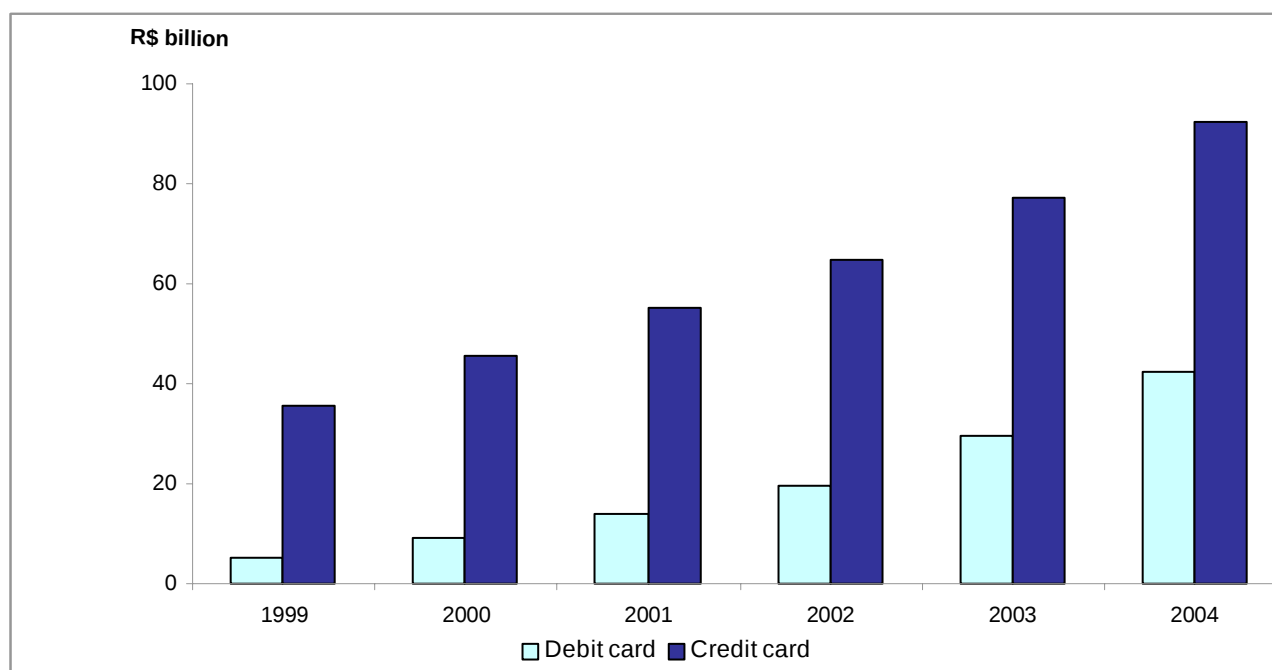
Table 10 shows that the increment of 160%, in 1999-2004, in overall value of transactions with credit cards was basically due to the increment in the number of transactions, since the average value of these transactions remained relatively stable along the period. Transactions with debit cards increased 741% in the same period, even though the average value per transaction presented a decrease of 1.5% (nominal value) – R$ 46.4 in 2004. Graph 8 shows the evolution in the value of payment card transactions.

Table 10: Payment cards – Value of transactions

Item	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Credit card (R$ million)	35,553	45,776	55,215	64,786	77,209	92,505	160.2
Fluctuation (%)	–	28.8	20.6	17.3	19.2	19.8	–
Average value per transaction (R$)	64.27	64.85	66.93	66.82	71.26	73.9	14.9
Average value per card (R$)	1,517.26	1,557.00	1,560.79	1,589.41	1,753.33	1,729.11	14.0
Debit card (R$ million)	5,030	9,131	14,151	19,684	29,534	42,345	741.9
Fluctuation (%)	–	81.5	55.0	39.1	50.0	43.4	–
Average value per transaction (R$)	47.05	44.37	43.38	43.62	44.64	46.4	-1.5
Average value per card (R$)	74.59	106.85	139.96	172.32	181.43	1,753	2,250.7

Source: Banks, acquirers and card administrators.

Graph 8: Payment cards – Evolution in value of transactions

Source: Acquirers and card administrators.

3.1.2   Comparative analysis

In the case of other countries, data have been collected from BIS/CPSS (Red Book) and European Central Bank (Blue Book) publications[19].

Table 11 shows the use of non-cash payment instruments in some countries. As can be observed, replacement of cheque by electronic instruments is a trend. This happens in Brazil as well, although in this case cheques still present a high level of use (Brazil is second for the United States).

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[19] BIS/CPSS, Red Book, November 2003; BCE, Blue Book, April 2004.
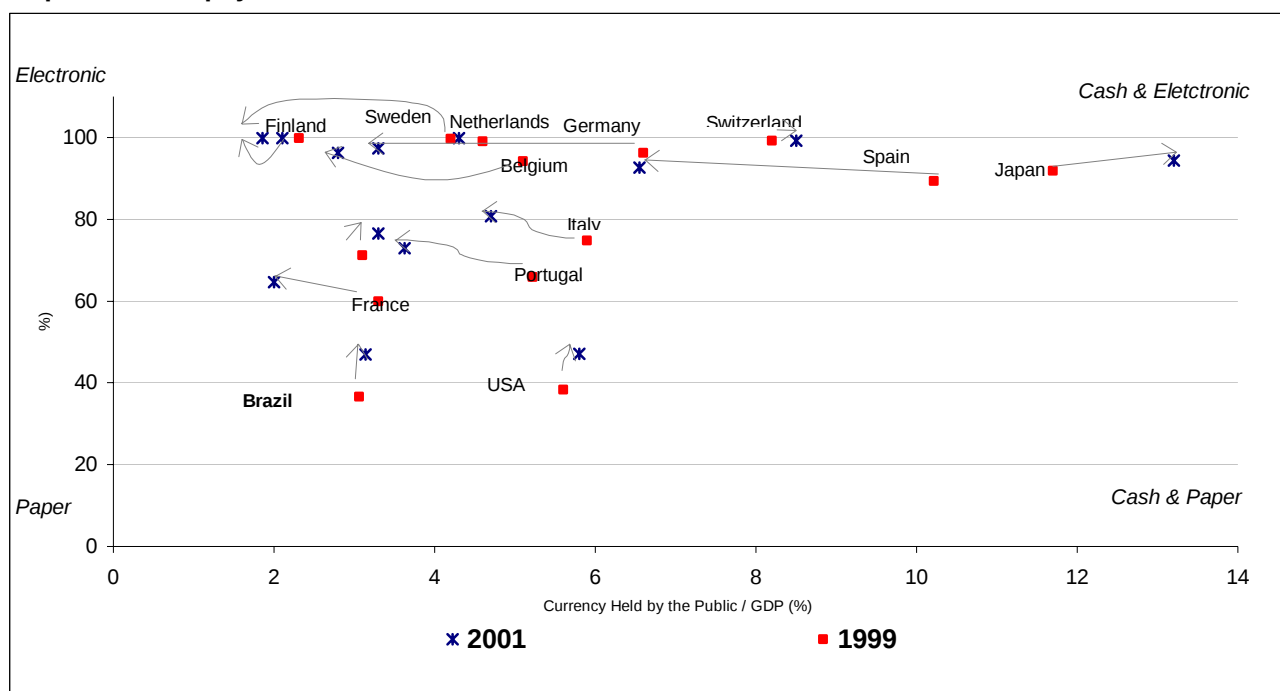
Table 11: Relative use of non-cash payment instruments in selected countries[1]

Country	Cheque			Debit Card/Credit Card			Credit transfer			Direct debit		
	1999	2003	%	1999	2003	%	1999	2003	%	1999	2003	%
Germany	3.8	1.0	-73.7	11.0	16.9	53.6	47.2	42.6	-9.7	37.8	39.3	4.0
Belgium	5.8	1.4	-75.9	28.9	32.8	13.5	51.9	46.7	-10.0	10.2	11.2	9.8
Brazil	62.5	39.4	-36.9	16.5	32.2	95.7	15.6	16.8	7.8	5.5	11.6	111.3
Spain	10.7	...	...	24.3	22.9	-5.8	14.5	15.2	4.8	50.5	...	...
United States	61.7	45.3	-26.6	31.4	35.2	12.1	4.5	4.8	6.7	2.4	4.1	70.8
Finland	0.1	...	...	38.4	40.5	5.5	56.8	54.6	-3.9	4.6	...	...
France	40.1	29.7	-25.9	26.1	27.8	6.5	18.4	17.7	-3.8	15.5	17.8	14.8
Netherlands	1.0	0.0	...	27.7	29.3	5.8	41.2	40.4	-1.9	29.3	27.8	-5.1
Italy	25.2	15.6	-38.1	18.0	21.2	17.8	38.0	36.6	-3.7	18.8	22.3	18.6
Japan	8.2	4.3	-47.6	51.9	58.2	12.1	39.9	35.2	-11.8	...	...	...
Portugal	34.1	...	...	47.2	50.6	7.2	6.3	7.7	22.2	11.9	...	...
United Kingdom	28.8	18.6	-35.4	34.3	36.6	6.7	18.1	17.8	-1.7	18.8	20.1	6.9
Sweden	0.3	0.0	...	22.3	26.7	19.7	69.6	65.4	-6.0	7.4	9.9	33.8
Switzerland	0.8	0.4	-50.0	26.0	28.4	9.2	68.4	62.9	-8.0	3.5	5.3	51.4

Source: Banco Central do Brasil, banks, acquirers, card administrators, BIS/CPSS, ECB.

[1] Except for Brazil, all of the countries include card-based e-money on the calculus of the relative importance of non-cash payment instruments (such instrument is not considered in this table).

Graph 9 shows a change in the relative use of payment instruments in some countries. The horizontal line presents the relation between currency in circulation and GDP, while the vertical line shows the use of electronic instruments relatively to the non-cash payments. As the graph shows, in most countries there is a clear increment in the use of electronic instruments. However, there are some countries that still present high level of use of paper-based instruments, as is the case of the United States and Brazil, or cash payments, as is the case of Japan and Switzerland. The graph also highlights that most European countries present broad use of electronic instruments, especially Germany, Belgium and the Netherlands, which have presented significant reduction in the use of cheque, as well as in currency in circulation.

Graph 9: Use of payment instruments in selected countries

Source: BIS and ECB

Table 12 compares the use o payment cards (debit, credit and withdrawal cards) in some countries. Regarding withdrawal function, in 2003 Brazil presented an average of 12.6 transactions per card, while, regarding debit function, the average was 5.3 transactions per card, the lowest average among the countries of the sample. However, in the same year, Brazil presented one of the highest averages regarding credit function – 24.6 transactions per card.

Table 12: Payment cards – Average number of transactions per function in selected countries

Country	Withdrawal function			Debit function			Credit function		
	2002	2003	%	2002	2003	%	2002	2003	%
Germany	14.0	27.9	99.3	16.4	18.5	12.8	17.8	17.9	0.6
Belgium	16.4	16.9	3.0	39.9	40.2	0.8	18.8	22.2	18.1
Brazil	**15.0**	**12.6**	**(16.2)**	**4.0**	**5.3**	**34.1**	**23.3**	**24.6**	**5.5**
Spain	15.3	...	–	11.4	...	–	19.1	...	–
United States	12.3	12.1	(1.6)	59.8	70.2	17.4	14.2	14.4	1.4
Finland	38.2	...	–	95.7	...	–	26.9	...	–
France	26.7	26.1	(2.2)	97.9	97.8	(0.1)	...	...	–
Netherlands	18.7	18.4	(1.6)	49.5	53.3	7.7	8.9	7.7	(13.5)
Italy	22.8	21.8	(4.4)	20.8	21.7	4.3	16.5	14.6	(11.5)
Japan	1.1	1.0	(9.1)	...	...	–	9.6	10.0	4.2
Portugal	30.7	...	–	57.2	...	–	67.6	...	–
United Kingdom	16.0	15.0	(6.3)	50.4	53.5	6.2	30.5	29.0	(4.9)
Sweden	67.2	63.3	(5.8)	104.0	119.8	15.2	23.9	24.2	1.3
Switzerland	12.6	12.6	0.0	39.0	41.2	5.6	24.5	24.3	(0.8)

Source: Banks, acquirers and card administrators, BIS/CPSS, ECB.

3.2   Distribution Channels

3.2.1   ATM terminals

3.2.1.1 The Brazilian case

Information on ATM terminals encompasses the period 1999-2004 (banks and Tecban have provided related information).

In Brazil, there are 27 ATM networks: 26 are proprietary networks[20], and one is a shared network (Banco24Horas which is owned by Tecban). Tecban provides services to financial institutions not having proprietary network, and integrates some proprietary networks as well. *Rede Verde e Amarela* – RVA (Green and Yellow Network) is another network, which is operated by a state-owned bank association (ASBAC). RVA integrates ATM terminals owned by participant banks. Through these ATM terminals, bank clients can make several transactions, such as withdrawals, payments and balance enquiries.

Some proprietary networks have some degree of interoperability[21], which allows clients of a certain bank to make transactions through ATM terminals belonging to other bank. RVA interlinks ATM terminals owned by eleven associated banks. Banco24Horas, besides being used by clients of its associated banks, allows access to international networks Cirrus, Maestro and Amex.

Regarding interoperability, ATM terminals are categorized in this report into open access terminals and restricted access terminals. In the case of restricted access, only clients of the proprietary institution can use related terminals, while in the case of open access clients of more than one financial institution can use the terminals.

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[20] Network owned by a financial institution, which is mainly used by its clients (,by agreement, it can also be used by other institutions' clients).
[21] See Chapter 4 for more details.

Table 13 and Graph 10 show that in Brazil, from 1999 to 2004, the number of ATM terminals increased 61.8%, and open access terminals showed increment (124.2%) larger than restricted access terminals (39.7%). In 2004, there were 36.3% terminals with open access, and 63.7% with restricted access.

Table 13: ATM network – Number of terminals per type of access
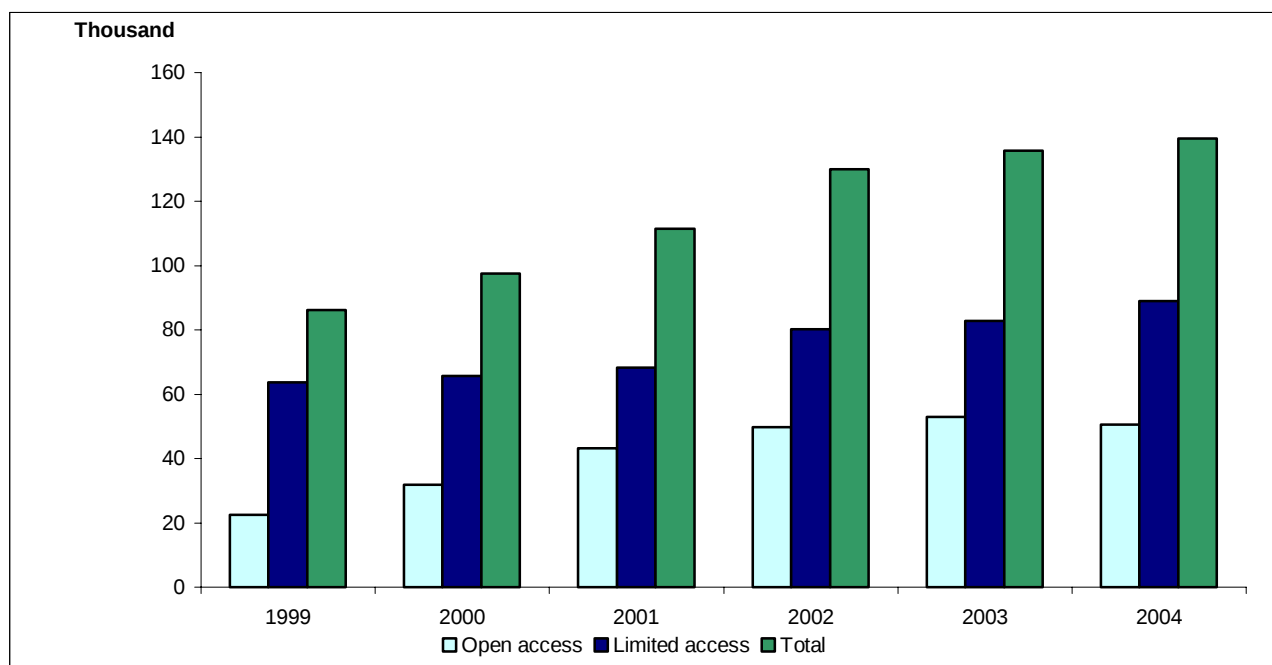
Type of access	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Total:	**86,170**	**97,519**	**111,370**	**129,913**	**135,626**	**139,457**	**61.8**
Open Access [1]	22,569	31,764	43,171	49,813	52,915	50,601	124.2
Percentage of the total (%)	26.2	32.6	38.8	38.3	39.0	36.3	38.5
Fluctuation (%)	–	40.7	35.9	15.4	6.2	-4.4	–
Restricted Access [2]	63,601	65,755	68,199	80,100	82,711	88,856	39.7
Percentage of the total (%)	73.8	67.4	61.2	61.7	61.0	63.7	-13.7
Fluctuation (%)	–	3.4	3.7	17.5	3.3	7.4	–

Source: Banks and Tecban.

[1] ATM terminal enabling cards that have not been issued by the network owner to make a transaction.
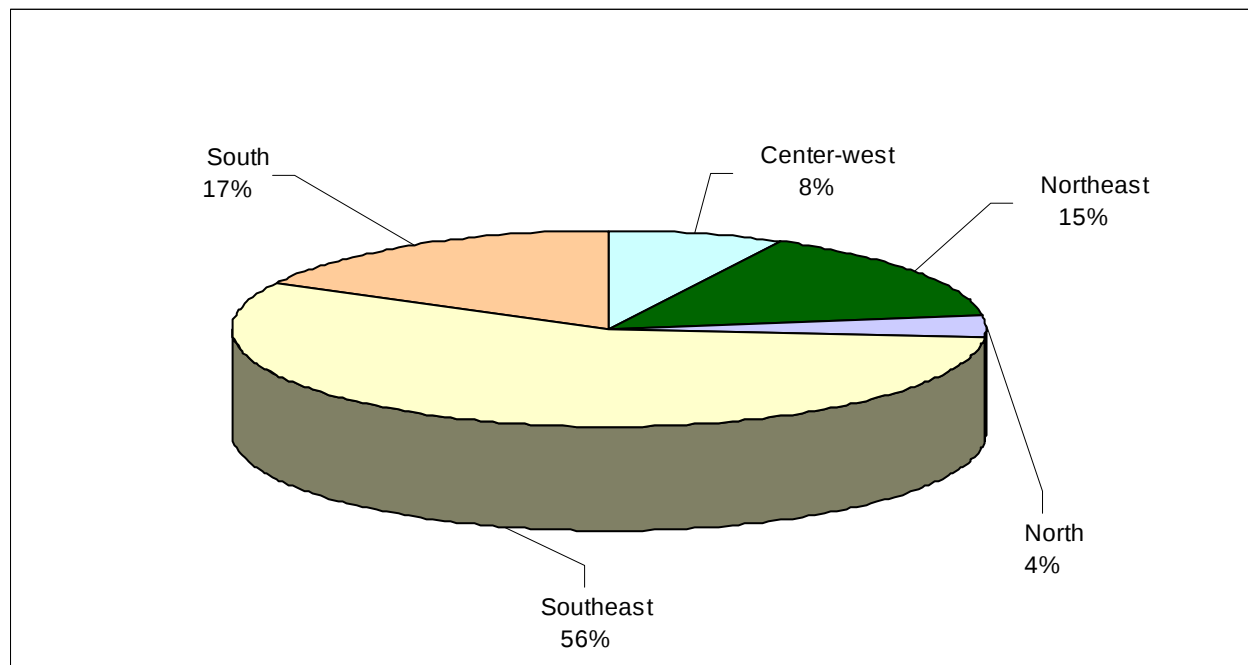
[2] ATM terminal enabling only cards that have been issued by the network owner to make a transaction.

Graph 10: ATM network – Evolution in the number of terminals

Source: Banks and Tecban.

In 2004, 56% of the terminals were installed in the Southeastern Region, while, together, the Northern and Center-Western Regions accounted for 12% of the terminals (Graph 11). Table 14 shows that Sao Paulo and Rio de Janeiro concentrate almost half of the ATM terminals in the country.

Graph 11: ATM terminals – Geographic distribution (2004)

Source: Banks and Tecban.

Table 14: Distribution of ATM and POS terminals per Brazilian State

State	ATM	%	POS	%
Acre	324	0	2,796	0
Alagoas	1,213	1	8,634	1
Amapá	260	0	3,150	0
Amazonas	1,155	1	14,140	1
Bahia	6,215	4	69,356	6
Ceará	2,904	2	27,474	2
Distrito Federal	3,445	2	32,998	3
Espírito Santo	2,560	2	23,823	2
Goiás	3,791	3	21,182	2
Maranhão	1,506	1	12,582	1
Mato Grosso	1,614	1	20,704	2
Mato Grosso do Sul	1,678	1	10,741	1
Minas Gerais	13,818	10	87,244	7
Pará	2,061	1	20,392	2
Paraíba	1,523	1	11,654	1
Paraná	8,797	6	56,874	5
Pernambuco	4,195	3	31,248	3
Piauí	962	1	11,692	1
Rio de Janeiro	15,684	11	173,559	15
Rio Grande do Norte	1,455	1	12,781	1
Rio Grande do Sul	10,133	7	58,038	5
Rondônia	668	0	5,828	0
Roraima	179	0	9,535	1
Santa Catarina	5,112	4	34,699	3
São Paulo	46,413	33	416,717	35
Sergipe	1,146	1	5,828	0
Tocantins	660	0	3,584	0
Total	139,471	100	1,187,253	100

Source: Banks, acquirers and card administrators.

Table 15 presents data relating to the use of ATM terminals in Brazil. From 2001 to 2004, there was an increment of 62.2% in number of transactions, and 57.3% in quantity of transactions per inhabitant.

Table 15: ATM network: Volume of transactions

| Item	2001	2002	2003	2004	2001 – 2004 (%)
Total number of transactions (millions)	3,817	5,021	5,672	6,192	62.2
Number of transactions per inhabitant	22	29	32	35	57.3
Number of transactions per terminal	34,274	38,647	41,824	44,400	29.5
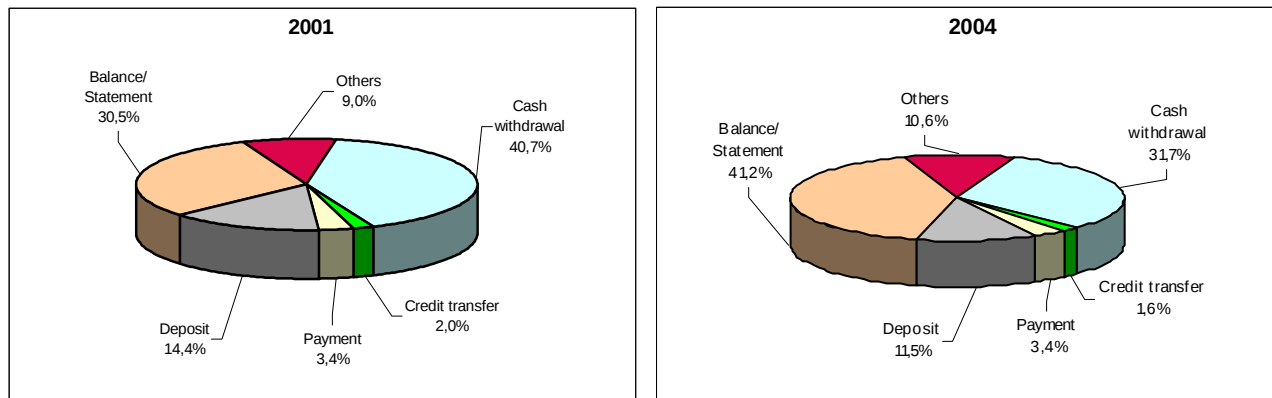
Source: Banks and Tecban.

As shown in Table 16, which demonstrates the use of cards per function, there was an increment of 119% in "balance enquiry function", and 117.6% in "other functions". This second percentage reflects incorporation of new functions to ATM terminals, such as "cheque dispenser", "direct credit to consumer" (DCC transactions) and "transactions relating to investments". Nevertheless, most transactions continue to be related to account balance enquiries

Table 16: ATM network – Volume of transactions per type of access and function

Million

Type of access and function	2001	2002	2003	2004	2001 – 2004 (%)
Open Access	**1,552**	**1,840**	**2,037**	**2,351**	**51.5**
Cash withdrawal	616	682	688	830	34.7
Balance and statement enquiries	496	592	727	844	70.0
Other functions	199	235	233	311	56.2
Deposit	157	215	261	242	53.9
Payment	56	86	100	101	80.0
Interbank credit transfer	27	30	29	24	-13.3
Restricted Access	**2,265**	**2,706**	**3,635**	**3,841**	**69.6**
Cash withdrawal	938	1,140	1,184	1,132	20.7
Balance and statement enquiries	670	774	1,511	1,710	155.3
Deposit	391	420	477	470	20.1
Other functions	143	239	312	343	139.4
Payment	75	80	85	111	48.6
Interbank credit transfer	49	53	67	76	55.5
Total:	**3,817**	**4,546**	**5,672**	**6,192**	**62.2**
Cash withdrawal	1,554	1,822	1,872	1,961	26.2
Balance and statement enquiries	1,166	1,366	2,237	2,554	119.0
Deposit	590	655	737	712	20.5
	300	454	546	654	117.8
Payment	131	166	184	212	62.1
Interbank credit transfer	76	83	96	99	30.7

Source: Banks and Tecban.

Graph 12: ATM network –Relative use per type of transaction – In volume

Source: Banks and Tecban.
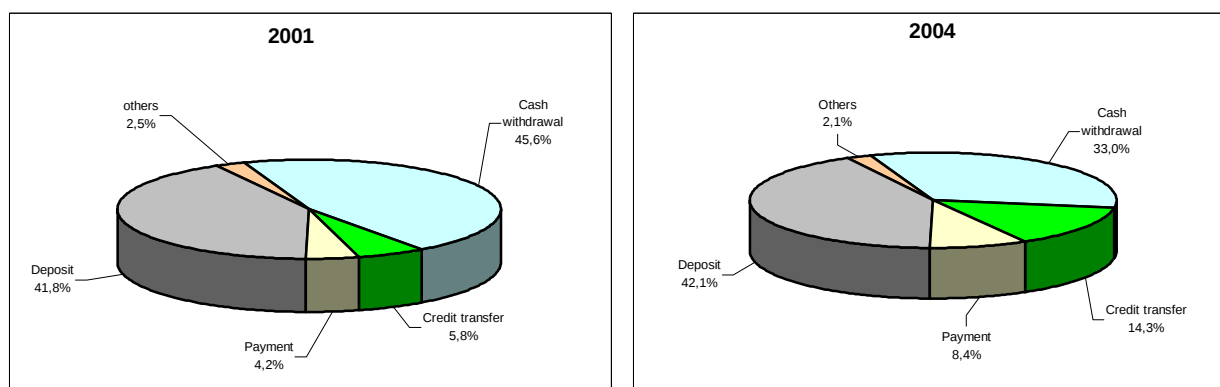
Table 17 and Graph 13 show that, in value, there was reduction in the relative use of withdrawal transactions against increment in deposit transactions, either in absolute or relative terms.

Table 17: ATM network – Value of transactions

					R$ billion
Transaction	2001	2002	2003	2004	2001 – 2004 (%)
Total:	**430**	**620**	**710**	**960**	**123.4**
Cash withdrawal	201	243	266	324	61.1
Interbank credit transfer [1/]	26	31	39	140	444.7
Payments	19	27	36	83	342.4
Deposit	184	319	368	413	124.4

Source: Banks and Tecban.

[1/] TED on behalf of client, DOC and "bloqueto de cobrança".

Graph 13: ATM network – Relative use per type of transaction – In value

Source: Banks and Tecban.

Table 18 shows that in Brazil shared networks are not effectively used by clients of a non-proprietary bank, since transactions in which clients of a certain bank use either a terminal owned by other bank or a terminal belonging to a shared network correspond to only 6% of the overall transactions.

Table 18: ATM network – Transactions carried out at open access terminals

Type of transaction	2003				2004			
	Non-shared [1]		Shared [2]		Non-shared [1]		Shared [2]	
	Volume (thousand)	%	Volume (thousand)	%	Volume (thousand)	%	Volume (thousand)	%
Total:	**2,016,180**	**98.96**	**21,146**	**1.0**	**2,208,777**	**93.97**	**141,757**	**6.0**
Cash withdrawal	671,647	**97.68**	15,940	**2.3**	741,991	**89.44**	87,572	**10.6**
Credit transfer	29,255	–	–	–	23,754	–	–	–
Payment	99,858	**99.96**	40	**0.0**	100,853	**99.87**	131	**0.1**
Deposit	260,570	–	–	–	241,651	–	–	–
Balance and statement enquiries	721,368	**99.29**	5,166	**0.7**	819,988	**97.20**	23,622	**2.8**
Other functions	233,483	**100.00**	0	**0.0**	280,541	**90.21**	30,433	**9.8**

Source: Banks.

[1] Transactions made by means of cards issued by the ATM network owner.

[2] Transactions made by means of cards not issued by the ATM network owner.

3.2.1.2 Comparative analyses

In the tables 19 and 20 can be observed that, comparatively with other countries, Brazil presents a medium position regarding number of terminals per inhabitant, number of transactions per inhabitant, and number of transactions per terminal. This position could be improved by enlarging the access to banking sector, as well as by getting a better distribution of ATM terminals mainly through increasing network interoperability, all these changes contributing to a higher level of efficiency in the payment system.

Table 19: ATM network – Number of terminals, volume of transactions and average value per transaction in selected countries

Country	Number of terminals per million inhabitants			Number of transactions per inhabitant			Average value per transaction (USD) [1]		
	2002	2003	%	2002	2003	%	2002	2003	%
Germany	612	620	1.3	20.2	39.6	96.0	149.7	200.2	33.7
Belgium	684	681	(0.4)	23.6	25.4	7.6	98.5	120.5	22.3
Brazil	**744**	**767**	**3.1**	**26.0**	**32.1**	**23.3**	**46.5**	**50.8**	**9.2**
Spain	1,230	...		21.0	...		93.8		
United States	1,221	1,275	4.4	36.8	37.1	0.8	68.0	68.2	0.3
Finland	406	...		46.3	...		74.9		
France	637	683	7.2	19.8	20.3	2.5	59.1	73.4	24.2
Netherlands	466	465	(0.2)	30.5	30.4	(0.3)	100.0	118.6	18.6
Italy	683	671	(1.8)	10.9	11.0	0.9	152.6	186.1	22.0
Japan	895	872	(2.6)	2.9	2.7	(6.9)	461.0		
Portugal	1,074	...		38.0	...		83.3		
United Kingdom	690	783	13.5	38.3	40.0	4.4	90.0	99.1	10.1
Sweden	297	299	0.7	36.0	36.6	1.7	86.2	106.4	23.4
Switzerland	706	722	2.3	15.5	15.8	1.9	157.3	179.5	14.1

Source: Banks, Tecban, BIS/CPSS, ECB.
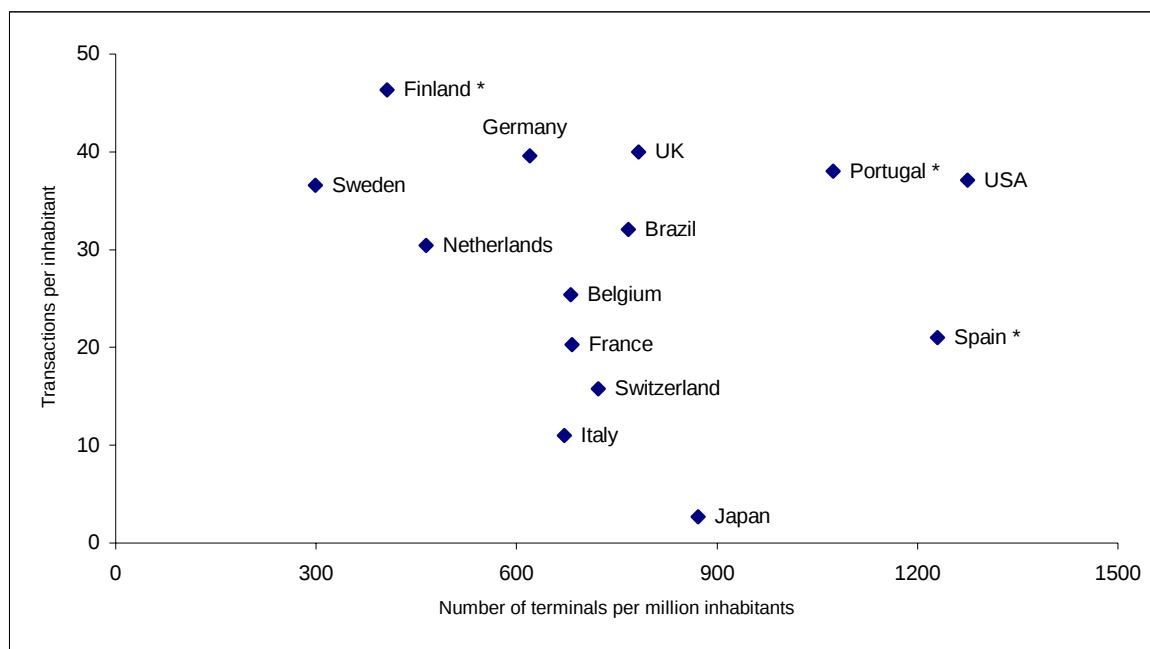
[1] Value converted at annual average exchange rate.

Table 20: ATM network – Volume of transactions per terminal in selected countries

Country	Number of terminals per million inhabitants			Number of transactions per terminal		
	2002	2003	%	2002	2003	%
Germany	612	620	1.3	33,007	63,871	98
Belgium	684	681	-0.4	34,503	37,298	11
Brazil	**744**	**767**	**3.1**	**34,995**	**41,824**	**20**
Spain	1,230	...	-	17,073	...	-
United States	1,221	1,275	4.4	30,139	29,098	-3
Finland	406	...	-	114,218	...	-
France	637	683	7.2	31,083	29,722	-4
Netherlands	466	465	-0.2	65,451	65,376	0
Italy	683	671	-1.8	15,959	16,393	3
Japan	895	872	-2.6	3,240	3,096	-4
Portugal	1,074	...	-	35,382	...	-
United Kingdom	690	783	13.5	55,507	51,086	-8
Sweden	297	299	0.7	121,212	122,408	1
Switzerland	706	722	2.3	21,955	21,884	0
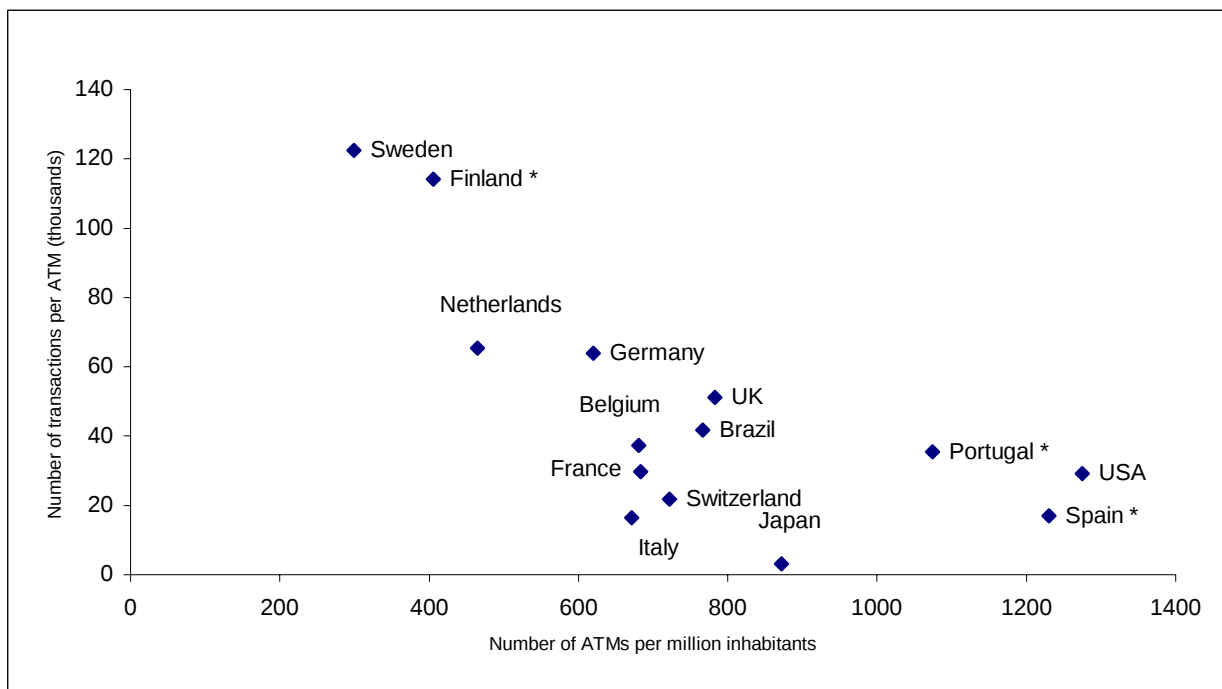
Source: Banks, Tecban, BIS/CPSS, ECB.

Graphs 14 and 15 demonstrate the level of use of ATM terminals in some countries, including Brazil. Taking into account the number of terminals per million inhabitants as well as volume of transactions per inhabitant (Graph 14), the United States is an example of a large network with high level of use. Sweden position deserves to be highlighted since this country presents a small network with high level of use, while Japan, on the contrary, presents a large network but with low level of use. Graph 15 compares size of network with number of transactions per terminal. As can be observed, Sweden and Finland present high level of use, while Japan presents low productivity per terminal.

Graph 14: ATM network – Number of transactions per inhabitant in selected countries (2003)

Source: Banks, BIS and ECB.

* Available data for 2002.

Graph 15: ATM network – Number of transactions per terminal in selected countries (2003)

Source: Banks, BIS and ECB.

* Available data for 2002.

3.2.2   POS networks

3.2.2.1 The Brazilian case

It should be observed that, regarding Brazil, POS terminals are being considered according to their functions (debit or credit) and not as physical units, including the case of large firms that count on own solutions to capture data from payments cards. For example, in the case of a supermarket, which usually has a number of physical terminals capturing payment card transactions, it is being considered just one terminal for debit transactions and one terminal for credit transactions.

Brazilian infrastructure for capturing payment card transactions encompasses:

a) Redecard, which is responsible for capturing transactions with Mastercard cards;

b) Visanet, which is responsible for capturing transactions with Visa cards;

c) American Express, which is responsible for capturing transactions with its cards;

d) Tecban, which is responsible for capturing transactions with its cards.

Table 21 and Graph 16 show the evolution in the number of POS terminals, from 1999 to 2004[22]. At the end of 2004, there were 1.187.253 terminals, representing an increment of 335% comparatively to 1999. Still regarding to credit card, in the same period the number of terminals per million inhabitants increased 301%, from 1,666 to 6,680 terminals.

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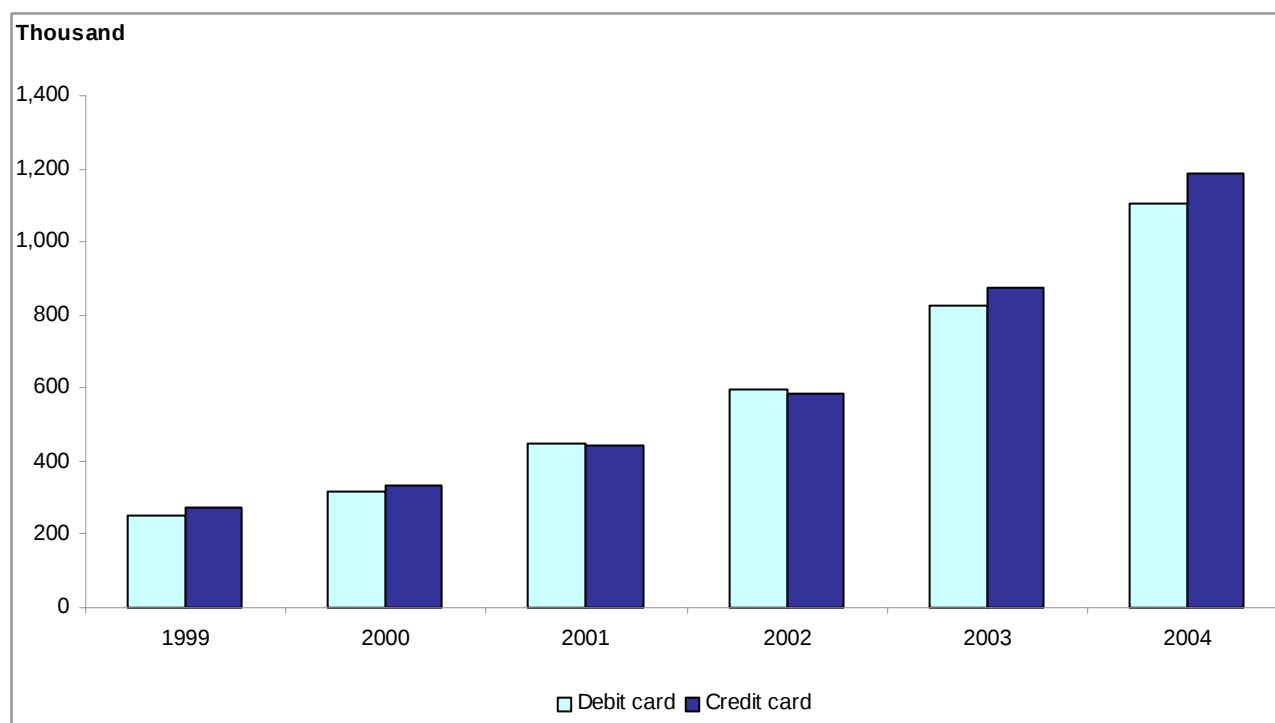
[22] Visa and Mastercard POS terminals can capture both debit transactions and credit transactions, according to agreements with each commercial firm and the correspondent acquirer. Amex carries out credit transactions only, while all TecBan transactions (Electronic Cheque) are debit transactions. To count the number of terminals, functions they present (debit and credit) are been considered. In the period 1998-2004, more than 90% of POS terminals could be used for both functions.

Table 21: POS network – Number of terminals

Number of terminals	1999	2000	2001	2002	2003	2004	1999 – 2004 (%)
Credit card:	273,057	333,639	440,451	583,794	874,916	1,187,253	335
Fluctuation (%)	–	22.2	32.0	32.5	49.9	35.7	–
Terminals per million inhabitants	1,666	2,009	2,555	3,343	4,947	6,680	301
Debit card:	250,148	315,469	446,276	595,152	824,238	1,106,011	342
Fluctuation (%)	–	26.1	41.5	33.4	38.5	34.2	–
Terminals per million inhabitants	1,526	1,899	2,589	3,408	4,660	6,223	308
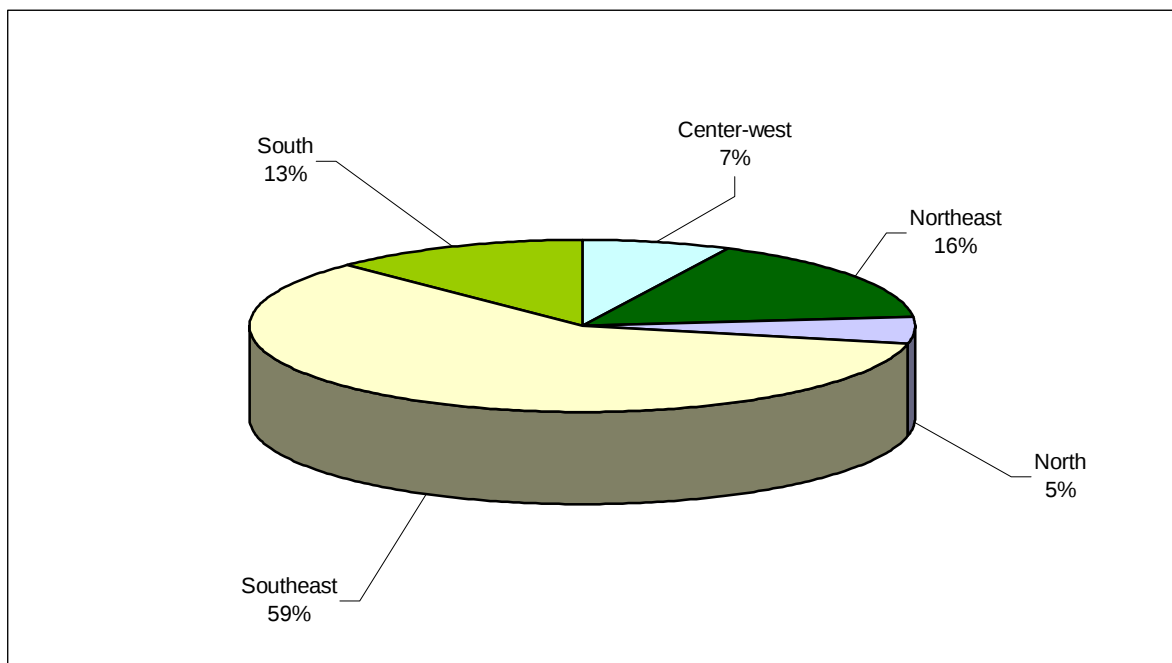
Source: Banks, acquirers and card administrators.

Number of debit POS terminals increased 342% in the same period, from some 250,000 to around 1,100,000 terminals (2001 presented the largest increment – 41.5%). Regarding number of debit POS terminals per million inhabitants, there was an increment of 308%, from 1,526 to 6,223.

Graph 16: POS network – Evolution in number of terminals

Source: Acquirers and card administrators.

Graph 17 shows that Southeastern Region concentrates almost 60% of POS terminals in Brazil. In Table 14, which shows the distribution of POS terminals per Brazilian state, it is possible to see this concentration with more details. As can be seen, 35% of the POS terminals are concentrated in Sao Paulo.

Graph 17: POS terminals – Geographic distribution (2004)


Source: Acquirers.

3.2.2.2 Comparative analysis

Table 22 presents the number of debit POS terminals per million inhabitants, number of transactions per capita, and average value per transaction in selected countries (1999-2003). Comparatively, Brazil shows low indices (2003): 4,660 terminals per million inhabitants; 2.6 transactions per inhabitant; and average value of US 43.6 per transaction. Nevertheless, in the period 1999-2003 Brazil presented a large increment in number of terminals per million inhabitants (205%) and in number of transactions per inhabitant (296%).

Table 22: POS network - Transactions with debit cards in selected countries
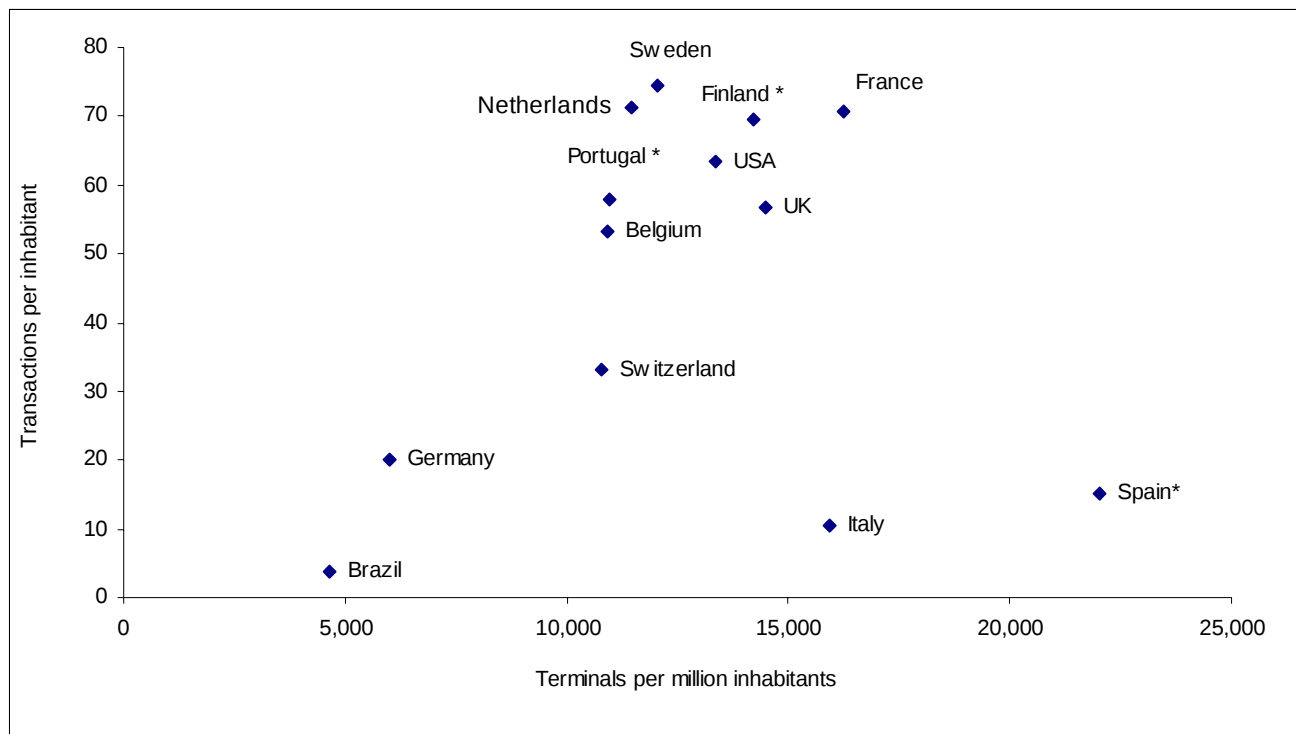
Country	Number of POS terminals per million inhabitants			Number of transactions per inhabitant			Average value per transaction (USD) [1]		
	1999	2003	%	1999	2003	%	1999	2003	%
Germany	5,761	6,008	4.3	11.6	20.2	74.1	79.4	73.9	-6.9
Belgium	9,746	10,900	11.8	34.6	53.2	53.8	53.8	57.1	6.1
Brazil	**1,526**	**4,660**	**205.4**	**0.7**	**2.6**	**296.3**	**47.4**	**43.6**	**-8.0**
Spain	18,802	...		6.5	...		36.6	...	
United States	8,414	13,365	58.8	26.9	63.4	135.7	43.0	44.5	3.5
Finland	11,617	...		42.0	...		38.8	...	
France	13,261	16,267	22.7	48.3	70.6	46.2	49.2	53.1	7.9
Netherlands	9,208	11,466	24.5	44.3	71.2	60.7	48.6	52.6	8.2
Italy	7,549	15,945	111.2	4.3	10.5	144.2	81.5	109	33.7
Japan	...	...		0.0	0.1		247.5	482.6	95.0
Portugal	7,963	...		36.4	...		26.3	...	
United Kingdom	11,970	14,508	21.2	35.3	56.7	60.6	51.0	63.3	24.1
Sweden	9,160	12,062	31.7	22.4	74.6	233.0	72.7	53	-27.1
Switzerland	8,599	10,803	25.6	19.1	33.1	73.3	76.0	121.1	59.3

Source: Banks, acquirers, card administrators, BIS/CPSS, ECB.
[1] Value converted at annual average exchange rate.

Graph 18 shows, for the same countries and period, the relation between number of terminals per million inhabitants and number of transactions per inhabitant.

Graph 18: POS network - Transactions with debit cards in selected countries (2003)

Source: Acquirers, card administrators, BIS and ECB.

 * Data available for 2002 only.
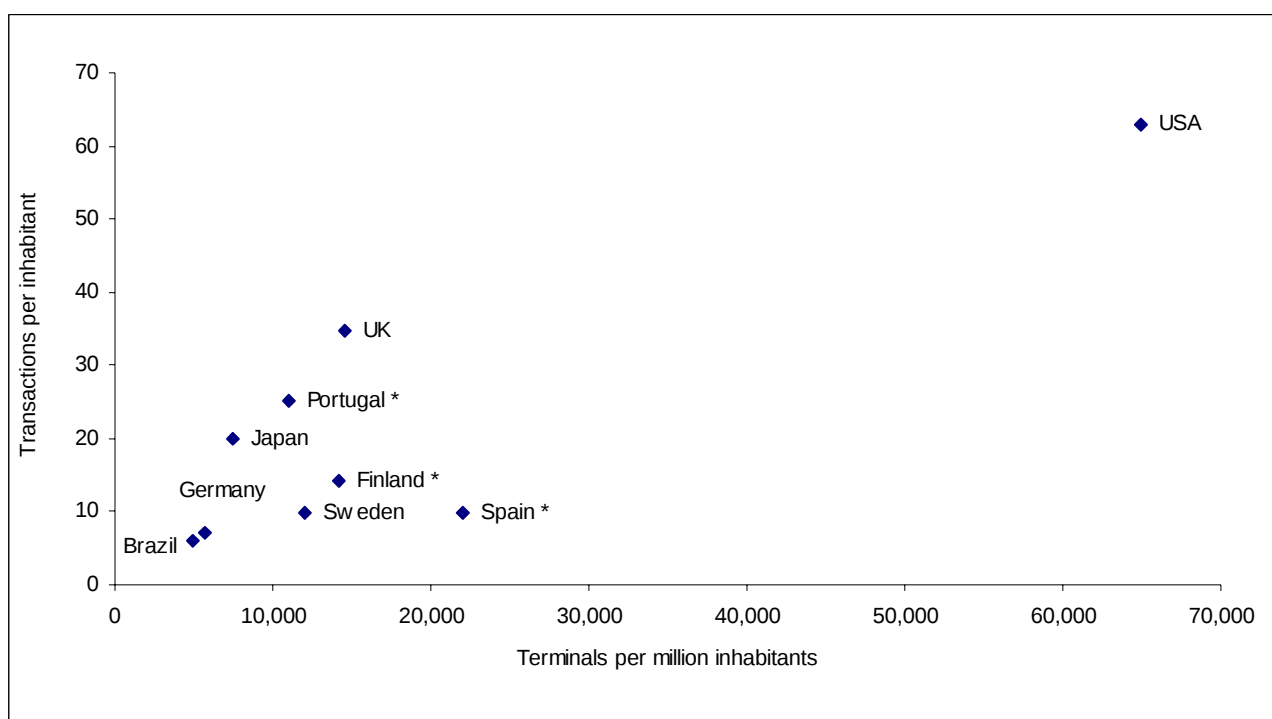
Regarding credit card infrastructure, Table 23 shows that Brazil presents the lowest number of terminals per million inhabitants along all the period 1999-2003. In 2003, there were 6.1 transactions per inhabitant in Brazil, which is bigger than correspondent index presented by the Netherlands but much smaller than those presented by the United States, Japan and the United Kingdom. As in the case of number of ATM terminals, Brazil stands out regarding increment of credit POS terminals per million inhabitants in the period (197%).

Graph 19 compares number of credit POS terminals with number of credit card transactions per inhabitant in selected countries. In general, the larger the network, the larger the number of transactions processed.

Table 23: POS network - Transactions with credit cards in selected countries

Country	Number of POS terminals per million inhabitants			Number of transactions per inhabitant			Average value of transaction (USD) [1]		
	1999	**2003**	**%**	**1999**	**2003**	**%**	**1999**	**2003**	**%**
Germany	4,905	5,733	16.9	3.3	7.1	115.2	89.1	76.7	-13.9
Belgium	...	...	–	4.8	6.6	37.5	107.6	120.3	11.8
Brazil	**1,666**	**4,947**	**197.0**	**3.4**	**6.1**	**81.6**	**20.9**	**23.2**	**10.9**
Spain	18,802	...	–	5.5	...	–	55.4	...	–
United States	40,459	64,938	60.5	52.3	62.9	20.3	86.6	93.4	7.9
Finland	11,617	...	–	20.7	...	–	52.7	...	–
France	13,261	16,267	22.7	...	...	–	...	...	–
Netherlands	...	...	–	2.8	2.7	-3.6	105.7	125.4	18.6
Italy	...	...	–	4.0	6.4	60.0	97.6	105.6	8.2
Japan	5,488	7,503	36.7	12.0	19.9	65.8	116.6	90.1	-22.7
Portugal	7,963	...	–	15.5	...	–	36.2	...	–
United Kingdom	11,970	14,508	21.2	26.2	34.8	32.8	98.9	109.2	10.4
Sweden	9,160	12,062	31.7	6.4	9.9	54.7	116.7	107.4	-8.0
Switzerland	...	...	–	12.1	11.0	-9.1	121.7	139.2	14.4

Source: Acquirers, card administrators, BIS/CPSS, ECB.

[1] Value converted at annual average exchange rate.

Graph 19: POS network – Transactions with credit cards in selected countries (2003)

Source: Acquirers, card administrators, BIS and ECB.
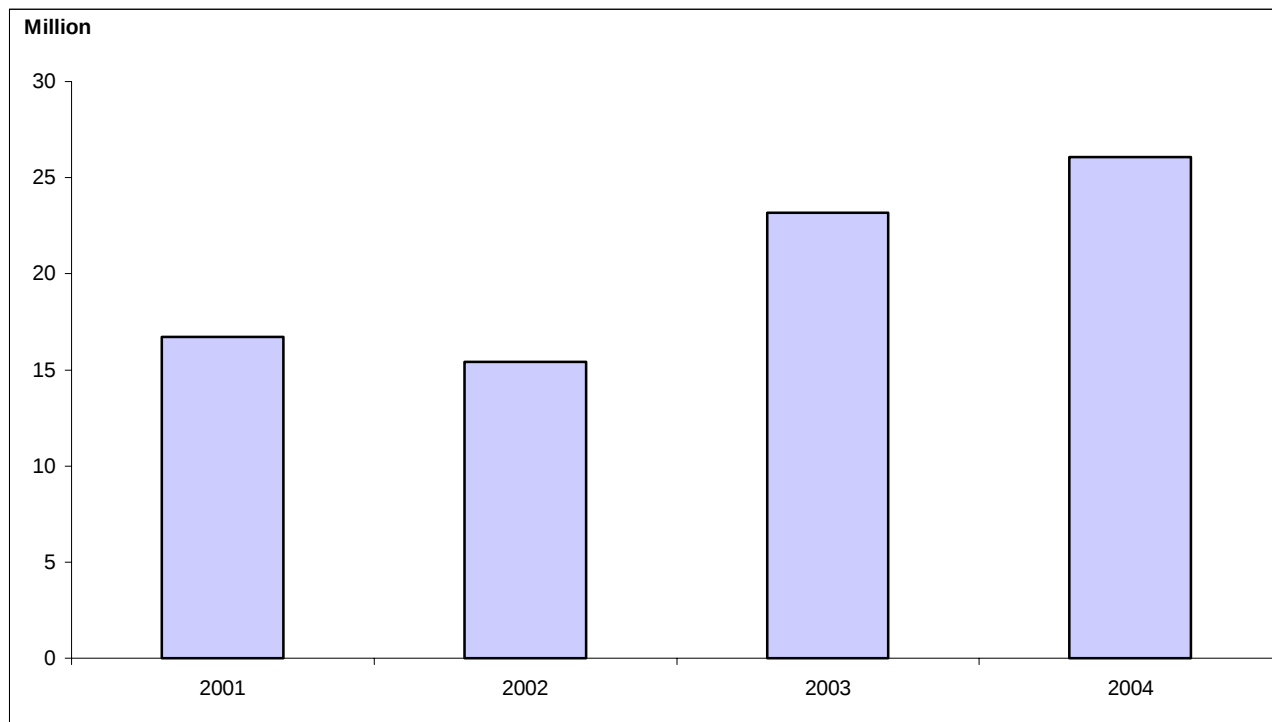
 * Available data for 2002.

3.2.3 Remote access

Analysis of remote access channel involves transactions carried out through users' equipments, such as personal computers and fixed and mobile telephones. It does not include transactions carried out through ATM terminals.

Taking into account information provided by 34 banks that offer this kind of service, it is possible to see that, in 2004, more than 25 million people used this channel, representing an increment of 39% as compared to 2001. The increasing use of this channel occurs because it allows easy access to users to banking services, and also means cost reduction to banks.

Graph 20: Remote access – Number of users

According to Table 24, in 2004 less than 20% of overall transactions through remote access channel corresponded to payments. From 2001 to 2004, there was an increment of 158.5% in the use of this channel. Graph 21 shows the distribution of the remote access per kind of transaction.

Table 24: Remote access – Volume of transactions [1]
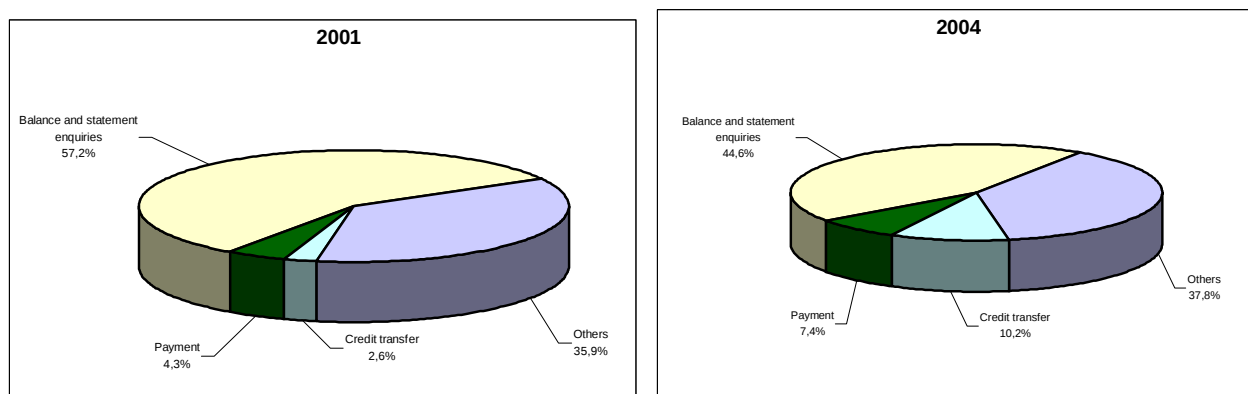
					Million
Transactions	2001	2002	2003	2004	2001 – 2004 (%)
Total volume:	**1,281**	**1,789**	**2,819**	**3,311**	**158.5**
Payment	**88**	**144**	**387**	**585**	**566.6**
Credit transfer[2]	33	45	215	339	927.8
Bloqueto de cobrança and bills[3]	55	99	172	246	349.0
Non-payment:	**1,193**	**1,645**	**2,433**	**2,725**	**128.4**
Balance and statement enquiries	733	1,083	1,268	1,475	101.3
Others	460	561	1,164	1,250	171.6

Source: Banks.

[1] Intra and interbank transactions.

[2] TED, DOC and book transfers.

[3] Taxes, contributions, utility bills etc.

Graph 21: Remote access – Relative use per type of transaction - In volume

Source: Banks.

Table 25 shows the use of remote access in value of transactions. It points out the increment in credit transfers.

Table 25: Remote access – Value of transactions [1]

Value of transactions	2001	2002	2003	2004	2001 – 2004 (%)
Value (R$ billions):	**175**	**394**	**1,473**	**1,881**	**976**
Credit transfers[2]	26	36	776	1,099	4,116
"Bloquetos de cobrança" and bills[3]	149	358	668	737	395
Others	...	...	29	45	–
Average value per transaction (R$):	**3,505**	**4,415**	**7,418**	**6,297**	**112**
Credit transfers[2]	790	803	3,476	3,241	310
"Bloqueto de cobrança" and bills[3]	2,715	3,612	3,913	2,994	10
Others	...	...	29	62	–

Source: Banks.

[1] Intra and interbank transactions.

[2] TED, DOC and book transfers.

[3] Taxes, contributions, utility bills etc.

Table 26 presents number of transactions and value of transactions per user of remote access. From 2001 to 2004, there was an increment of 86.3% in number of transactions per user, while value of transaction per user increased from some R$ 11 thousand, in 2001, to R$ 72 thousand in 2004, representing an increment of 551%.

Table 26: Remote access – Number and value of transaction per user

Indicator	2001	2002	2003	2004	2001– 2004 (%)
Number of transactions per user	77	116	122	143	86.3
Value of transaction per user (R$)	11,074	26,385	60,530	72,121	551.3

Source: Banks and Febraban.

3.3 **Conclusion**

In Brazil, the use of payment instruments and related distribution channels underwent important changes in the period 1999-2004. Comparing with other instruments, payment cards (debit and credit) had a significant growth both in volume and in value of transactions. Even though cheque continues to be the most important payment instrument in terms of volume of transactions, its use has been declining since 2002. As for value of transactions, credit transfer was the main payment instrument during the whole period. Payment cards presented a strong growth in value of transactions, mainly in the case of debit cards. However, in comparison with other countries, debit card still presents very low level of use in terms of transactions per card and transactions per inhabitant. It should be highlighted that the number of payment cards and the number of POS terminals presented a significant growth, allowing strong increment in the use of these instruments.

ATM and POS infrastructures had an important increment as well. Regarding ATM networks, in the period considered the number of open access terminals increased more than the number of restricted access terminals. However, even so, restricted access terminals still prevail (2/3 of the whole number of the terminals), and more than 90% of transactions carried out through open access terminals are non-shared transactions. Together, these facts demonstrate that the Brazilian ATM networks still present low level of interoperability. As for POS terminals, in which case shared networks practically do not exist, it should be pointed out the Brazilian low indices regarding both number of terminals per million inhabitants and number of transactions per inhabitant, comparatively with other countries.

4.   Fundamental issues concerning retail payment systems

The aim of this chapter is to discuss the main issues relating to the development of the Brazilian retail payment system, specially regarding the clearing and settlement infrastructure design, as well as the operational model of networks that support the electronic distribution channels for payment instruments.

Initially, the report presents some relevant concepts involving discussion on goods and services, which are subjected to the so-called network effects or externalities. These effects are present where the value of a good or service increases as new users are incorporated to access network. Such a characteristic is on place in networks that capture, process, and settle retail electronic payments. The importance of this analysis stems from the special characteristics of these goods and services, which have a great influence on the development of systems that are subjected to these effects.

After that, the infrastructure arrangement of the retail payment system is discussed taking into account both the clearing and settlement systems and the distribution channels for electronic payment instruments (ATM and POS networks). At the end, the report analyses the main aspects involving access to the payment services, pricing structure relating to products and services, and legal and regulatory framework regarding use of payment instruments.

Regarding infrastructure arrangements concerning both settlement systems and distribution channel networks, it will be addressed the trade-off between cooperation, which stimulates use of shared networks, and competition which induces multiplicity of systems. It will be also addressed issues relating to interoperability and standardization in distribution channels, and also the pros and cons of different general arrangements for clearing and settlement of retail payments (single system vis-à-vis integrated multiple systems).

As for access to payment services by commercial firms, financial institutions and users, the main objective of the report is to discuss implications of the access structure in the dissemination of a given payment instrument. Regarding payment instrument pricing structure, the factors that hinder or stimulate innovations in payment services will be discussed – in this case innovation means creation of new products, as well as improvement of existing ones. Finally, aspects relating to legal and regulatory framework will be discussed.

Each item will be divided into 3 parts. In the first one, the report will present fundamental concepts regarding the topic in discussion, and whenever possible the influences of related network effects will be pointed out. The second part involves experience of other countries regarding the topic being discussed, and in this case information obtained from published works and also from technical visits to these countries will be used. Finally, in the third part, the Brazilian case will be discussed mainly through comparison with other countries, in order to identify differences and similarities with these countries regarding development process of retail payment system. Compliance with international organisms' recommendations will be checked as well.

4.1   Network goods and services

Network goods and services present the following main features:

    a)   their value increases insofar as increases the number of people using these goods or services;

    b)   the choice of technology by a firm concerning certain product will depend on the choice of technology by other firms regarding the same product.

The Importance of these features for some goods and services can be observed in a range of sectors of the economy, such as telecommunication and transportation, where network externalities are very important regarding supply and demand of goods and services. In essence, network externality is characterized by increment in the value of the good or service, which is supplied through an access network, each time a new user is incorporated to the system, as well as by the fact that technology adopted by the system is in general compatible with technology adopted by other networks supplying the same good or service (Economides, 1996; Katz e Shapiro, 1994).

In payment systems (mainly retail payment systems), network effects or externalities play an important role. The more accepted a payment instrument is, the greater will be the benefits both to users and to commercial firms that accept it (demand externalities). At the same time, economies of scale in payment services stimulate suppliers of these services to aim standardization as well as associations with other suppliers (through joint

venture initiatives for instance), which is known as supply externalities (Kemppainen, 2003; McAndrews, 1997).

The main topics to be considered in discussions on network goods and services are:

a) complementarity;

b) compatibility;

c) standardization;

d) economies of scale;

e) underproduction;

f) inertia to innovations.

4.1.1   Complementarity

Complementarity in network goods and services happens where a single decision to enter a network provokes positive effects to the other system participants, either users or service providers. It appears in form of decision interdependence. The choice of an instrument by the payer will depend on the supply of this instrument by its bank, as well as on the possibility of the payee to accept the instrument chosen by the payer. On the other hand, this possibility will depend on the supply of the instrument by the payee bank. The relevant choices will also depend on price and quality of the service, if there are alternative instruments.

Apart from considerations on fixed capital costs, investments by the payer bank to offer a payment instrument will depend on investments by the payee bank to operate with the same payment instrument. It is not useful for a bank to offer a payment instrument to its clients if the payee bank is not able to receive the related funds transfer orders.

In markets involving networks, complementarities between users and/or products originate network externalities. Therefore, complementarity has an important role to play in payment systems. In systems operating payment cards, for example, the bigger the number of people using cards, the bigger the number of firms willing to operate with this payment instrument. This happens because, in offering payment instruments that are more convenient to clients, commercial firms will increase their potential to sell products. Moreover, the bigger the number of commercial firms accepting payments through cards, the greater the value of this payment instrument to the users.

4.1.2   Compatibility

Compatibility is associated with the possibility of products and systems supplied by different providers present level of standardization that allows them to share infrastructures. Together with complementarity, comparability between products is also essential to take advantage of network externalities. This means that products and systems should operate using the same or compatible standards so as to take advantage of potential social benefits that result from network externalities.

Thus, to accept payment cards, it is necessary that the commercial firm's POS terminal is able to read and process information relating to them. In this example, if the POS terminal is able to process cards from just one payment card network, relevant network externalities will only impact users of this network, without benefiting other users. On the other hand, if the POS terminal is compatible with other card networks, the relevant network effects will be extended to the users of these other networks.

4.1.3   Standardization

In networks that operate payment instruments, the process of setting standards both for processing and for communication protocols is essential for the compatibility between their participants, and also for compatibility between networks. Compatibility makes more potent the network externalities produced by complementarity between users. In this sense, systems operating electronic payment instruments should set certain technical, business and interoperability standards relating to acceptance and processing of payment instructions.

Technical standards set common rules concerning functions of the payment instruments or payment systems, such as message formats and protocols used to change payment information. Business standards are agreements involving service providers, financial institutions and commercial firms, which define procedures, legal aspects and/or technical standards to be adopted, or rules for processing, clearing and settling interbank payments.

Payment service providers and financial institutions can choose to cooperate further. They can decide in favor of reciprocal use of capture and distribution channels through interoperability agreements. The degree of cooperation may vary. An institution making its infrastructure available can both act as a remote mailbox -- in this case sending immediately payment instructions to the other institution – and as a correspondent of the other institution in which case it would carry out part of the payment process.

Standardization can have several positive effects regarding efficiency and competition. Technical standard agreements can allow reduction of development and operational costs relating to payment processing. It can also facilitate compatibility, allowing payment service providers and financial institutions to choose the best available technology so as to get an optimized evolution regarding technological development.

Full compatibility among different standards adopted by payment service providers can lead to a larger infrastructure for capturing and processing transactions. However, definition of standards is a complex process, since adoption of a premature standard can lead to perpetuation of a certain technology due to difficulties to replace it with another one more efficient. In contrast, search of the best option can provoke excessive delays in the process of choosing standards, since providers will compete among themselves to make a given standard market leader. Moreover, in some cases standard agreements can be used to limit competition in certain markets.

4.1.4 Economies of scale

Payment systems are subject to economies of scale since they demand significant investments (high fixed costs) to be implemented and operated, while the processing of additional services in an existing infrastructure is usually an alternative that presents a relatively slow marginal cost. This characteristic is relevant for electronic payments processed by a distribution channel network or settlement system, where a large number of payments is considered a prerequisite to make these channels and systems feasible. However, new solutions for future payment systems can change this scenery.

4.1.5 Underproduction

Network goods and services may also be subject to underproduction. The degree of use may be low because users do not realize the gains relating to the network effects before their entrance. Thus, supply in the payment service market may be low because the use of the network imposes an external effect to other users, but this effect is generally disregarded. For instance, when consumers decide to use a network service they do not consider the benefits to other users that would be produced by the enlargement of the network. In payment systems, where economies of scale should be present, some authors argue that underproduction is the more relevant problem, and it should be corrected through regulatory authorities' actions (Gowrisankaran and Stavins, 2002).

4.1.6 Inertia to innovations

Difficulties in promoting innovation on network services, which are mainly observed in retail payment systems, can be understood taking into account the following aspects:

•   *Costs of changing*

Markets subject to network effects may also tend to inertia regarding standards and technologies. Users tend to prefer a technology already established, even where a change to a new technology that is not compatible with the previous one would produce benefits. Service providers and end users may be reluctant to adopt a new technology, if they have to pay the related transition costs, or if most related benefits will be enjoyed by future users (Farrell and Saloner, 1986).

- *Past dependence*

Generally, equilibrium in market subject to network externalities cannot be understood without knowing the technological standards adopted in previous periods. This means that the effects of previous decisions are fundamental for the following decisions. As service providers and end users wish compatibility with the infrastructure already in place, better products arriving to market in a later stage cannot be able to replace others that, although less efficient, are already established and standardized. Past dependence can be observed in the development of national payment systems, and especially in the slow change of payment habits in many countries. Environmental factors, such as legislation and regulation, can also contribute to this phenomenon.

- *Critical mass*

Critical mass and service infrastructure already in place play an important role regarding both the launch and the growth of a network. Launch of a new network service may be hindered because there is not critical mass – potential users cannot adhere to the network because few users have already done that. Therefore, potential users' expectation regarding future size of the network plays an important role in relation to its present size.

4.2   Infrastructure arrangements in retail payment systems

Both in distribution channel networks and in retail payment systems, concentration of infrastructure into a single system, which is observed in many countries, is fundamentally determined by economies of scale, positive network externalities, and also by the need to set common standards, protocols and processes (BIS, 2001). Network externalities allow that value of goods and services increases exponentially with the number of users. Therefore, an increment in the number of participants will also increase both the scale and the level of services provided by the system to them

A concentrated and shared infrastructure is more efficient than having several systems in the same market because of the related high investment costs. Likewise, adoption of a single standard for communication protocols and processes, which is provided by an integrated infrastructure, eliminates costs and risks relating to the access of users to networks employing standards that are different and, in some cases, incompatible. Soundness and integrity are very important aspects regarding security and efficiency of integrated networks, which demands appropriate operational risk management.
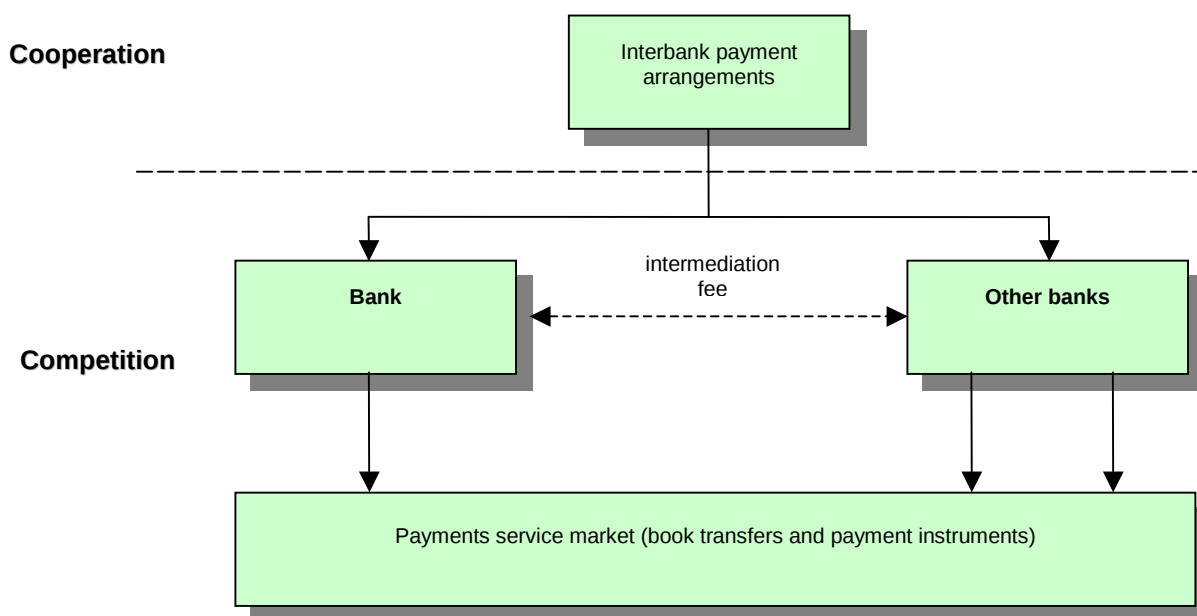
Recent experiences in network development suggest that network externalities and economies of scale do not necessarily imply monopolistic situations. Technological improvements can increase contestability since they facilitate the entrance of new service providers into the market. In telecommunications and railway transportation, for instance, it is argued that segments supplying network infrastructures could be other than those providing services to final consumers. Because of the high fixed costs that are necessary to implement a network, only segments owning it could be treated as a natural monopoly and should be under some kind of regulation, and in this case competition in the market would be restricted to final service providers. Even in this approach, a minimum level of concentration in the infrastructure -- or minimum number of users – may be necessary to allow optimization in the supply of services, although this is difficult to quantify (Gangulny B; Milne A, 2002 a, b).

In a retail payment vertical structure, an entity owns and operates all the parts of the system, from the capture of the transaction to its clearing and settlement, while in a horizontal structure specialized entities own and operate only parts of the whole process. In this later structure, there are two markets that can be identified by their different characteristics. The first is the market that deals directly with services to clients regarding banking accounts (banks) or payment instruments, which is called here downstream market. The second is the market that provides services for capturing, processing, clearing and settling payment transactions, i.e., the so-called upstream market.

Downstream market is potentially competitive, since its participants demand access to networks in order to meet users' needs through new products. Activities relating to upstream market are characterized by presenting economies of scale on the supply side, and network externalities on the demand side. The later market presents high fixed operational costs, as well as high costs to expand the network, and in which, in view of that, shared arrangements to process, clear and settle payments are common.

The following diagram shows how a retail payment infrastructure can be divided, from the point of view of competition and cooperation.

Diagram 12: Cooperation and competition in payment services

Another important issue to be analyzed is related to governance of firms acting in retail payment markets. Typically, firms acting in this market are owned by banking institutions due mainly to the nature of the relevant services, which demand high level of both standardization and process integration among banks, payment service providers and settlement systems.

Competitive effects resulting from integration of retail payment infrastructures depend on factors such as governance of the shared system, criteria of access, market demand for payment products and services, and also on levels of economies of scale. If the governance structure acts either to restrict access, to limit introduction of new services, or to implement anticompetitive pricing arrangements, the overall competition could be adversely affected.

Interbank payment system infrastructure is considered an essential service, and the access to it should be open in order to promote an environment in which participants could offer services on competitive and fair basis. Determination of competitive effects in a shared system – social welfare effects – is a complex task that requires a cost-benefit assessment, in which it is important to segregate the payment infrastructure environment from the payment product environment.

4.2.1 International experience

Interoperability of payment instrument distribution channels

Infrastructures to access electronic payment instruments, which are called distribution channels in this report, have a determinant influence regarding the use of these instruments. Network interoperability and shared networks have been important to disseminate the use of electronic payment instruments in several countries. In all the countries considered in this report, ATM networks are shared. There are, however, different models.

In some countries, a single network presenting high level of standardization and interoperability serves all financial institutions. In these cases, typically, ATM terminals are standardized and the access to ordinary transactions (withdrawals; balance enquiries; and payments) is open to all users (clients of any participant bank). Operation of the network, maintenance of ATM terminals and development of new platforms and products are made by a firm owned by the banks, which results in gains of scale and reduction of cost per transaction. Furthermore, benefits of network externalities are offered at a larger degree to banking service

users. In this model, the ATM terminals are owned by banks, which are remunerated by an interbank fee. Feasibility of an ATM terminal is assessed based on the interbank fees charged from clients of other banks. Countries such as Portugal, Switzerland, Belgium, the United Kingdom, Finland and France adopt this model

In the United Kingdom and Sweden, the single network resulted from merging of pre-existing ATM networks, which allowed full interoperability between banks' ATM terminals. In Finland, the three biggest banks created a specific firm to handle their proprietary networks. In Portugal, banking system automation occurred since the beginning with the adoption of a single shared network to capture and process ATM and POS transactions.

Interoperability between proprietary networks is observed in Spain, Italy, the Netherlands, the United States and Germany. In these countries, ordinary transactions are shared, but each bank offers different financial products through its proprietary network.

Both interoperability among proprietary ATM networks and adoption of a single ATM network have allowed the increasing use of this distribution channel. There has been increment in the number of terminals, and also in the number of transactions per inhabitant due to reduction of maintenance and implementation costs (Guibourg, 2001).

A factor likely influencing use of shared networks is if fee is – or is not – charged from a client using a shared ATM terminal. This might be one of the reasons why countries where no fee is charged in this situation -- Portugal, the United Kingdom and Sweden – present higher growth rate.

Banking concentration process, occurred from 90s, has also contributed to interoperability between ATM networks. The existence of few financial institutions owning networks with similar size facilitates the use of shared networks, since interoperability between networks presenting different sizes leads to asymmetric gains (Guibourg, 2001).

Regarding POS networks, interoperability directly affects commercial firms insofar as it allows cost reduction in the use of the infrastructure to capture transactions. For the user, on the other hand, benefits are related to the greater acceptability of the payment cards, since commercial firms will have lower costs to capture transactions made with payment cards from different brands.

In all the countries considered in this report, there is full interoperability between POS networks. Basically, there are two models that make interoperability feasible. The first model is characterized by the presence of a single firm acting as acquirer/processor for all brands, which is responsible for capturing and processing all payments. This is the case of Portugal, Switzerland, the Netherlands, Belgium, the United Kingdom and Sweden. In the second case, two or more firms – which might be the issuing banks – act as acquirers and/or processors but neither one is linked to a specific brand, that is, each acquirer or processor can offer services to any brand, which benefits competition between these acquires/processors. Even in this case, transaction capture infrastructure is usually shared through a third firm, which is responsible for integrating individual networks.

Infrastructure arrangement for clearing and settling

The clearing and settlement infrastructure has undergone important changes from 1980s in the countries considered in this report. Regarding retail payments, there is a clear trend towards consolidation of infrastructure, and related obligations are usually settled with multilateral netting. There are some exceptions: in Sweden, retail payments are settled with bilateral netting; in Germany and Switzerland, settlement is mainly made on gross basis (BIS, 2001).

More recently, because of the creation of the European Union, infrastructure consolidation tends to happen regionally, with many countries using the same infrastructure for settling retail payments. The launch of the euro in 1999 and the introduction of correspondent notes and coins in 2002 have given to the European Community the opportunity to create a single currency area.

As a first step in direction to SEPA (Single Euro Payments Area), the European Parliament through the Directive EC 2,560/2001 set rules and terms to the elimination of any discrimination regarding fees being charged to make cross-border funds transfers between Euro Zone's countries. In 2002, the main European banks and banking associations created the European Payments Council (EPC) with the aim of establishing

standardized rules and procedures for retail payment instruments, and also consolidating the related infrastructure in order to reduce the costs of making funds transfers between member-countries (EPC, 2002).

There have been some actions in Europe in order to reduce and increase efficiency in retail payments, as the following ones: the launch of the system STEP2 in 2003, which is operated by the European Bank Association – EBA; the unification and harmonization of the rules, standards and procedures to make funds transfers and direct debits to be effective in 2006; the creation of standardization for card transactions to be effective in 2007 with the introduction of the EMV standards in all the countries; and the migration of domestic retail payments into a single clearinghouse (PE-ACH) until 2010. No measure has been adopted to stimulate the use of cheques in cross-borders transfers, which means an incentive to the countries still using cheques in large scale to migrate to electronic payments.

This trend towards infrastructure consolidation occurs fundamentally because of gains that are obtained from this type of infrastructure. The standardization of processes and communication protocols, which allows participants to maintain simpler controls, implies significant cost reduction.

As can be seen in Table 27, Spain, Finland, the Netherlands, Italy, Portugal and Sweden have each one a single system to settle all retail payment instruments. Belgium, France, the United Kingdom and Switzerland have each one two systems, which in general settle separately electronic instruments and paper-based instruments. In Germany, the United States and Brazil a number of clearinghouses co-exist, settling each one various or specific payment instruments.

Table 27: Retail payment clearing and settlement infrastructure in selected countries

Country	System
Germany	RPS, PostBank, Girozentrale and Genossenschaftsbank AG.
Belgium	CHB* and CEC
Brazil	CIP-Sitraf, CIP-Siloc, Tecban, Redecard, Visanet, COMPE
Spain	SNCE
United States	Various**
Finland	PMJ
France	CEPC* and CIT
Netherlands	Interpay
Italy	BI-Comp
Portugal	SICOI
United Kingdom	CC&C* and BACS
Sweden	Bankgiro
Switzerland	SIC and Postfinance

* Paper-based instrument clearinghouses that process small volume and value of transactions.

** FED-ACH accounts for 85% of electronic payments.

Retail payment settlement is usually carried out through a single section each day, based on multilateral net positions. In some cases (the Netherlands and Sweden), more than one section is carried out each day. In the United Kingdom there is a line of demarcation between the institution defining rules and features of payment instruments, and the one responsible for operating the related infrastructure.

4.2.2 Brazilian case analysis

Interoperability of payment instrument distribution channels

● **ATM networks**

Banking automation in Brazil has occurred mainly from 1980s and has been based on multiple proprietary networks, so that this process is characterized by strong technological competition and low level of interoperability. The financial institutions, in the case of ATM terminals, and the payment service providers, in the case of POS terminals, have developed and implemented individual networks for capturing and processing transactions, so that the development has not been aimed at improving neither the interoperability between proprietary networks nor the use of shared networks.

In the case of ATM networks, there are basically three possibilities regarding the use of terminals by banking clients. In the first case, the bank has a proprietary network not linked to any shared network, in which case its clients can use only terminals owned by this bank. Another situation is the bank that has a proprietary network and shares its terminals with other institutions, whether partially or totally, through a third network that may has or not its own ATM terminals. In this case, clients have the option of using both terminals owned by their respective banks and shared terminals (terminals owned by other banks). There is also the case where banks not having proprietary terminals are associated to a shared network.

Table 28 shows that 36.3% of ATM terminals are shared, i.e., there is open access to them. However, only 2.3% of transactions carried out through these terminals are transactions that actually use a shared terminal, that is, transactions that are carried out by a client of a bank through a terminal owned by other bank, or belonging to a shared network.

Table 28: ATM – Use of shared terminals (2004)

Item	Volume (%)
ATMs with open access	36.3
ATMs with restricted access	63.7
Shared transactions	2.3
Non-shared transactions	97.7
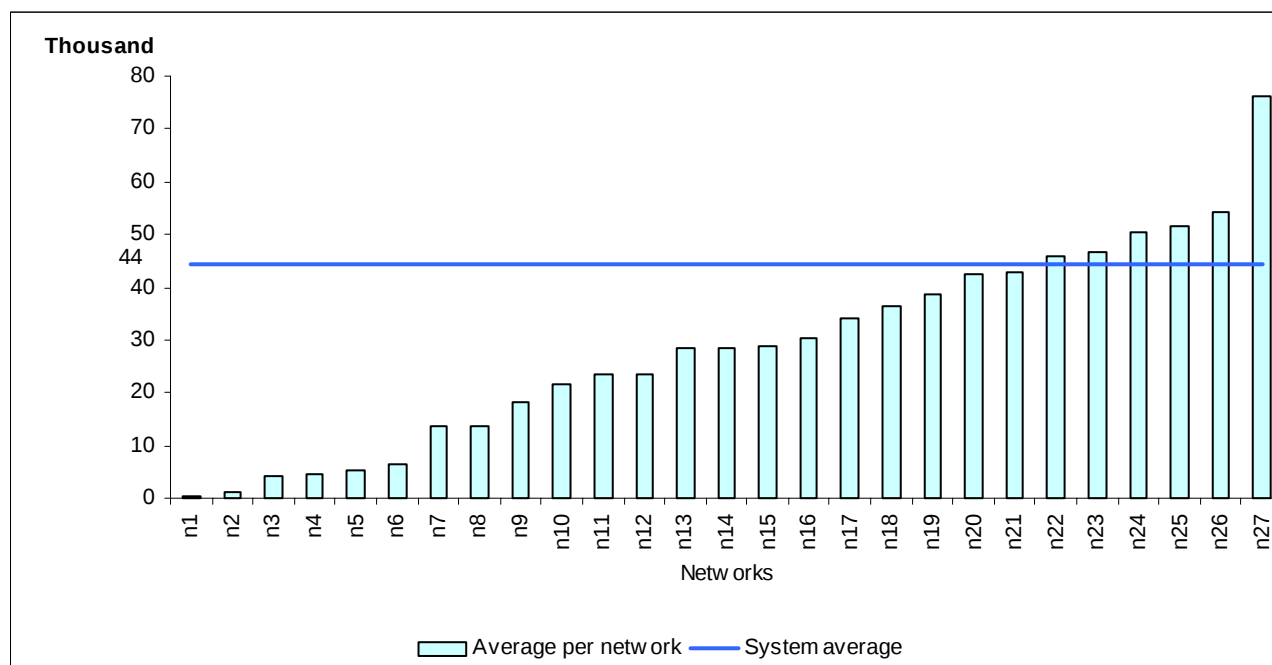
Source: Banks.

Considering the banking system as a whole, the low level of interoperability in Brazil implies that the ATM terminals:

a) present an average number of transactions per terminal that is lower than those presented by other countries considered in this report;
b) are not well deployed;
c) demand higher costs of development and maintenance.

Graph 22 shows the average number of transactions per terminal for each one of the twenty-seven proprietary networks in 2004, comparatively to the overall average that is represented by a horizontal line.

Graph 22: ATM network – Average of transactions per terminal (2004)

Source: Banks and Tecban.

It can be observed that only six networks present level of use higher than the average level. This indicates that ATM networks present low level of use.

Regarding the effects of interoperability on both development of payment instruments and relevant distribution channels, the banking sector[23] points out mainly the following benefits:

a) enlargement of the access to payment channels, which would increase the capillarity of the networks, promote gains of scale, and reduce the costs relating to the development, operation, and maintenance of the networks and correspondent terminals;

b) possible fee reduction benefiting clients since there would be fixed cost reduction and, consequently, reduction of cost per transaction as well;

c) greater variety of options regarding the use of banking services, which would make the terminals more convenient and useful for the users, besides facilitating the access to new financial products;

d) possible enlargement of the ATM network in order to reach places that are not presently served, thanks to reduction of implementation and maintenance costs;

e) more rationality in, and optimization of, investments relating to infrastructure –hardware, software and network connectivity --, as well as cost reduction for developing and up dating ATM terminals.

Despite these benefits, banking industry entities[24] also indicate that there are some impediments that hinder higher interoperability levels, as follows:

a) large differences among proprietary ATM networks in terms of size and technological features. The largest retail financial institutions have made high initial investments to implement their nationwide networks, aiming to get a competitive advantage based on the extension of their branch network, technological differential and quality of services;

b) lack of coordination among the financial institutions regarding standardization of communication protocols and procedures, safety requirements and ATM networks' minimum level of quality;

c) lack of coordination among the financial institutions to set interbank fees needed to get financial equilibrium and feasible investments in shared infrastructures or in systems connecting proprietary networks.

- **POS networks**

The infrastructure to establish agreement with merchants and to capture payment card transactions is essentially composed of three firms – which are called acquirers – jointly owned by Brazilian financial institutions and international enterprises. Thus, to accept payments through any card brand, merchants should reach an agreement with each one of these firms, which implies multiplicity of costs to the merchants regarding acquisition and maintenance of multiple POS terminals, if they wish to operate with more than one brand. Because of this, some merchants opt to work with just one acquirer and, consequently, accept payments through just one card brand. For the users, this model implies restrictions to the use of their cards -- unless they use a card for each brand and support the larger associated costs --, and consequently they get less utility of the payment instrument.

The acquirers[25] consider that interoperability of networks and terminals would be an important factor for the modernization of payment instruments. They point out the following benefits:

a) enlargement of the POS terminal network since greater capillarity would allow both reduction of costs and optimized use of equipments, as well as would make not necessary to have at least one POS terminal for each brand in the same establishment;

b) reduction of cost to merchants to adhere to the networks, because having to use a single POS terminal this would allow them cost reduction both for renting and for maintaining the terminal, and also reduction of costs relating to staff training, apart from facilitating their operations and controls;

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[23] Based on the questionnaires answered by a sample of twenty banks with different sizes (small, medium and size).

[24] See footnote 23.

[25] Based on responses to the questionnaires sent to them.

c)   more rationality in, and optimization of, technological investments needed to expand networks, apart from allowing reduction in the processing cost per transaction.

Despite these benefits and the international trends towards the use of shared POS networks, there still are some issues making it difficult full-share of the acquirers' networks. It should be pointed out that the existence of multiple payment system infrastructures is due mainly to vertical structures that are used to supply a certain payment instrument and to process the transactions carried out. This, in turn, makes it not possible to reach maximum benefits that, otherwise, could be gotten from competition between networks. This is the case of Brazil, where acquirers and processors are each one tied to specific products. Likewise, a merchant wanting to have access to a certain card brand has no option except to reach an agreement with the respective acquirer. Thus, the competition model involving international brands is reproduced in the operations of acquires acting in the domestic level, what makes it difficult for them to reach interoperability agreements.

This model, in which competition is based on infrastructure or technology and where each acquirer works with a single brand, entails difficulties that are indicated by the acquirers themselves and that are mainly related to the "market position" of each payment service provider.

Clearing and settlement infrastructure arrangement

The Brazilian arrangement for clearing and settling payments has undergone significant changes from April 2002 on, with the restructuring process of the payment system as a whole. Before this process, all payments were directly or indirectly settled through COMPE regardless their individual value. Thus, interbank multilateral net positions calculated by the retail payment service providers (Tecban, Redecard and Visanet) were settled together with critical payments made through cheques and credit transfers.

Presently, payment clearing and settlement infrastructure is composed of the following systems:

a) STR: settles interbank funds transfers in real-time;

b) COMPE: clears and settles cheques in T+1;

c) CIP-SITRAF: clears and settles funds transfers in T+0;

d) CIP-SILOC: clears and settles funds transfers in T+1;

e) Tecban: clears and settles both debit card transactions (Electronic Cheque) and direct debits;

f) Redecard: clears and settles credit and debit card transactions relating to "Mastercard";

g) Visanet: clears and settles credit and debit card transactions relating to "Visa".

This arrangement has significant implications on the efficiency of the retail payment system. Regarding costs, the existence of a number of systems may have the following effects on the financial institutions:

a) need of larger intraday liquidity;

b) need of multiple structures to control operations;

c) need of adhering to many settlement systems;

d) larger processing and operational costs.

An issue to be considered in the analysis of the infrastructure model for clearing and settling payments is the governance structure of the related systems, and also the effects that such a structure has on the efficiency of the payment services. The providers of these services as well as the settlement system operators, in spite of being jointly owned by banks, present different compositions in their control structure, which could emphasize competition aspects to the detriment of vantages relating to cooperation. This may be one of the reasons why some products did not get sufficient acceptability among the banks and, consequently, it was not possible to reach a scale large enough to make them feasible.

The case of direct debit and direct credit exemplifies the effects resulting from low level of cooperation among financial institutions, regarding the use of clearing and settlement infrastructure. In Brazil, these payment instruments present notably different arrangements as compared to those observed in the countries considered in this report, since each bank offering an account to its client also processes the related direct

debit and credit transactions, according to the rules and specifications that it determines. Therefore, direct debit and direct credit are usually restricted to intra-banking transactions, which reduces their efficiency and utility. As an example of this, firms willing to offer this service to clients of different banks usually have to open an account in each one of them and, consequently, have to maintain more complex controls.

In general, Brazilian banking institutions[26] consider that the present fragmentation in the infrastructure to clear and settle these instruments entails inefficiencies, and also that settlement in a single system would produce a number of benefits, among them:

a) cost reduction for participants;

b) gains of scale;

c) possible aggregation of new services;

d) implementation of new electronic payment instruments;

e) standardization of communication protocols and processes;

f) lesser operational complexity;

g) more powerful multilateral netting effects.

The banking industry members have highlighted that the retail payment service providers should aim to develop operational procedures and technological standards that allow compatibility among all entities directly or indirectly involved with payment processes, so that further payment services could be offered to the end users and merchants, as well as to the banking system as a whole.

However, the challenge of adopting a single system is fundamentally related to the establishment of cooperation arrangements supporting a shared infrastructure, without eliminating the benefits that competition brings to end users.

4.3   Access to retail payment systems

The analysis of issues relating to access of service providers, consumers, merchants and financial institutions to retail payment systems might be basically divided into two main approaches:

a) access of end users to payment instruments and related distribution networks; and

b) access of final institutions both to distribution networks and to clearing and settlement systems.

From the end users' point of view, it is possible to discuss both the access to a certain payment instrument and the access to the channels enabling its use. The main factor determining the access to almost all presently available non-cash payment instruments is if the end user has or not access to a banking account, since most of these instruments are related to funds transfers between these accounts (account-based instruments). However, in some cases users not holding a banking account can make use of payment instruments that are typically used by account holders. Individuals receiving government payments can have access to the related funds through ATM terminals, or can purchase goods and services through POS terminals. Wage cards used by employees not holding a banking account can also have these functions (BIS, 2001).

Issues relating to safety and fees are fundamental to determine the level of access to, and use of, payment instruments. In the case of ATM networks, the pricing structure adopted by the market can affect the access of the users to them. In a shared network, if the users have to pay high fees in order to have access to terminal owned by other bank, they will preferentially use terminals owned by their respective banks. On the other hand, if ATM service suppliers are insufficiently remunerated this may hinder the enlargement of the networks as well as the access of the clients to them (Stavins, 2000; McAndrews, 1996).

Access of financial institutions to networks operating payment instruments is a particularly important issue in payment systems with a horizontal structure. In these structures, there are specialized institutions operating each one of the activities involving a payment instrument (capture, processing, clearing, settlement, control, etc).

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[26] See footnote 23.

Two competition models are observed: competition focused on infrastructure, and competition focused on services. In the first model, it is possible to have multiple infrastructures competing for the market, and in this case competition among them is prioritized. In the second model, in which a new participant can rent infrastructure from specialized institutions, the environment can be more favorable to the entrance of new participants, and competition is focused on the service market (Ganguly and Milne, 2002 b; Cruickshank, 2002).

4.3.1   International experience

Access of end users to retail payment instruments

In all countries of the sample, most inhabitants have access to the financial system and, therefore, hold banking accounts. This facilitates the use of such electronic payment instruments as direct debits and direct credits, payment cards, and credit transfers, as well as transactions through ATM networks. The United Kingdom is an example of this, since around 90% of all wage payments are carried out through BACS (the main ACH in the country) by means of direct credits. The direct debit service offered by BACS is also largely used, corresponding to 55% of overall recurrent payments made by individuals in general.

Still regarding the use of direct debit and direct credit in England, it is interesting to mention the relationship between BACS and financial institutions' corporative clients. In this model, the financial institutions offer the payment service (product) to their clients (firms), competing each other in this market in relation to the extent of the services and respective prices. The corporative clients can submit payments directly to BACS using their own communication channels, which makes viable the interbank settlement of these payments. This makes clear that it is possible not to tie the instrument (standardized by BACS) to the specific banking product (offered by the banks), which facilitates the access to these payment instruments since there is a common and shared infrastructure that is open to any financial institution.

It should be highlighted that BACS is owned and managed by the British commercial banks, which settle related positions through accounts they hold in the Bank of England. BACS's corporative clients, around sixty thousand, should elect a settlement bank participating in the clearinghouse to clear and settle their orders. There is no competition between BACS and the banks regarding supply of payment instruments. BACS offers the physical infrastructure as well as the systems and processes that facilitate and make feasible the offer of payment instruments by the banks (Cruickshank, 2002).

Access of financial institutions to retail payment networks

In payment systems presenting a horizontal structure, where there is a high level of specialization in each stage (capture, processing, clearing, settlement, control, etc), the issue related to the access of financial institutions both to payment instrument distribution channels (ATM and POS networks) and to clearing and settlement systems become more relevant. In this kind of structure, financial institutions should have access to a number of service providers according to the different stages of the process. If there was in any stage a barrier to the entrance, the offer of a certain payment instrument might be hindered.

In the countries considered in this report, barriers to the access of financial institutions to the main clearing and settlement systems, regarding either cheques or ACH typical payments, were not observed. Obviously, there are, in each system, minimum requirements to be observed by the participants, which are needed to mitigate the risks faced by the clearinghouses. It was also observed that access to ATM networks – as LINK in the United Kingdom, CEKAB in Sweden, and SIBS in Portugal – is open to all banking institutions in each country (ECB, 2003).

In most cases, access of a financial institution to a certain network – for example to an ATM network – where this institution had already access to a contestant network was one of the main issues in the discussion agenda. Financial institutions participating at the same time in two networks would actually imply the merger of these networks, since they would not have to compete for the participating banks. In the cases that have been studied, regulatory authorities removed access restrictions since they have concluded that benefits in increasing the convenience to the users were more important than adverse effects related to reduction of competition between the networks.

4.3.2   *The Brazilian case*

A factor limiting dissemination of electronic payment instruments in Brazil is the low percentage of inhabitants holding banking accounts. There have been many initiatives aimed at enlarging the access to the Brazilian banking system, which has been important to increase the use of some instruments. This has enabled both financial institutions and payment service providers to take advantage of economies of scale and network externalities.

As for the access of merchants to payment instruments, the main barrier, according to members of the industry, is the high costs to adhere and operate in the payment card networks, which is especially true for small establishments that do not aggregate large volume of transactions.

Regarding payment instrument clearing and settlement systems, in general there is no restriction to the access of financial institutions. Therefore, all commercial banks are able to offer to their clients the main payment instruments in use in Brazil, such as cheques, debit and credit cards from different brands, as well as credit transfers.

The vertical structure usually adopted in Brazil, in which each bank implements and operates a proprietary ATM network, poses itself restrictions to the access of financial institutions and consumers to this distribution channel. *Rede24Horas* (owned by Tecban) and *Rede Verde e Amarela* (owned by Asbace) are exceptions, as they offer access to any institution willing to participate, provided it complies with established technical and safety criteria.

4.4   **Pricing of payment instruments**

A factor influencing the use of a payment instrument is its cost to the users – merchants and consumers. This cost is determined in the "payment instrument production chain", which involves capture, transmission or transportation, processing, control, and settlement of transactions (Humphrey et alli, 1997, 2001, 2003 b).

In this topic, forms of pricing adopted in the payment industry will be discussed with focus on remuneration structures that determine fees regarding banking services and payment cards, as well as in ATM networks. The cost of a payment instrument is directly associated to its remuneration structure. In the payment industry, activities that are in some way related to each payment instrument are considered to allocate the respective costs. These are the main factors:

   a)   staff used to carry out both procedures and controls, as well as to improve all the processes;

   b)   technology encompassing development and maintenance of systems;

   c)   infrastructure and distribution channels used by each payment instrument;

   d)   fees paid to third parties participating in the processing and/or settlement of transactions;

   e)   costs related to production of the payment instrument such as in the case of cheque;

   f)   frauds, defaults and respective protection mechanisms;

   g)   specific costs such as interbank fees.

On the other hand, revenues received by financial institutions offering payment services can stem from:

   a)   fees charged to clients;

   b)   gains of float related to the period in which payment funds remain in deposit until transaction is settled;

   c)   cross subsidies (revenues received on other products or services, which cover partially or totally costs of payment services).

Payment instrument pricing can be direct or indirect. Direct pricing happens where fees are charged to the users according to the costs incurred in offering payment services (Guibourg and Björg, 2004; McAndrews, 1996). Payment services can still integrate "service packages" offered by banks (credit, financial guidance, etc). In this case, indirect pricing is made through either cross-subsidies or gains of float and it does not directly reflect the costs of the "payment service production chain".

Cross subsidies, as a strategy used by providers for pricing payment services, can induce the use of a payment instrument regardless the direct costs incurred to offer it. Users do not have sufficient information to make a direct relation between the use of the payment instrument and its production cost. Gains of float can increase the supply of certain payment instruments presenting larger gains of float to the detriment of others. In this case, the fee charged to the user does not directly reflect the cost of the payment instrument because of the lag existing until the instrument is settled – float (McAndrews and Roberds, 2000).

Theoretical studies show that payment service markets get optimum equilibrium between supply and demand where prices directly reflect costs in the case of direct pricing. However, there is no empirical evidence of this (Guilbourg and Björg, 2004)

4.4.1   *Payment card market*

In payment card markets there are basically two models of networks:
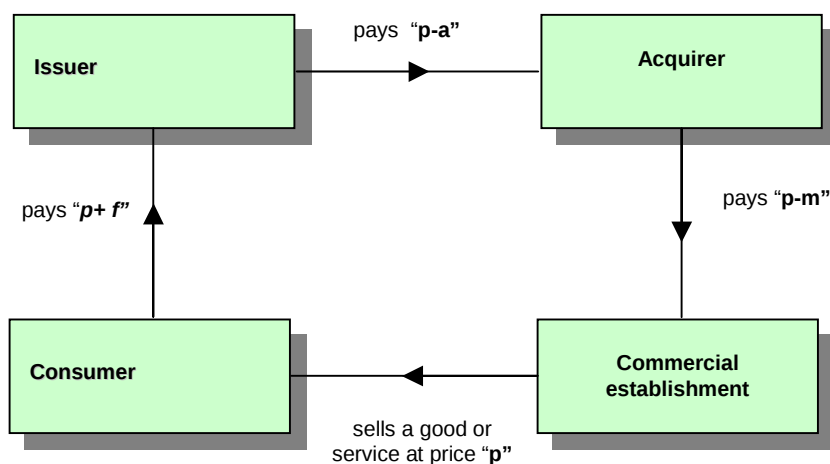
   a)   open networks which are usually operated by non-for-profit associations owned by card-issuing banks;

   b)   closed networks that are managed by firms that issue cards and establish agreements with merchants.

In the open network model, the institutions that have issued cards (issuers) can freely charge the cardholders, and institutions that have established agreement with the merchants are free to set the fee they judge more convenient. In this model, there is cooperation in operational areas, while there is competition to attract and maintain clients.

Issuers are in part remunerated by means of the interchange fee (**a),** which is charged to the respective acquirer each time a transaction is made, since the user holding a card issued by a certain institution (bank) can purchase goods or services in any establishment that has been credentialed by other institution (acquirer).

The fee that the user pays to the issuer to have the right to use the card (**f**) (usually an annual fee), and the discount fee that the merchant pays to the acquirer (**m**) are determined by the market with the aim of maximizing the network benefits. The fees maximizing profits take a number of factors into account: net costs of a transaction, including issuing costs (**Ce**) and acquisition costs (**Ca**); the extent in which there is competition with other card networks, or even with other payment instruments; and lastly price elasticity regarding consumers and merchants. The following diagram shows the payment flow:

Diagram 13: Payment card – Payment flow

   p = price paid by the user for purchasing good or service
   a = interchange fee
   f = fee that user pay annually to the issuer
   m= discount fee

As the diagram shows, fee "**a"** is paid to the bank and not to the brand administrator. Besides, the brand administrator does not set fees "**f**" and "**m**" (they result from competition in the market). In contrast with this, in the closed network model (where the issuer and the acquirer are the same entity) fess "**f**" and "**m**" are directly determined and the network operator receives the related revenues. It should be pointed out that the analysis is related to the use of cards as payment instruments and not as credit instruments (Hunt, 2003; Chakravorti and Emmons, 2001).

Although in the closed network model there is no explicit interchange fee it does not mean that there is no worry on equilibrium between the two sides of the market (issuing market and credentialing market).

Payment card networks should seek to set an optimum price structure that stimulates both sets of clients (consumers and merchants) to participate in them. If cost is too high, the cardholder will use cash and cheque to make payments. On the other hand, if fees charged by the acquirer are too high, the merchants will not operate with it anymore. Therefore, the structure and the level of prices are relevant factors for markets presenting these characteristics.

In payment card markets it is not possible to elaborate a cost-price analysis taking into account just one of the sides. An analysis of fees charged to merchants by acquirers (**m**) should consider the net benefit to the merchants (**Be**), which, apart from being function of the number of credentialed establishments (network effect), is also function of the number of cardholders and, therefore, depends on the efforts of the issuing banks (Rochet and Tirole, 2000).

Externalities in payment card markets

In payment card markets, the larger the number of users, the larger the number of merchants wishing to accept this payment instrument. This happens because, in providing payment alternatives more convenient to the users, merchants will have higher potential of sales. Moreover, the larger the number of merchants accepting payment through cards, the greater the value of these payment instruments to the users (Economides and White, 1994; Economides, 19996 a).

Quantity supplied by a service provider – issuer or acquirer – can be upper or lower than needs of the other. Therefore, interchange fee can be considered as a mechanism to adjust both markets at a certain point of equilibrium, and its calculation should reflect the more efficient result regarding distribution of costs and revenues for both sides.

Payment card networks are fundamentally two-sided markets. The key aspect in such markets, from either a social perspective or a business perspective, is to put both sides on the scales to get equilibrium between demands from both merchants and consumers.

However, regarding use of card payments, there are some asymmetries between cardholders and merchants. While merchants need to accept a variety of payment instruments (cash, cheque, debit and credit card from different brands, etc) in order not to lose sales, cardholders face relatively low costs to have at the same time other payment instruments, and they can make a choice among them each time a payment is made. Moreover, it is not expensive for them to change to another card, from the same brand or other (Weizsäcker, 2002).

As a result of these asymmetries, merchants have a low bargain power in relation to payment service providers, while users have the facility to choose the most suitable payment instrument to be used in each occasion. This explains why, as compared to merchants, users have a higher sensibility to prices. Regarding issuers and acquirers, they can be seen as partners in the same market. However, distribution of costs and revenues can be asymmetric between them. Many times a larger share of costs and a shorter share of revenues are attributed to one of the parts. In this situation, the interchange fee may stimulate a better distribution of costs and revenues between them.

4.4.2   ATM network market

In the ATM service provider market there are basically four types of fees: interchange fee; switch fee; foreign fee and surcharge fee (McAndrews, 1996; Stavins, 2000). Interchange fee in a shared network is the fee that an institution pays to another institution each time their clients use the network owned by this other institution. Together with interchange fee, switch fee is usually paid by the participant in order to cover costs related to

routing of transactions through the network. Foreign and surcharge fees are paid by clients of a bank whenever they use an ATM terminal that is owned by other bank. Foreign fees are charged by the bank holding the clients' accounts in order to cover at least partially the costs with interchange fees, while the bank owning the ATM terminal charges the surcharge fees.

In a pricing structure model in which all fees apply to a certain transaction, a consumer should decide between using an ATM terminal owned by its bank, and not to pay foreign fee and surcharge fee, or a terminal owned by other institution and to pay the related fees. Regarding their own terminals, banks usually cover related costs charging their clients a "fee package", or through some kind of indirect pricing.

Conflicts relating to shared networks are not rare since there may be asymmetries regarding number of clients and size of the networks. Therefore, if two banks have approximately the same number of clients, and their networks are similar in size, each bank will get equivalent revenues in the shared network. On the contrary, the bank having fewer clients and network with a smaller size will take advantage. To make up for this advantage, smaller banks pay larger fees to bigger banks.

4.4.3   International experience

In the countries considered in this report, banking and interbank fees vary according to different pricing structures adopted. In general, banking fees are charged indirectly through "fees packages", cross- subsidies or gains of float. In Norway and Finland, prices of payment instruments seek to reflect the related production costs. In those countries, use of cross subsidies is relatively low, and level of use of electronic instruments is high (Gresvik, O; Wore, G, 2002; Snellman, 2000). In the case of interbank fees, pricing is basically direct, as it is the case of fees relating to both settlement of cheques and use of shared ATM networks.

As for payment cards, in most countries there are few acquirers, sometimes just one (ECB, 2003). In the Netherlands and Finland, debit card transactions are charged based on fixed fees, while in Germany, Italy and the United Kingdom fees are charged according to the value of the transaction.

In the Netherlands, as well as in many others European countries, fees are not directly charged over domestic POS transactions and ATM withdrawals. In most cases, costs for using cards are limited to an annual fee. Pricing in this case is made in an indirect way, as gains of float, since banks pay – if any – interest rates close to zero over users' deposits (Bolt, 2003).

4.4.4   The Brazilian case

- **Banking market**

In Brazil, use of payment instruments is basically charged in an indirect way. The payments services may integrate "service packages" offered by the banks (credit, financial guidance, investments, etc), that is, there are cross-subsidies and payment instrument users pay other services offered to them. In the case of cheque, which is an instrument that has been offered for a long time, investments carried out to implement the respective clearing and settlement infrastructure have already been recouped.

Interbank fees are charged according to the instrument as follows;

- a) cheque: fees are paid by drawee banks;
- b) credit transfers:
  - "bloqueto de cobrança": fees are paid by beneficiary banks;
  - DOC: fees are paid by sending banks;
  - TED: there is no interbank fee.

Besides, there are fees to clear and settle payment instruments, which are charged according to the system in which the funds transfers are settled. In the case of cheque, settlement fees are paid to Banco do Brasil, which is the settlement agent even where the value of the instrument is larger than R$ 250 thousand and, therefore, settlement is made through STR. In the case of "bloqueto de cobrança" and DOC, interbank fees are paid to CIP. As for TED, which can be settled through either SITRAF or STR, the related fees are charged by the

respective system operator, that is, CIP or Banco Central do Brasil, and both the sending bank and the beneficiary bank pay these fees.

- **Payment card market**

As for payment card market, in general Brazil follows the international pattern regarding remuneration of market participants. Merchants make payments to acquirers based on the discount fee, and on the value of each transaction carried out by the end user. Both the value paid to the issuer (interchange fee) and the value paid to the brand administrator (Visa, Mastercard, Amex, etc), as well as expenses relating to indirect taxes such as ISS, COFINS and PIS[27] are deducted from the acquirer's revenue. The main costs incurred by them refer to:

a) staff, processing and infrastructure;

b) telecommunication;

c) banking services;

d) maintenance of POS terminals;

e) depreciation of equipments;

f) forms used to register transactions in a manual way, where this is the case;

g) remuneration paid to the brand administrator.

Acquirers remunerate the brand administrators based on transactions captured. The individual fees are set by the brand administrator according to the approval of a council in which participate representatives of issuers and acquirers. On the other hand, the fees charged to the merchants are defined by the acquirers, which, to set them, consider the contribution margin of each product (debit card and credit card) taking into account, basically, all direct costs that can be allocated to each transaction, all indirect taxes (ISS, PIS, COFINS), the respective net revenue relating to the interchange fee, and the financial cost incurred by the acquirer to finance its investment and working capital.

Discount fee is set for each commercial establishment according to its contribution margin, and takes into account factors such as related risks, location, volume of sales, types of products, and type of capture process (mechanical or electronic). This fee can be charged based on a fixed value per transaction, as well as on a variable value corresponding to a percentage of the value of the transaction. In the later case, the percentage range from 1.5% to 4%. There is no fee over not-authorized transactions.

In the case of remote transactions (card-not-present) that are carried out through Internet – thus without using the acquirer's POS network --, discount fee charged to the merchant is lower since in this case it will be exposed to the buyer credit risk. The merchants do not have to pay annual fixed fees, but they have to rent the POS terminals apart from to pay for using software needed to connect the acquirer's network.

The brand administrators, by means of agreements with acquirers and issuers, define the interchange fee. The revenue of the issuers, which are mostly banks, are composed of annual fixed fees charged to their clients, interchange fees received from the acquirers, and mainly (more than 75% of the overall revenue) interests paid by clients over balances that are financed (Rochet and Tirole, 2001; 2003). On the other hand, the main expenses for issuers are related to administrative costs incurred to maintain clients' accounts, processing and security costs, and mainly costs incurred to finance credit card balances and to cover client defaults, which correspond to around 70% of the overall cost (Rochet and Tirole, 2001; 2003). It should be highlighted that the main issuers' revenues and costs are related to credit cards, that is, to the use of the payment instrument as a credit instrument.

Debit cards observe the same pricing structure applied to credit cards, but discount fees are a little lower. The same infrastructure is used to capture both credit and debit transactions.

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[27] ISS: Tax over Provided Services; COFINS and PIS: Social Security Taxes.

- **ATM market**

In Brazil, most ATM networks are not shared. Pricing is based on "service packages", but there may be direct pricing from a certain quantity of transactions. In the shared networks, there are agreements regarding both interchange fee and switch fee.

4.5 Innovation in retail payment systems

Innovation regarding retail payment systems can be considered in the context of new products or changes in the existing ones, aiming to improve their efficient, security and accessibility. Innovation may also occur in the features of the instruments, as well as in different stages of their processing (BIS, 2003; ECB, 2003). It is important to understand all factors determining payment instrument acceptance, which should be taking into account when a new one is to be launched.

Likewise, factors that stimulate or inhibit both the offer of new products and the improvement of the existing ones should be considered. For that, it is fundamental to understand the effects that the arrangement of retail payment systems – from the perspective of fragmentation, governance and accessibility -- have on the competition between payment service providers.

At the end, it will be briefly described policies that can be adopted by regulatory authorities in order to stimulate investments in modernization of both payment instruments and clearing and settlement infrastructure.

4.5.1 Factors determining success of a new payment instrument or service

A new payment instrument or service should offer to the users an additional value as compared to traditional products and services, if one intents to disseminate its use mainly where replacement of existing instrument is the aim. In this sense, some aspects are relevant from the point of view of both users and payment service providers.

Apart from price, which is a key aspect for both users and payment service providers, safety has a fundamental role. Users' confidence (consumers and merchants) in the new retail payment instrument is crucial to its acceptance in large scale. Safety is mainly related to the certainty that, once a payment has been initiated by the payer, and since have been respected all related procedures (authorization, authentication and non-repudiation), the beneficiary will receive integral funds in the due time, that is, the intention of the payer will be respected.

To be successful, a new payment instrument should have a widespread acceptance. Users should have the possibility – and this should be convenient for them – to use it in any situation they wish. As retail payment systems are subject to network effects, both merchants and financial institutions investing in infrastructure or in development of new technology (payment product) will stimulate its use, so that the system could reach critical mass as soon as possible.

It is also important to improve the legal and regulatory framework defining rights and obligations of each payment system participant, so as to reduce uncertainty and legal risk in the relationship among payment service providers, financial institutions and users. On the other hand, it is also important that the legal environment be not a barrier to the entrance of new participants and payment service providers (banks or non-banks) in order to preserve competition.

4.5.2 Factors influencing supply and demand for new payment instrument or service

IT developments as well as the equilibrium between competition and cooperation regarding supply of payment services have been critical factors to increase the use of electronic payment instruments in several countries, which have allowed the development of interoperability standards, creation of comprehensive networks, and increasing use by both consumers and merchants (Farrel and Saloner, 1986).

On the demand side, the following factors have influenced the use of payment instruments: possibility of choice (both consumers and merchants like to have the option to use different forms of payment); convenience of use; relative costs; overall acceptance and availability of alternative instruments; and long term economic growth, especially regarding its effects on the evolution of the private consume.

Likely, the main element enabling the use of electronic payment instruments is the development of new technologies of information. Regarding any new technology to be adopted by the payment industry, there is always certain inertia in the side of participants, since they prefer to wait for definition of the "winner technology" and "industry standard", before investing in large scale. When new technologies are finally adopted, cost reduction is observed in the supply of the new product, as well as payment service providers will have greater opportunities to get revenues.

In general, at the beginning there is some resistance regarding introduction of a new product, especially where the intention is to replace one which use is already consolidated. This happens because initial costs can be very high, and there is no guarantee that consumer will use the new instrument in a scale high enough both to cover maintenance costs and to recoup money invested. Hence it is easier to invest in projects that are compatible with the existing infrastructure. In this sense, in order to limit costs and increase return on investment in new infrastructure, service providers usually use both alliances and cooperative arrangements.

Even though technological innovations enable creation of new products, it is the end users' demand that stimulates competition between service providers and acts as a catalyst for market development. Hence, "network economies" are critical to have success on new payment technologies.

4.5.3   International experience

Recent innovations regarding retail payments include new instruments, such as e-money, and ways to originate and process payments, as it is the case of payments through both internet and mobile facilities (mobile payment).

The first e-money arrangements based on cards were developed in the mid 90's in Belgium and the United Kingdom. These arrangements are mainly used for low value transactions relating to purchases at points of sale, as well as for payments of such public services as parking and public transportation. Use of e-money is still moderated, but it presents a trend to increase in the future. Internet banking has become a widespread distribution channel for such traditional instruments as credit transfers. Financial institutions are the main suppliers of Internet payments, but non-banking institutions have played a role in this area as well.

E-money arrangements based on chips are more common than those based on use of software, but both arrangements have been only used in pilot projects. Belgium, Germany, the Netherlands, Sweden, Finland and Switzerland already have arrangements based on cards, but implementation of these arrangements has been difficult and use of e-money is still low.

Likewise, both Internet and mobile payments are in an embryonic stage. There are some pilot projects in some countries considered in this report – France, Germany, Belgium, Switzerland, the Netherlands, Finland, the United Kingdom and the United States (BIS, 2003).

Some innovations regarding clearing and settlement of retail payments have been observed in some countries, such as the United Kingdom and Sweden. The first innovation is related to the capacity of an ACH to clear several types of such payment instruments as credit transfers and direct debits, among others. Other development is related to the number of settlement cycles each day. In the United Kingdom, for instance, the main ACH will clear and settle retail transactions at intervals of at most two hours, twenty-four hours per day, seven days per week. In Sweden, the main ACH already settles several cycles along the day, a different payment instrument in each cycle. In the Netherlands, all retail payments are settled each thirty minutes (multilateral netting is used) in a single ACH, and in Switzerland payments are settled in aggregate values all day long.

4.5.4   The Brazilian case

Regarding variety of payment instruments, Brazil basically follows the international trend despite the limitations that characterize a developing country, with strong inequalities in terms of income and where, as a consequence, many people do not have access to both banking system and electronic payment instruments. However, some retail payment products and services, which are used in large scale in most countries considered in this report, face some barriers in Brazil. It is especially true regarding direct credit and direct debit.

In Brazil, direct credit and direct debit are only used in intrabank environments. Direct credit is used for recurrent payments relating to wages, government social benefits, etc. Direct debit, also usually associated to recurrent payments, is commonly used for payments relating to utility services (water, electricity, telephone, etc), insurance and leasing transactions, middle and long-term financing transactions, etc. The present arrangement implies that:

a) beneficiaries (mainly firms and, in some cases, individuals) usually have to maintain accounts in several banks;

b) they have to maintain multiple controls since the payments are transferred to different banks;

c) clients face larger costs and higher complexity. In the case of direct credit, this happens because the payees have to maintain accounts in more than one financial institution in order to receive payments from different payers. As for direct debit, it is impossible to use the instrument where the beneficiary of the payment does not have account in the payer's financial institution.

As for the retail payment infrastructure, Brazil presents some features that may be reducing the velocity of innovation in this area, such as the existence of several clearing and settlement systems. The Brazilian situation contrasts with the international trend towards interoperability between systems, use of shared networks, and integration of networks that operate, at all levels, retail payment instruments.

Still regarding retail payment system framework, in the ATM market there seems to be an option for competition among bank-owned independent networks. In this area, competition has had an important impact on innovation as each bank, in order to attract more clients, has increasingly offered new services through its proprietary ATM network since the beginning of the process. However, this process presents some costs: ATM terminals are underused, and the overall network is not so convenient for end users as it could be.

In Brazil, as in other countries, e-money is still at an initial stage. As examples of initiatives in this area, products that can be loaded through either banking branch terminals, ATM terminals or internet banking have been launched, allowing greater facility and comfort to the users.

4.6   Legal and regulatory framework

The legal and regulatory framework that supports the use of payment instruments, as well as defines rights and obligations between participants of a clearing and settlement system, has a strong influence in the use of diverse products and infrastructures. International organizations that make recommendations for payment systems (mainly BIS) have been emphasizing the need to have a sound, clear and consistent legal and regulatory framework in order to guarantee safe and efficient payment systems.

This framework is necessary not only for appropriate protection of users and payment systems' direct participants, but mainly to avoid impediments to technological innovations and market development. At the same time, clear and consistent laws and rules increase the confidence of participants regarding the systems, at the extent that the related rules, rights and obligations are clearly defined, which makes payment transactions more transparent and subject to a lesser level of uncertainty.

In a scenery presenting fast technological changes, it is necessary to adapt constantly the legal and regulatory framework in order not to hinder new developments in the payment systems. Nevertheless, this should be done without detriment to risk mitigation mechanisms.

4.6.1   International experience

The legal and regulatory framework supporting the use of payment instruments in the countries considered in this report varies considerably. However, in view of recommendations made by international organizations (especially BIS), central banks have been more concerned about both legal risk and users' protection in aspects relating to retail payment systems and relevant instruments. Hence many countries have improved the legal and regulatory framework, mainly in relation to the following aspects:

a) equality in the access to payment service market;

b) clear definition of stakeholder responsibilities regarding the use and processing of payment instruments;

c) removal of obstacles that could hinder innovation and improvement of both payment instruments and distribution channels;

d) protection to end users of payment instruments and related access channels.

Country	Legal and regulatory provisions	In force from
Belgium	Law on cheques	1961
Belgium	Real Decree on financial service fees	1997
Belgium	Law on electronic payment instruments	1997
Belgium	Law on implementation of telecommunications and electronic signature in judicial and extrajudicial procedures	2000
Belgium	Law on certification of electronic signatures	2001
Germany	Law on cheques	1933
Germany	Agreement on cheque receiving	1998
Germany	Agreement on direct debits	1999
Germany	Agreement on credit transfers	1999
Germany	Decree on credit transfers	1999
France	Decree on daily safety	
France	Decree on safety of cheques and payment cards	1991
USA	Commercial code	
USA	Decree on availability of funds – cheque	1987
USA	Decree on electronic funds transfers	1978

An example of improvement is the legal and regulatory recognition of digital signature. On March 13, 2000 the French Civil Code was modified in order to attribute to digital signature the same force as the written signature. This has legally underpinned electronic commerce and will be the basis for preparing a new law on digital information. The French Civil Code confers authenticity to digital signature where it is made by means of a reliable procedure in a way that guarantees it is tied to the related act. Unless there is evidence to the contrary, digital signature is presumed to be true if it was created and validated according to the conditions set by the State Council.

Recently, by means of either laws or decrees, monetary authorities from several countries have instituted procedures on information exchange through electronic means, especially as for digital signature. In the European Union, on December 13, 1999 a directive on digital signature was adopted, aiming to facilitate its use as well to contribute to its legal recognition.

In the case of France, there are standardized interbank procedures on digital signature in the context of the system *Echange Telématiques Banque-Clients* (Etebac 5), which set rules on file transfers (bank-client and client-bank), authenticity of operations and integrity of data. A specific algorithm (RSA) is used for digital signature recognition.

In Belgium, Finland and France there is no regulation regarding specific requirements on the form and the means contracts should be elaborated. Thus, agreements and contracts can be made in different forms and means, including electronic means. However, there are several cases in which traditional written signature is needed to validate the contract/agreement. In the case of Italy, article 10 of the *Testo Único* sets forth that digital signature is fully recognized as prove of will expression. In Germany and in the Netherlands, digital signature is recognized by their respective civil codes, but in Germany in some cases a written signature is required. In Portugal, Spain, Sweden and the United Kingdom, equivalency between digital signature and traditional signature is respectively determined by Decree-Law 290/1999, Royal Decree-Law 14/1999, Law on Qualification of Digital Signature, from 2001, and Regulation on Electronic Signature, from 2002.

4.6.2   The Brazilian case

The Brazilian legal and regulatory framework has been continuously improved and in this sense Law 10,214, from March 27, 2001 should be highlighted. Among other things, this law set which institutions compose the Brazilian payment system, recognizes multilateral netting, and prescribes the use of a central counterparty in all systems that are considered systemically important. Moreover, regulation on Brazilian payment system sets forth the responsibilities of settlement system operators especially regarding risk management, as well as the criteria that should be observed by the Banco Central do Brasil to approve these systems.

The main legal and regulatory improvements are related to recognition of electronic transactions and documents, as well as electronic crimes. Recognition of both electronic document and digital signature was improved through Provisional Law (MP) 2,200-2, from August 24, 2001, which instituted the Brazilian Infrastructure for Public Keys (ICP-Brasil)[28]. ICP-Brasil is empowered to form the so-called digital certification chain, which aim is "to guarantee the authenticity, integrity, and legal validity of documents in electronic form, related support applications and applications using digital certificates, as well as to have safe electronic transactions".

MP 2,200-2 refers to both public and private documents regarding all legal effects, and statements on them are presumed to be true regarding their signatories. Other means to confirm authorship and integrity of electronic documents can be accepted, since the parties of the contract determine so, or the person to whom the document is opposed accepts them.

Apart from MP 2,200-2, Decree 3,587/2,000 sets rules for Federal Government's Public Key Infrastructure (ICP-GOV), which should contemplate, among other things, the set of rules and policies to be defined by the Authority for Administration of Policies (AGP) in order to set safety, operational and technical standards that should be observed by ACs integrating ICP-GOV. To guarantee compliance regarding these rules, audit procedures should be observed.

The cost of digital signature is an important aspect to be considered regarding the use of this safety mechanism. As for retail payments, it is crucial that the related infrastructure makes feasible the critical mass needed to take advantage of economies of scale, so as to have low access cost. An inadequate infrastructure might hinder the use of this mechanism in large scale, which would impede important developments in the retail payment system.

On June 13, 2000 Decree 3,505 instituted the Policy on Safety of Information, aiming to protect information systems against, among other things, intrusive use or unauthorized change of data and information.These issues, as well as others affecting the use of electronic payment instruments, are in discussion in the National Parliament. It is expected that, in a middle term, Brazil will have a legal and regulatory framework compatible with the new developments in information technology.

As for service providers that process, clear and settle electronic instruments, there was an important improvement in the context of the Brazilian payment system reform on April 2002. These systems have also been designated for Banco Central do Brasil's oversight.

In Brazil, payment instruments are regulated as specific banking products, while in the countries considered in this report they are usually regulated in generic terms (credit transfers, direct debit, etc). Therefore, TED, DOC and "bloqueto de cobrança" are regulated by the Banco Central do Brasil by means of individual regulations.

In searching to improve the retail payment system, it is important to take into account the characteristics and peculiarities of the local financial market and specific requirements of the related legislation and regulation. An example of these peculiarities is the existence in Brazil of procedures and legal or regulatory requirements determining use of cheque to settle obligations relating to contracts, labor relationship, and even tax.

Banking industry representatives, payment service providers and commercial firms are the opinion that, to improve the Brazilian legal framework relating to payment services, the following points should be addressed:

a) Law on cheque: adequacy to both new technologies and transaction needs, especially recognizing digital image as an instrument to prove the settlement of cheque, which would facilitate cheque truncation;

b) Civil code: need for strengthening enforcement of electronic means in order to guarantee the occasional execution of an obligation based on electronic document;

c) Penal code: creation of more stringent punishment regarding electronic crimes so as to combat frauds in the payment system;

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[28] ICP-Brasil comprises the Management Committee, which is responsible for establishing technical and operational rules (twelve representatives participate in the Committee --seven from the government sector and five from the private sector), the Central Authority for Certification (ACRaiz), and a chain of Authorities for Certification (AC) and Authorities for Register (AR).

d) Commercial code: creation of mechanisms allowing judicial execution of obligations registered in electronic means;

e) Ordinary legislation: improvement of regulation relating to electronic payments, which is nowadays based on MP 2000-2 as for digital certification.

<u>Conclusions</u>

The main aspects characterizing the Brazilian retail payment system are: use in large scale of paper-based payment instruments; fragmented arrangement of the retail clearing and settlement infrastructure; low level of interoperability in the payment instrument distribution channels – ATM and POS networks.

Considering that, this report indicates that market forces, to reach the objectives of efficiency and safety in a satisfactory way, need to be adequately stimulated so as to get payment system operators and participants acting more cooperatively.

As for use of payment instruments, even though an increment in the use of electronic instruments has been observed, cheque is still the non-cash payment instrument most used in volume (Brazil is second among countries where cheque is intensively used). However, use of cheque in Brazil has been declining since 2002 (in some countries use of cheque has almost been eliminated).

Another important issue indicated in this report is the low level of cooperation between payment service providers, especially regarding development and operation of both shared and interoperable networks. Lack of interoperability is essentially observed in ATM and POS networks. In the case of POS networks, interoperability exists only in pilot projects and reaches few terminals. This low level of interoperability imposes restrictions to commercial establishments, which, to accept different brands of cards, have to maintain more than one terminal and support additional costs that otherwise they would not have.

The multiplicity of settlement systems presenting different arrangements of governance and control can also hinder innovation, insofar as development of new payment products and improvement of the existing ones depend on reaching critical mass to take advantage of economies of scales that exist in network services. In Brazil, there are six retail payment clearing and settlement systems. In most countries of the sample considered in this report, this infrastructure is concentrated in a single system that carries out not only clearing and settlement of transactions, but also aggregates other services guaranteeing straight through processing, which means more efficiency and safety in banking and payment services.

Payment instrument pricing structure based on cross-subsidies and gains of float is other feature pointed out in this report. Under this model, prices of payment instruments are not transparent for end users, which may hinder the choice of the payment instrument that presents the best cost-benefit relation.

Fundamentally, the report underlines that low level of cooperation among financial institutions, payment service providers, and settlement system operators implies a fragmented arrangement that does not benefit from economies relating to network services. Moreover, this governance model can hinder both innovation and acceptance of interoperability standards, and also the rationality of the related investments.

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Glossary [1]

automated teller machine (ATM)	electromechanical device that permits authorized users, often using machine-readable plastic cards, to withdraw cash from their accounts and/or access services, such as balance enquiries, transfer of funds or acceptance of deposits; ATMs may be operated either online with real-time access to an authorization database or offline.
batch	the transmission or processing of a group of payment orders as a set at discrete intervals of time.
"bloqueto de cobrança"	bar-coded standardized document that allows bills to be paid in any bank.
card	see *cash card, cheque guarantee card, chip card, credit card, debit card, delayed debit card, prepaid card, retailer's card, travel and entertainment card.*
brand administrator	company which owns the trademark of a particular credit or debit card, possibly providing a number of marketing, processing or other services to the members using the card services.
cash card	card for use only in ATMs or cash dispensers (other cards often have a cash function that permits the holder to withdraw cash)
cash dispenser	electromechanical devise that permits consumers, often using machine-readable plastic cards, to withdraw banknotes (currency) and, in some cases, coins; *see automated teller machine (ATM).*
cheque	written order from one party (the drawer) to another (the drawee, normally a bank) requiring the drawee to pay a specified sum on demand to the drawer or to a third party specified by the drawer; widely used for settling debts and withdrawing money from banks.
chip card	card containing one or more computer chips or integrated circuits for identification, data storage or special-purpose processing used to validate personal identification numbers (PINs), authorize purchases, verify account balances and store personal records; in some cases the memory in the card is updated every time the card is used: for example, when an account balance is updated; also known as IC card or smart card.
closed network	telecommunications network used for a specific purpose, such as a payment system, and to which access is restricted.
counterparty	the opposite party in a financial transaction.
credit card	card whose holder has been granted a credit line, enabling the holder to make purchases and/or draw cash up to a prearranged limit; the credit granted can be settled in fully by the end of a specified period or in part, with the balance taken as extended credit; interest is charged on the amount of any extended credit and the holder is sometimes charged an annual fee.
credit card company	company which owns the trademark of a particular credit card, possibly providing a number of marketing, processing or other services to the members using the card services.
credit transfer	payment order or possibly a sequence of payment orders made for the purpose of placing funds at the disposal of the beneficiary, possibly via other banks as intermediaries and/or more than one credit transfer system.
debit card	card enabling the holder to have its purchases directly charged to funds on its account at a deposit-taking institution (sometimes combined with another function; for example, that of a cash card or cheque guarantee card).
direct debit	preauthorized debit on the payer's bank account initiated by the payee.
electronic data interchange (EDI)	the electronic exchange between commercial entities (in some cases also public administrations), in a standard format, of data relating to a number of message categories, such as orders, invoices, customs documents, remittance advices and payments; EDI messages are sent through public data transmission networks or banking system channels; any movement of funds initiated by EDI is reflected in payment instructions flowing through the banking system; EDIFACT, a United Nations body, has established standards for EDI.
DOC (Document of Credit)	credit transfers which interbank settlement occurs in T+1.

electronic credit transfers	credit transfers not involving the exchange of paper documents between banks; other credit transfers are paper-based.
electronic money (e-money)	value stored electronically in a device such as a chip card or a hard drive in a personal computer.
face-to-face payment	payment carried out by the exchange of instruments between the payer and the payee in the same physical location.
final transfer	irrevocable and unconditional transfer which effects a discharge of the obligation to make the transfer; delivery and payment are defined to include a final transfer.
home banking	banking services that a financial institution's retail customer can access by telephone, television, terminal or personal computer as a telecommunication link to its computer centre.
inpayment	payment instruction, sent together with the bill for the delivery of goods and/or services, which is prepared by the payee; the payer can either pay through its designated bank account or by means of a cash payment at a designated agent (bank or non-bank).
interchange fee	transaction fee set by the network organization and paid by the card issuing institution to the acquiring institution for the cost of deploying and maintaining ATMs and EFTPOS terminals.
obligation	(i) duty imposed by contract or law; (ii) security or other financial instrument, such as a bond or promissory note, which contains the issuer's undertaking to pay the owner.
offline	(i) in payment and settlement systems, the transmission of transfer instructions by users, by such means as voice, written or faxed instructions, that must subsequently input into a transfer processing system; (ii) the storage data by the transfer processing system on media such as magnetic tape or disk such that the user may not have direct and immediate access to the data.
online	(i) in payment and settlement systems, the transmission of transfer instructions by users, by such electronic means as computer-to-computer interfaces or electronic terminals, that are entered into a transfer processing system by automated means; (ii) the storage of data by the transfer processing system on a computer database such that the user has direct access to the data (frequently real-time) through input/output devices such as terminals.
open network	telecommunications network to which access is not restricted.
paperless credit transfer	credit transfers not involving the exchange of paper documents between banks; other credit transfers are paper-based.
payment	the payer's transfer of a monetary claim on a party acceptable to the payee; claims often take the form of banknotes or deposit balances held at a financial institution or a central bank.
payment system	set of instruments, banking procedures and intebank funds transfer systems that ensure the circulation of money.
personal identification number (PIN)	numeric code which the cardholder may need to quote for verification of identity; seen in electronic transactions as the equivalent of a signature.
point of sale (POS)	use of payment cards at a retail location (point of sale); the payment information is captured either by paper vouchers or by electronic terminals, which are in some cases also designed to transmit the information, in which case the arrangement may be referred to as electronic funds transfer at the point of sale (EFTPOS).
prepaid card	card loaded with a given value, paid for in advance.
remote payment	payment made by sending payment orders or payment instruments (for example, by mail); contrast with face-to-face payment.
retailer's card	card issued by a non-bank for use in specified stores; the holder has usually been granted a credit line.
retail transfer system	interbank funds transfer system which handles a large volume of payments of relatively low value in such forms as cheques, credit transfers, direct debits, and ATM and EFTPOS transactions.

settlement	act that discharges obligations in respect of funds transfers between two or more parties.
settlement risk	the risk that settlement in a transfer system will not take place as expected; this risk may comprise both credit and liquidity risk.
standing order	instruction from a customer to its bank to make a regular payment of a fixed amount to a named creditor.
switch fee	transaction fee set by the network organization and paid by the card issuing institution to the organization for the cost of routing transaction information.
surcharge fee	transaction fee set by an ATM owner and paid directly by the cardholder to the ATM owner for the cost of deploying and maintaining the ATM.
TED (Electronic Funds Transfer)	credit transfers which interbank settlement occurs in T+0 (same day funds), usually few minutes after issuance by the sending bank.
transfer	the sending (or movement) of funds or of a right relating to funds from one party to another party by (i) conveyance of physical instruments/money; (ii) accounting entries on the books of a financial intermediary and (iii) accounting entries processed through a funds transfer system, the act of transfer affects the legal rights of the transferor, the transferee and possibly third parties in relation to the money balance or other financial instrument being transferred.
user fee	transaction fee set by the card issuer and paid by the cardholder to the issuing institution for card payments or ATM cash withdrawals; other user fees, sometimes called foreign fees, are paid by the cardholder to the issuing institution for the use of ATMs not owned by the issuing institution.

[1] Based on the glossary of the report "Retail Payments in selected countries: a comparative study", BIS/CPSS.