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The Brazilian Payment System – Current Design and Future Outlook

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... Data unknown.
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0 ou **0,0** figure smaller than half the value of the last digit to the right.
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Foreword

The institutionalization of the Banco Central do Brasil Technical Notes, conducted by the Department of Economics, promotes the dissemination of works featuring economic content, attracting both theoretical and methodological interest, giving a view of the short-term developments of the economy and reflecting the work of the Bank's employees in all areas of action. Besides, other works, though external to the Banco Central, may be included in this series provided the Bank has afforded institutional support to their preparation.

The Brazilian Payment System – Current Design and Future Outlook

ADRIANA SOARES SALES

Resumo: em julho de 1999, o Banco Central começou formalmente a conduzir o projeto de reestruturação do Sistema de Pagamentos Brasileiro, que objetiva melhorias na sua segurança, eficiência e integridade. Este texto faz uma descrição do desenho atual do nosso sistema, tanto no que se refere a sistemas de pagamento e de liquidação de ativos quanto a instrumentos de pagamentos. Descrições desta natureza têm sido realizadas por diversos países, e derivam da crescente importância que o assunto vem assumindo em virtude do aumento do valor e volume de transações em sistemas de pagamentos de grandes valores. Aspectos relevantes do Sistema Financeiro Nacional, que auxiliam o entendimento do atual processo de reestruturação, também são abordados. Além de procurar propiciar um melhor conhecimento do desenho atual, o texto tenta mostrar, de forma geral, as reformas que estão sendo implementadas.

Summary

The Brazilian Payment System – Current Design and Future Outlook[1]

ADRIANA SOARES SALES[2]

1. Overview

Brazil has a fairly sophisticated payment system. Until recently, changes in payment system were motivated by the need to cope with high inflation rates. This development was partly a result of the need to create alternative, quasi-money indexed financial assets before the launching of the Real Plan in July 1994. In fact, the annual inflation rate in 1993 reached almost 2,500%, coming down steeply since 1994 and averaging 6% in 2000.

During the high inflation period, the Brazilian payment system achieved a high degree of technological progress, especially aimed at enhancing the speed of processing financial transactions. Investments that would not be feasible in a low inflation environment turned out to be profitable. Costs were not incurred directly by the clients but rather compensated by float yields from inflation, which boosted the technological advances. The search for lowering the exposure of money balances to the effects of high inflation, for instance, motivated the widespread use of automation in check clearing. In other words, technology and human capital in banking, a legacy of the inflationary environment, were "positive" externalities to further development of the Brazilian payment system. The Central Bank of Brazil (BCB) has played an important role in both the oversight and in the creation and promotion of innovations in the payment system.

Additionally, the external debt crisis in the early 80's was crucial for the automation of foreign exchange transactions. The need to pursue a tight control of the cash flow in foreign currencies by the BCB encouraged the development of the settlement process, including the introduction of electronic inputs in the domestic currency leg of foreign exchange transactions in substitution for inputs via Telex.

The Brazilian payment system has also benefited from very co-operative interactions between the key players: financial institutions, clearinghouses and the BCB.

Currently, the payment system in Brazil contemplates several different types of institutions, payment and settlement systems (henceforth clearinghouses) and payment

1/ This note has benefited greatly from the comments of Hélio Mori and José Pedro R. Fachada M. da Silva. The author is also grateful to Elker T. P. de Castro for preparing the tables. The views expressed herein are the author's and do not represent the views of the Central Bank of Brazil.

2/ Department of Banking Operations and Payments System.

instruments. The system is highly automated, with separated subsystems for clearing and settlement of checks and other documents, of government securities, of private securities and of foreign exchange transactions. All those systems are connected to the BCB's mainframe computer system (Sisbacen) which allows 24-hour/day access. Since financial institutions must comply with regulatory restrictions that prohibit banks from holding demand deposit accounts at other banks, the BCB operates as the main settlement agent – the financial settlement of all transactions is made against bank reserves held at the BCB.

Securities market in Brazil is also well developed. Open market was established to create and promote the market for Federal Government Securities. Automated systems provide for registry, custody and transfer of securities against payment. The Selic system, the settlement system for government securities, developed by the BCB in 1979, was instrumental in the pursuit of this objective. The creation of the Cetip system, the securities settlement system for private debt instruments, was a joint initiative of the BCB and financial institutions in 1986. The evolution of the Brazilian payment system in retrospect shows the crucial role of the BCB in designing and implementing it.

This note is structured in eight sections, after this brief overview. The first section discusses regulatory and institutional aspects of the system. The second to fourth sections describe the Brazilian retail and wholesale payment systems. The fifth section presents the liquidity support requirement of the system and is followed by two sections that discuss the reforms that are being introduced in the payment system. Finally, the last section shortly presents some lessons derived from the Brazilian experience.

2. Institutional aspects

In Brazil, financial institutions are regulated by the Banking Act of December 1964 (Law 4,595/64) and by the Capital Market Act of July 1965 (Law 4,728/65). There is also legislation concerning agricultural loans (Law 4,829/65), credit unions (Law 5,764/71), liquidation of financial institutions (Law 6,024/74) and crimes against the financial system (Law 7,492/86).

The official regulatory institutions are the National Monetary Council (CMN), the BCB, the Brazilian Private Securities and Stock Exchange Commission (CVM) and the Bureau of Private Insurance (Susep). These institutions regulate the financial system as a whole, including brokers' associations, stock exchanges and private insurance companies.

The BCB, through the Monetary Policy Committee (Copom), is responsible for formulating and implementing monetary policy. Monetary policy instruments include open market operations, reserve requirements, and standing facilities. The BCB is responsible for supervising and regulating the financial market, including operations of

foreign banks. The BCB is also responsible for the supervision of financial institutions, oversight of payment and settlement systems and surveillance of some financial markets. Its regulatory responsibilities include approval of banks acquisition, changes of control and mergers, among others. It is also responsible for implementing a number of statutes designed to ensure that bank customers have sufficient information and are fairly protected in credit and other financial transactions.

The BCB is also in charge of banknote issuance and payment services. With few exceptions, only bank reserve holders have direct access to the BCB[3] payment services. Also, it acts as fiscal agent for the Brazilian government as the National Treasury maintains an account at it. This account is used to transfer reserves related to Treasury transactions. Treasury payments and collections are generally handled by Banco do Brasil S. A., a state-owned commercial bank.

Surveillance of financial markets is also exercised by the CVM, which brings some overlapping with the BCB oversight function. Information exchange and cooperation between payment system overseers is strongly taken into consideration for helping to ensure effective oversight.

In December 2000, there were 215 banks in Brazil classified as commercial banks, banks with multiple portfolio (hereafter referred as universal banks), development banks and investment banks. As one can see in Table 1 (Annex 1), the number of banks has been decreasing from 267 banks in 1994. Many banks are associated with large holding companies.

Including credit unions, brokers' associations, saving and loans associations, loan companies and leasing companies, the number of financial institutions reached 1,731 in December 2000. Despite a large number of banks and other financial institutions, the Brazilian financial system is highly concentrated in terms of banks' net worth.

In June 2000, banking and non-banking system's total assets achieved USD 515 billion and USD 27 billion, respectively. Total equities amounted to USD 49 billion and USD 8 billion, respectively.

Other entities involved in providing payment services to the public include postal service, bankcard companies[4] , stock exchanges and the commodities and futures exchange.

Post offices have a limited role in the Brazilian payment system. Clients can use them to send payment orders, to transfer funds, to cash low-value checks and to pay some bills.

3/ Concerning the role of the BCB in payment system, refer to the paper "Sistema de Transferência de Reservas – Self-Assessment of Compliance with the Core Principles for Systemically Important Payment Systems".

4/ See item 3.2.

Stock exchanges play an important role in the system. Bovespa, the São Paulo Stock Exchange, has agreement for operations with other Brazilian stock exchanges, including the Rio de Janeiro Stock Exchange – BVRJ. The agreement makes Bovespa to centralize all operations in the stock market. Bovespa has an insurance fund, which covers losses in case of fraud or of an operational outage.

The Commodities and Futures Exchange (BM&F) carries the vast majority of transactions with derivatives in Brazil. The settlement process is similar to the one used by stock exchanges[5] . It is carried out in a net basis through the Central Custody and Settlement of Securities – namely Cetip System – and the settlement lag is 3 days (T+3). The BM&F has guarantees and funds to ensure settlement.

3. Payment means used by non-financial entities

Payment instruments and networks in Brazil are highly automated, which ensures a fair degree of efficiency and sophistication. During the inflationary period, the use of payment services was rarely charged. Nowadays, pricing policies are based on almost full cost recovery method. Most of instruments, mainly checks, are standardized, which contribute to system automation.

On the retail level, there is also an emphasis on co-operation between the BCB, operators of clearinghouses and other participants in the system. The BCB focuses mainly on efficiency, operational reliability, security and integrity regarding that system. The main instruments and networks will be described below.

3.1 – Cash

Cash still remains an usual and widespread payment instrument in Brazil. It is used particularly for small-value transactions. Settlement for coin and banknotes is made in real-time on the books of the BCB. Currency in circulation as a proportion of GDP increased to 3% in year 2000 from 0.6% in 1993 as table 3B indicates.

3.2 – Non-Cash Payment Instruments

3.2.1 – Checks

Checks are the most widely used cashless payment instrument in Brazil[6]. Checks are mainly used to pay for consumer purchases of goods and services. Post-

5/ For more details, see item 5.

6/ According to BIS Glossary (2001), truncation is a procedure in which the physical movement of paper payment instruments "within a bank, between banks or between a bank and its customer is curtailed or eliminated, being replaced, in whole or in part, by electronic records of their content for further processing and transmission".

dated checks, in turn, are frequently used as a credit instrument. As Table 3B indicates, there are currently around 0.39 checking accounts per capita and the average check value is USD 300. The volume of checks per capita was around 16 in 2000.

As seen in Table 4, a recent widespread use of credit transfers (called DOC) and credit cards seem to have reduced the growth of checks in Brazil. Direct debit terminals at retail stores and the decline in the inflation rate may also have contributed to this fall. Table 4 unveils the relative importance of some cashless payment instruments. Considering checks, credit cards, DOCs and "cobrança", in 2000 checks represented about 60.4% in volume and 48% in value of cashless instruments.

Check truncation is currently under discussion in Brazil[6] . There may be an efficiency-gain when checks are truncated early in the collection process. Generally, check truncation requires that the bank truncates checks to convert its data to electronic form which is already done in Brazil, safekeeping the checks, returning them at the request of the payer bank and providing information on checks when requested.

There is a legal basis for transaction with checks in Brazil. The legislation sets rules for collecting and returning checks. As far as fraud rules are concerned, there are some reasons why checks can be returned as well as an execution time to return them. The percentage of volume of checks returned is about 2.0% per month of which checks with insufficient funds accounts for 95%.

Check endorsement is usual and ascertainment of non-payment is effected via protest. Penalties envisaged for issuers of uncovered checks are penal sanctions, fines and prohibition of check issuing. It should be noted that the BCB sets a maximum delay allowed for banks to make funds available to clients, which means that the float enjoyed by banks is limited.

3.2.2 – "Bloquetos de cobrança"

"Bloquetos de cobrança" are documents used to pay bills. When a customer receives a "bloqueto de cobrança", he/she takes it to a bank and pays in cash or writes a check to authorize payment through his/her account. Alternatively, the customer can input the bar-coded numbers at a home-banking station. Banks charge the payee an interbank fee to use them. They are cleared and settled electronically.

In 2000, "bloquetos" comprised about 14.3% of cashless payment items by volume and 13.8% by value, as it can be seen in Table 4.

3.2.3 – DOC or credit transfer

DOC is used for making intrabank or interbank transfer of funds between different accounts at same or different banks. In case of interbank funds transfer, it is cleared and settled electronically through a national clearinghouse. As the "bloqueto

de cobrança", a client can also make a DOC using a home-banking station. In December 2000 it comprised about 1.6% of clearinghouse items by volume and 37.2% by value, which shows that DOCs are commonly used for making large-value interbank payments.

3.2.4 – Credit cards

Credit cards have become of widespread use in Brazil since inflation rate dropped. The volume of annual transactions using credit cards has increased from 210.3 millions in July 1994 to 1.038 billions in December 2000. The settlement of credit card balances is made through the clearinghouse of checks and other documents.

Credit cards' management companies linked to a bank issue most of credit cards in Brazil[7] , under license from an international company such as Visa, MasterCard and Diners Club. Besides bank's management companies, only American Express offers credit cards in Brazil. There are also charge cards issued by large retailers such as supermarkets, stores, etc.

3.2.5 – Other payment system instruments and networks used by non-banks

- ***Debit cards and direct debits*** – debit cards (with PIN) offer on-line or next-day electronic checking services. They draw funds from the cardholder's checking account at the issuing bank. Like credit cards, their use is spreading nationwide. The volume of transactions using debit cards has increased from 56 millions in December 1997 to 235 millions in December 2000. There are direct debit/credit services, but not on an interbank basis. Both the payer and the payee must hold accounts at the same bank. Direct debit/credits are expected to increase because they are safer and cheaper than checks, besides being more convenient to customers.

- ***Bankcards, Automated Teller Machines (ATM) and Cash Dispensers*** – bankcards provide a suitable method for receiving cash through ATM and cash dispensers and for purchasing retail goods and services. Bankcards can be credit cards, debit cards, cash dispenser cards, point-of-sale cards or combined features of them. All of the major private banks operate their own ATM networks. Smaller banks usually prefer a different strategy, by sharing an ATM network to benefit from economies of scale.

- ***Home Banking and Telephone Banking*** – several banks offer home banking products such as Internet and telephone banking services. Despite the fact that these services are charged, the number of subscribers is

7/ To simplify hereinafter referred as "bankcards".

rapidly increasing. Home banking, however, has not yet become established as a common mean of making payments.

- ***Smart Cards and Prepaid Cards*** – only few banks issue smart cards to customers. There is only one system – Visa Cash – currently being adopted. Table 5 shows specific features and statistics of electronic-money (e-money) products. Prepaid cards represent a very small portion of total payment volume. Most prepaid card mechanisms are used in telecommunication and transportation sectors, where there are repetitive purchases of a standardized service.

4. Interbank exchange and settlement systems that settle directly at the Central Bank

4.1 – Overview

In Brazil, interbank payment and settlement systems that are settled directly at the BCB are: (1) Selic; (2) Cetip; (3) SCCOP; and (4) Foreign Exchange System. Despite the existence of securities settlement systems and a foreign exchange netting system, there is no specific system to process large-values funds transfers in the Brazilian payment system.

In general, the payment systems in Brazil are operated in deferred net settlement (DNS) mode. Foreign exchange transactions are the exception since they operate under trade-by-trade deferred settlement. Financial settlement of all operations as well as reserve requirement maintenance on demand deposits is made through bank reserves. Again, the BCB provides interbank financial settlement services for all payment activity in the country.

The Brazilian payment system includes the following payment and settlement entities (see Table 6):

a) ***The Special System of Custody and Settlement of Federal Securities*** (Selic) is an electronic settlement system for bills, notes and bonds issued by the National Treasury and the BCB through delivery *versus* payment (D*v*P) method in accordance with *model 3*[8] described in the D*v*P Report[9]. Interbank reserve transfers under the technical form of repurchase agreements and "DI-Reserva" agreement, which is an uncollaterilized transfer of reserves, is carried out in the Selic system. Settlement is made on a same-day basis and securities are registered in book-entry form. As Table 6 shows, in December 2000 the system had 188 direct participants

8/ Simultaneous net settlement of securities and funds transfer.

9/ BANK FOR INTERNATIONAL SETTLEMENTS. *Delivery Versus Payment in Securities Settlement Systems*, report prepared by the Committee on Payment and Settlement Systems of the Central Banks of the Group of Ten Countries, Basle, September 1992.

and daily average turnover of USD 48.5 billion. Selic system is controlled and operated by the BCB. The National Association of Open Market Institutions (Andima) is responsible for providing hardware computer facilities and skilled personnel to operate this system. Services are charged by volume.

b) ***The Central of Custody and Financial Settlement of Securities (Cetip)*** is a Selic-like system, operated by the Andima, mainly comprising transactions with private securities, securities issued by state-owned companies, special purpose public companies and swaps. Settlement is on T+1. The system also handles interbank reserve transfers and the net financial results from the stock exchanges and the futures and commodities exchange. Transactions that flow through Cetip are settled in D*v*P method. In December 2000, the Cetip daily average turnover was USD 9.1 billion in 7,100 operations involving 173 direct participants. Cetip system is a private-owned, non-profit organization. There are about 750 owners, which include brokerage houses, dealers, and commercial, universal and investment banks. Each bank has to pay a fee to participate in the system and a monthly fee, and services are charged by volume.

c) ***The Clearance of Checks and other Documents (SCCOP[10])*** is a multilateral net settlement system for checks and other payment documents. It provides check clearing services all over the country. Nowadays 99% of the documents that flow through Compe are settled electronically. Settlement is made against banks' reserve accounts at the BCB on T+1[11]. In December 2000, there were 157 participants nationwide. The average daily turnover was USD 8.1 billion and the daily volume of transactions reached 13.3 million. Compe system is regulated by the BCB, which establishes general rules and standardization. Banco do Brasil is the operator of the regional and national clearinghouse, and it is authorized by law to operate them. It is also responsible for elaborating operational rules and maintaining the system. Compe system services are charged by volume by Banco do Brasil, which uses full cost recovery method. There was a sharp decrease in the check clearing costs after the implementation of electronic clearing mechanisms.

d) ***Foreign Exchange system (FX system)*** is controlled and operated by the BCB through Sisbacen, which has links with every financial institution in the country. It handles all interbank currency trading, including operations involving the BCB and auctions of foreign currencies. Foreign exchange transactions are not processed in the payment *versus* payment feature. The majority of settlements are on T+2. In December 2000, the

10/ Henceforth referred to as Compe.

11/ Only a small fraction takes longer than that.

system had 222 direct participants, daily average turnover of USD 7.4 billions and daily volume of transactions of 2,100. The BCB charges by flow of data a monthly fee per megabyte exceeding 3 megabytes.

4.2 – Risk issues and the role of the Central Bank

Every morning, the BCB has an accurate information about each bank's reserves account balances of the previous day. Moreover, the BCB has precise information about the largest payments that will be settled during and at the end of the business day, as most of large value transactions are settled on T+1 or T+2. However as the payment system works in DNS mode, there is a reasonable degree of bank's credit exposures intradaily. Thus, during the day, the payment system works with an assumption that each transaction will be final. If a problem occurs with individual reserve positions, the BCB can be exposed to credit risk due to participant's overdraft position.

Although the BCB does not monitor on-line the participants' exposure, it still has the power to deny settlement for any transaction, but this can only be undertaken ex-post. It is technically able to monitor intraday positions through existing links with payment system's computers but this monitoring has not been implemented yet[12]. As said before, by the end of the day, the BCB has full information on each participant's net credit or debit position and its exposure.

4.3 – Bankruptcy rules

If a participant is under intervention or has been liquidated by the BCB, there are different rules to be observed in each system:

- ***Selic*** – the trustee has discretionary power either to unwind the transactions that would be settled on the date of the intervention or liquidation, or make them final. However, an unwinding is only made if the trustee judges that the transactions caused damage to the institution or if there was a fraud.

- ***Cetip*** – if the event occurs before 16:00 h., the BCB denies settlement for all transactions in the Cetip. After that time, the BCB settles the transactions that would be done on the date of the intervention or liquidation.

- ***Compe*** – items that will generate credit to the institution are accepted while those that will generate debit are returned on the date of the intervention or liquidation, and during the following working days. In practice, as large-value items are exchanged overnight in the clearing process, that rule is only applied to low-value items.

12/ For more details on that point, refer to the paper "Sistema de Transferência de Reservas – Self-Assessment of Compliance with the Core Principles for Systemically Important Payment Systems".

- ***FX system*** – the same as Selic system. In Brazil, the bankruptcy law assesses priority for some creditor's claims over others. For example, in case of default, the proceeds of selling assets go first to the employees of the institution that went bankruptcy, second to the National Treasury and so on. In addition, there is the Credit Insurance Fund (FGC), created in 1995, that guarantees demand deposits, savings and time deposits up to the limit of R$ 20,000[13] .

In the case of bankruptcy of the paying bank, checks or other payment documents sent to be cleared before or on the day of the bank's liquidation will be paid. If the receiving bank goes bankrupt before the payment order is accepted, the client can obtain funds from the paying bank directly. If it goes bankrupt after that, the client will receive the funds up to the limit of R$ 20,000.

5. Other security and derivative systems

In Brazil, there is no central securities depository that includes all different types of securities. In 1989, the CMN determined that clearing and settlement of stock exchange transactions can only be performed by a corporation specially created to provide these services. The Brazilian Clearing and Depository Corporation (CBLC) is the specific company established to be responsible for clearing and settling and performing the custody services of trades carried at the Brazilian stock exchanges.

The CBLC clears and settles for the São Paulo Stock Exchange. All transaction information is automatically sent to the CBLC through electronic links with Bovespa, which matches trades cleared through the CBLC, on line and real-time basis. Although the system deals with equities, its custody service could be used to provide the similar service for other financial instruments such as certificates of privatization, debentures, investment certificates, quotas of real estate funds and fixed income securities.

The CBLC settlement process applies D*v*P method and the financial settlement of its net results is made through Cetip on the books of the BCB. As one can see in Table 6, the average daily value cleared by CBLC reached USD 500 million in 2000 (USD 283 million in 1995) and the average number of trades cleared daily reached 16,800 (8,703 in 1995). Currently, 84 clearing members compose the CBLC. The customers of the CBLC's custody services have direct electronic links with their networks, which enables them to have full control of their custody accounts.

The CBLC also clears and settles for the over-the-counter (OTC) "Asset Markets Trader's Society" (Soma) and for "Government Securities and Other Assets Trading System" (Sisbex) established by the Rio de Janeiro stock exchange. The

13/ Or around USD 8,000 as for December 6, R$/USD = 2.42.

securities traded in its jurisdiction includes equities, options, futures and forwards on individual shares and government bonds.

The BM&F is the other entity that provides clearance, settlement and depository facilities in the securities market. It clears and settles futures, options and forward contracts on different financial assets, spot contracts on gold trading as well as agricultural commodities and OTC transactions registered in its electronic systems. The BM&F makes use of Cetip system for financial settlement. Table 6 shows that in December 2000 the average daily volume cleared by the BM&F was USD 15.2 billion and the average trading cleared daily was 8,000. Currently, BM&F has around 120 clearing members.

In Brazil, matching of trades is performed by the stock exchanges and commodities and futures stock exchange at the moment in which the system receives the transaction information. In that moment starts the process for comparing the trade or settlement details provided by counterparties in order to ensure that they agree with respect to the terms of the transaction.

Each clearinghouse and depository institution that operates with stock lending or futures markets sets its own margin deposits.

6. Liquidity support

The absence of real-time systems in Brazil has made easier the task of providing liquidity support since net systems demand less intraday reserves than real-time gross settlement systems to manage liquidity[14].

As the nominal interest rate is still high in Brazil, banks try to keep their balances as low as possible. The portfolio of federal government securities has become the bank's working capital given the high market liquidity of these instruments.

Reserve requirements are allowed to be met by average holdings during a two-week maintenance period. Hence, banks can offset deficiency positions with excess reserve positions during the same maintenance period so that average is accomplished. Under the new Brazilian Payment System, reserve requirements can provide for liquidity support as required reserves can be used for intraday payment purposes.

There are diversified credit facilities available to banks through interbank reserve market. Moreover, the BCB has the capability to supply liquidity to the system as a whole through open market operations until the participants reach a squared position. In such a case, the BCB assesses the liquidity needs by monitoring the interest rates.

14/ This is because customers of a real-time gross settlement (RTGS) system are constantly in need of liquidity to settle payment, transaction by transaction, in real-time, while those of a net system only need reserves to settle **netting** positions at the moment of the settlement cycle.

The BCB also provides standing facilities, which are credit lines charging bank reserve market's rate namely Selic plus a percentage, which ranges from 6% p.y. to 2% p.y[15]. The rate charged depends on the maturity of lending, asset quality and frequency of its utilization. Short-term operations are granted to institutions facing short-term liquidity constraints, and lending tenure is limited to 15 business days, and could be extended upon request provided the BCB credit line access does not exceed 45 business days. Overnight operations are only carried out through repo operations backed by federal government bonds.

Longer-term credit facilities are provided either through repo or rediscount operations, and are granted against a broad range of assets. Operations of 90 up to 180 day-tenure are applied only for banks facing solvency problems and the proposal would be filed together with a mandatory restructuring plan aiming at either recapitalization or transfer of ownership, which would be contingent on the approval of the BCB's Board of Directors. Total tenure may not exceed 180 days with the borrower being required to proceed with due structural adjustments in the meantime. Otherwise, the institution would be liquidated.

There is no formal limit for lending facilities granted to a bank during a year. Nevertheless, the BCB through moral suasion would bind banks' behavior. In the case a bank becomes frequent user of the facility, then the BCB would tighten the supervision up on that bank.

As the aforementioned operations charge penalty rates, the BCB does not rely on standing facilities to balance supply and demand in the bank reserves market. Except during exceptional or emergency situations, fine-tuning through open market operations is the main source of supply of reserves to the system. In order to avoid excessive exchange rate volatility and enhance the liquidity support framework, the BCB has had an important role in smoothing fluctuations in the exchange rate.

7. The restructuring of the Brazilian financial sector

The BCB is constitutionally responsible for the soundness and the stability of the financial sector. There are sufficient regulatory tools and previous expertise to cope with difficult situations in that field.

With the consolidation of the Real Plan, the financial sector's share on GDP in Brazil shrank from 15.9% in 1994 to 5.4% in 2000[16]. The Government has conducted prudently this process and, as a direct result, the consequences of a banking crisis were mitigated. To cope with creditworthiness and financial problems of an individual

15/ Refer to Annex 2 to more details about Central Bank credit lines.

16/ See Table 7.

institution the BCB has implemented a restructuring program to carry mergers, acquisitions and transfers of control. As for June 1994, three out of the country's top ten private institutions were absorbed by other banks in the system, while some smaller institutions were liquidated. In addition, foreign participation in the Brazilian financial sector is increasing.

Until recently, the Brazilian financial sector has been characterized by a high participation of state-owned banks. An adjustment process has been implemented for some years leading to a decline in the share of these banks in the system. Some federal banks were re-capitalized. At the state level, a specific program has been implemented. Some banks have been privatized, others turned temporarily into federal-owned banks, some others transformed into regional development agencies, which are non-financial institutions, and others rehabilitated.

Moreover, minimum bank capital requirement in Brazil is currently 11% of risk-weighted assets[17], including foreign branches, three-percentage points higher then BIS minimum standard. By the end of 1994, the BCB introduced minimum capital requirements along the lines of the Basle Agreement (Resolution n. 2,099/ 94). This new policy implied three basic changes: an increase in the minimum capital requirements, changes of the operational limits, and the introduction of the concept of consolidated bank supervision of economic conglomerates, including non-financial branches and subsidiaries abroad.

Minimum capital is also required to a broad category of financial institutions to be authorized to operate in the system. Once operating in Brazil, foreign financial institutions are subject to the same regulations and capital requirements applied to Brazilian financial institutions.

As said before, the ongoing change in the payment system has required some background. With the stabilization plan, the restructuring of the banking industry created a far sounder financial system than the one Brazil had before, which decreases the cost of the payment system reform. Also, the Brazilian payment system reform makes financial system better tuned to the internationalized financial markets.

8. Reforms and prospects

There have been two main concerns in carrying on the restructuring of the payment system in Brazil: the episodes of overdrafts on banks' reserve account and systemic risk issues.

17/ It excludes swaps operations and do not consider interest rate and foreign exchange risks in the banking book.

Overdrafts are currently a possible outcome. Since transactions have different settlement lags, the BCB has an accurate information about the balances held by banks in their reserves account only by the end of day. In this event, the BCB is exposed to credit risk. For instance, the net financial result of the Selic system impacts reserve account at 11:00 p.m. Furthermore, transactions can have their value adjusted back to the day of value, which is the day on which a payment is due to the receiving participant in the system. During the adjustment process been undergone by the Brazilian financial system since 1994, the BCB has involuntarily extended intraday credit in the form of daylight overdrafts in banks' reserve account without formal agreements and guarantees. Another important episode of overdrafts took place at the time of states' financial system crisis, which last from 1982 to 1984.

Moreover, all actions taken by the BCB are severely constrained by systemic risk issues, given the operational model of banks' reserve account. In the Brazilian Payment System, there is an assumption that the BCB guarantees the final completion of all transactions to be settled, meaning that it provides settlement finality. On the one hand, that assumption avoids problems of gridlock. On the other, as it leads the agents to incorporate the final settlement feature into their decision making process, the BCB comes to a situation in which it could not unwind transactions, even in the event of default by a participant. If the transaction is unwound, the lack of liquidity of one institution might be transferred to another institution, producing a domino effect.

Besides functioning as if it were an unlimited credit granted by the BCB to financial institution, without collateral and formal agreement, such an intraday credit may be converted into an overnight credit, which obliges the BCB to act as lender of last resort more frequently than it would be desirable. Thereby, it tends to increase moral hazard situations.

It should be noted that, in the Brazilian Payment System, the amounts of overdrafts and the magnitudes of the implied credit risks for the BCB and for private payment systems are potentially substantial.

The policy of not unwinding avoids systemic risk in the short run. On the other hand, as said before, in the event of a settlement failure there is an implicit assumption that the BCB will guarantee final settlement in good funds once it has processed the message. Such inappropriate economic incentives cause socially suboptimal outcomes. One problem, which is a moral hazard problem, comes from removing banks' incentive to introduce their own risk controls to reduce credit risks originated from default of their counterparties. As each bank behaves in the same way and has knowledge of other banks' behavior, that implicit assumption induces that individually, and hence jointly, banks bear higher risks than it would be socially optimal, which increases the probability of systemic crises. Another problem, which is an adverse selection problem, derives from eliminating banks with low nonobservable risk and serving those with high nonobservable risk and, hence, a higher probability of failure.

Being aware that the present operational model has generated poor economic incentives to the financial system, on June 1999, the Board of Directors of the BCB of Brazil launched the Brazilian Payment System Restructuring Project. The project is the result of a previous in-depth analysis that was carried out by the BCB for several months on all payment and settlement systems in Brazil. The analysis aimed at assessing the risks, which arise from the clearing and settlement of transactions, especially those with the potential to cause disruptions in the financial system in the event of a participant's default.

Below the main problems detected at the very beginning of the restructuring process are summarized:

- The BCB undertakes private risks partially or even totally because of that implicit commitment. Moreover, informal and unclear rules for a payment system affect investors behavior because risk management mechanisms need to be based on firmly established right and obligations so that they will function predictably when called upon during times of stress. The background of unclear rules has amplified the potential of systemic risk and constrained all actions undertaken by the BCB.

- There is no certainty of settlement in the Brazilian clearinghouses. In a general way, clearinghouses are not endowed with risk control mechanisms capable of ensuring at least the completion of an operation in the event of an inability to settle by the participant with the largest single debit position.

- It was necessary to remove important uncertainties in the legal framework of the Brazilian Payment System such as validation of multilateral netting agreements, collateral pledged at clearinghouses, etc.

- As there is no specific channel for critical payments, large and small-value payments flow together through the Compe system and are settled directly on the books of the BCB.

The main concern of the restructuring project is to reduce both systemic risk and credit risk of the BCB by shifting back to the financial institutions. This has been best achieved by strengthening the domestic payment system and adopting internationally accepted standards and practices in the design and operation of payment and settlement systems.

The Brazilian payment and settlement systems are expected to be fully operative under the new regulatory and operational framework by April 2002. The core measures already taken or to be implemented are: 1) clear definition of the role of the BCB in the payment system and establishment of a well-founded legal basis to

allow better risk control devices; 2) setting up of a large-value fund transfer system at the BCB, operating under a real-time gross settlement (RTGS) mode and a real-time monitoring of banks' reserve account balances; 3) enabling clearinghouses to assure certainty of settlement through the establishment of proper safeguard mechanisms; 4) clear definition of all the risks involved in every stage of the pre-settlement and settlement process.

In April 22, 2002, a new facility intended to allow reserves transfer under RTGS conditions, called "Sistema de Transferência de Reservas" – Reserves Transfer System – (STR) – will be fully operative. The BCB will be the operator and manager of the system, which is expected to be used mainly for large-value funds transfers. Provision of sufficient funds will always be required for any transfer in STR to be final. Otherwise the transfer message will be queued until eventual settlement, in the presence of sufficient funds, or refusal.

The private sector will also operate a large-value funds transfer system, called "Câmara Interbancária de Pagamentos" – Interbank Payments Clearinghouse – (CIP). Both systems, STR and CIP, will form the base for new bank products which will induce traditional payment instruments such as checks and credit orders (DOC) to be used less intensively. Any payment made through either system will be settled at most in the same day without the risk of payment unwind due to lack of funds, as may happen to checks.

The implementation of the new system will allow real-time monitoring of banks' reserve account by the BCB.

In addition, as the new Brazilian Payments System starts up, a new kind of lending facility, namely intraday operations will be available. It will provide intraday liquidity for the system to settle on a RTGS basis as well as help to solve queuing problems, which may put a large number of operations pending. That facility will be granted by the BCB at no financial cost since government securities traded in repo operations will have no spread since buy-back price will be equal to the price of the original operation. In order to avoid forward replacement costs, the underlying assets will be priced slightly below-market by the BCB.

A full communication network, totally dedicated to the Brazilian Financial System and its Payment System operations has been already developed. It is based on high performance and safety features (public and private cryptography keys and digital signature) ensuring straight-through process and minimizing information errors. The communication network will connect the BCB, financial institutions and clearinghouses and will have two service providers with two completely independent routes. Network tests have started last June. In addition, the BCB has created a monitoring center for intraday liquidity flows and settlements, which is now being installed. The center will be logistically equipped to more than cope with estimated peaks of intraday activities.

Two separated mainframes will simultaneously manage and process the information flow. The flow itself will have two physically independent systems to run in both systems, feeding each mainframe. Two physically far apart sites with their own autonomous power plants will host each mainframe so that an eventual failure of one machine shifts operations to the alternate one without interruption.

Finally, the BCB is now seeking to disentangle large values from the interbank system that clears checks, DOC and other documents, namely Compe system. Since BCB studies showed that there could be systemic risk in clearing checks and DOCs, it introduced a mechanism to induce the banking system to offer to their clients products which allow them to avoid issuing checks equal or greater than R$ 5,000.00[18]. This is the threshold value for systemic contagion resulted from simulations made by the BCB. Such a mechanism establishes pre-scheduled targets for reduction of the amount of interbank checks and DOC with unit value equal to or greater than R$ 5,000.00. Banks not meeting these targets will have to keep non-interest-bearing deposits at the BCB amounting to as much as the shortfall from the targets.

9. Conclusion

Some lessons can be derived from the Brazilian experience in modernizing its payment system. First, in emerging market economies like Brazil, the central bank should play an important role in leading the redesign of the system. Second, there should be a distinction between short-term and long-term improvements in the payment system, since sometimes even a technological infraestructure is a prerequisite for the implementation of a RTGS system. Third, emerging economies need to evolve to an efficient payment system in order to promote the development of crucial areas, such as in securities settlement systems, which need of book-entry securities transfer to better functioning. The fourth is that the modernization in payment system should follow a plan defining user's needs, standards, project goals etc. Finally, co-operation among participants can be useful and can generate economies of scale such as in the Compe's case, where participants have shared the transportation cost of the documents.

18/ As of December 6, R$/USD=2.42.

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Annex 1

Annex I

Table 1 - Categories and Number of Institutions

Categories	1994	1995	1996	1997	1998	1999	2000
Commercial Banks	34	35	38	36	28	25	28
Universal Banks	210	205	192	179	173	168	163
Development Banks	6	6	6	6	6	5	5
Investment Banks	17	17	23	22	22	21	19
Subtotal	**267**	**263**	**259**	**243**	**229**	**219**	**215**
Credit Unions	946	980	956	1.015	1.088	1.183	1.235
Brokers' Associations	616	560	502	435	404	378	359
Saving and Loans Associations	29	25	24	24	23	19	18
Loan Companies	42	43	48	48	42	41	42
Leasing Companies	77	80	75	78	80	79	77
Total	**1.977**	**1.951**	**1.864**	**1.843**	**1.866**	**1.700**	**1.731**

Source: Banco Central do Brasil.

Annex I

Table 2 - Banking Structure

Commercial and	1994	1995	1996	1997	1998	1999	2000
Universal Banks							
Number of Branches 1/	18,297	17,798	16,686	16,383	16,06	16,2	16,4
Number of Other Outlets 1/	15,005	15,665	15,448	15,997	16,3	21,4	29,9
Total 1/	33,302	33,463	32,134	32,38	32,37	37,6	46,3
Number of Checking Accounts 2/	43	41	44	49	52	57	64

Source: Banco Central do Brasil.
1/ In thousand.
2/ In million.

Annex I

Table 3A - Payment Instruments - Cash and Checks: Selected Countries (1999)

Information	Belgium	Canada	France	Germany	Netherlands	Sweden	Switzerland	United Kingdom	United States
Number of Accounts per capita	1,3	n.a.	0,9	1	1,3	n.a.	n.a.	2,6	n.a.
Average check value (USD thousand)	1,22724	3,04527	0,48151	2,79447	0,07914	0,87977	1,40772	1,12471	1,22125
Volumes of checks per capita p. y.	7,9	55,9	81,7	7,2	1,7	0,5	0,9	47,98	248,99
Cash/GDP (%) 1/	5,1	3,8	3,3	6,6	4,6	4,9	8,1	2,9	5,6

Source: Committee on Payment and Settlement Systems, "Statistics on payment systems in the Group of Ten countries", March, 2001.
1/ Currency in circulation.
Obs: n.a. means not available.

Annex I

Table 3B - Payment Instruments - Cash and Checks: Brazil

Information	1993	1997	1998	1999	2000
Accounts per capita	0,3	0,3	0,3	0,4	0,4
Average check value (USD thousand)	0,3	0,6	0,6	0,3	0,3
Volumes of checks per capita p. y.	28,9	18,5	17,0	15,9	15,9
Cash/GDP (%) 1/	0,6	2,3	2,6	3,1	3,0

Source: Banco Central do Brasil.

1/ Currency in circulation.

Annex I

Table 4 - Brazil: Relative Importance of Some Cashless Payment Instruments 1/

Year		Payment Instruments				
		Cobrança 2/	Credit Cards	Checks	DOC	Total
1996	Volume	487,9	437,1	3.177,3	-	4.102,3
	(%)	11,9	10,7	77,5	-	100,0
	Value	1.324,0	25,4	2.529,0	-	3.878,5
	(%)	34,1	0,7	65,2	-	100,0
1997	Volume	512,6	516,7	2.943,9	44,2	4.017,4
	(%)	12,8	12,9	73,3	1,1	100,0
	Value	351,7	27,6	1.860,4	1.676,1	3.915,8
	(%)	9,0	0,7	47,5	42,8	100,0
1998	Volume	545,3	641,3	2.751,5	49,8	3.987,9
	(%)	13,7	16,1	69,0	1,2	100,0
	Value	367,3	27,6	1.797,4	2.031,7	4.224,0
	(%)	8,7	0,7	42,6	48,1	100,0
1999	Volume	565,6	770,0	2.612,1	58,6	4.006,3
	(%)	14,1	19,2	65,2	1,5	100,0
	Value	421,3	23,0	1.741,0	1.859,0	4.044,3
	(%)	10,4	0,6	43,0	46,0	100,0
2000	Volume	624,4	1.038,0	2.637,5	70,1	4.370,0
	(%)	14,3	23,8	60,4	1,6	100,0
	Value	514,6	27,5	1.805,8	1.390,5	3.738,4
	(%)	13,8	0,7	48,3	37,2	100,0

Source: Banco Central do Brasil.

1/ Volumes in million and values in USD billion.

2/ Until December/96, it includes *cobrança* and DOC.

Annex I

Table 5 - Specific Features and Statistics of E-money Products in Brazil

Name of system	VISA Cash
Type of system	Card-based
Number of issuers	13 banks
Loading procedures	ATM
Limit on card or consumer software (in USD)	45 up to 136
Transferability among end-users	No
Adapted for network payment	considered
Multi-currency features	No
Multi-functional payment features	yes
Number of cards issued (or home PC users)	95.000
Volume of daily (purchase) transactions	334
Value of daily (purchase) transactions (in USD)	1.236
Average value of (purchase) transactions (in USD)	3,70
Reporting period	December/96 to April/98
Launch date of product	October/96

Source: Issuers' banks.

Annex I

Table 6 - Brazil: Payment and Settlement Systems

Systems	Period	Number of direct participants	Transactions Daily Turn-Over [1/] USD billion	Daily Turn-Over Thousand of operations
Selic	Dec/2000	188	48,5	n.a
Cetip	Dec/2000	173	9,1	7,1
Compe	Dec/2000	157	8,1	13.328,0
Forex Transactions	Dec/2000	222	7,4	2,1
CBLC	Dec/2000	84	0,5	16,8
Corporate shares-securities processed				-
Derivatives-securities processed				0
Government securities- securities processed				0,0
Corporate shares-trades				-
Derivatives-trades				-
Government securities- trades				-
BM&F	Dec/2000	120	15,2	8,0
Commodities - trades				-
Financial - trades				-
Commodities - contracts				-
Financial - contracts				-
In domestic currency				
In foreign currency				
Total		944	112,0	13.362,0

Source: Banco Central do Brasil, Cetip, CBLC and BM&F.

Annex I

Table 7 - Financial Sector's Share on GDP

Year	% GDP
1990	17,68
1991	13,94
1992	25,49
1993	32,76
1994	15,90
1995	8,02
1996	6,91
1997	6,45
1998	6,55
1999	6,37
2000	5,39

Source: Instituto Brasileiro de Geografia e Estatística - IBGE.

Annex II

Central Bank Standing Facilities - Operational Conditions
Commercial Banks, Universal Banks and Savings and Loans Associations

Technical	Tenure	Underlying instrument	Purchase price	Buy-Back Price
Repurchase Agreement	one day	Treasury and Central Bank bill and notes registered at Selic.	Based on market prices.	purchase price plus interest accrued at Selic Rate + 6% p.y.
	up to 15 working days, rollover allowed up to 45 working days	Treasury and Central Bank bill and notes registered at Selic, credits and credit rights, preferably backed by real collateral, and other eligible assets at Central Bank discretion.	- Federal Securities registered at Selic: based on market prices. - other assets: may vary according to the type of assets.	purchase price plus interest accrued at Selic Rate + 4% p.y.
	up to 90 days, rollover allowed up to 180 days	Federal Securities registered at Selic, credits and credit rights, preferably backed by real collateral, and other eligible assets at Central Bank discretion.	may vary according to the type of assets.	purchase price plus interest accrued at Selic Rate + 2% p.y. Credit line offer is contingent on a sound financial restructuring plan presented by the institution.
Rediscount	up to 15 working days, rollover allowed up to 45 working days	private securities and credit rights which have already been discounted by the institution.	may vary according to the type of assets.	the rediscounted amount plus interest accrued at Selic Rate + 4% p.y.
	up to 90 days, rollover allowed up to 180 days	private securities and credit rights which have already been discounted by the institution.	may vary according to the type of assets.	the rediscounted amount plus interest accrued at Selic Rate + 2% p.y. Credit line offer is contingent on a sound financial restructuring plan presented by the institution.

1/ Established by the Resolution nº 2.685, dated on 01.26.2000 and the Circular nº 2.965, dated on 02.08.2000.