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The Brazilian Payment System: The Need for a Real Time Gross Settlement System

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I - Introduction:

The financial system is one of the most important inventions of modern society. Its primary aim is to move funds from people who save to people who borrow to buy goods and services and to make investments in new equipment and facilities so that the global economy can grow and increase the standard of living enjoyed by citizens.

The great importance of the financial system can be illustrated by reviewing its different functions. The financial system in a modern economy has seven basic functions:

- **Savings function** - providing a potentially profitable, low-risk outlet for the public's savings;
- **Wealth function** - providing a means to store purchasing power until needed for future spending on goods and services;
- **Liquidity function** - providing a means of raising funds by converting securities and other financial assets into cash balance;
- **Credit function** - providing a supply of credit to support both consumption and investment spending in the economy;
- **Payments function** - providing a mechanism for making payments to purchase goods and services;
- **Risk function** - providing a means to protect businesses, consumers and governments against risk to people, property and income;
- **Policy function** - providing a channel for government policy to achieve society's goals of high employment, low inflation, sustainable economic growth, and other social objectives.

An efficient system is essential in any economy and determines, to some extent, its growth. Over the last two decades, central banks have tended to play a more important role in payment systems. There are several reasons for this changes. The most important are:

- rapid technological changes;
- growth of financial activity and consequent growth in volumes and values of payment transactions; and
- the integration (globalization) of financial markets.

The objective of this paper is to describe the main characteristics of the Brazilian payment system in terms of its payment instruments and organization, focusing on the role of the Central Bank of Brazil (BCB) to promote its stability and efficiency.

II - The Structure of the Brazilian Financial Sector:

Regulation and Supervision Entities:

- C M N National Monetary Council:
- **BCB - Central Bank of Brazil**
- CVM - Securities and Exchange Commission

- SUSEP - Private Insurance Superintendency
- SPC - Complementary Pension Secretariat

Supervised Institutions (each followed by its supervisory entity):

- Financial institutions that receive demand deposits:
 - Multiple or universal banks with a commercial bank portfolio - **BCB**
 - Commercial Banks - **BCB**
 - Savings banks - **BCB**
 - Credit cooperatives - **BCB**
 - Other financial institutions:
 - Multiple or universal banks without a commercial bank portfolio - **BCB**
 - Investment banks - **BCB** and CVM
 - Development banks - **BCB**
 - Consumer finance companies - **BCB**
 - Savings and loan companies - **BCB**
 - Mortgage companies - **BCB**
 - Savings and loan associations - **BCB**
 - Other financial intermediaries or auxiliaries:
 - Commodities and futures exchanges - **BCB** and CVM
 - Stock exchange - CVM
 - Securities brokers - **BCB** and CVM
 - Securities dealers - **BCB** and CVM
 - Leasing companies - **BCB**
 - Exchange brokerage companies - **BCB**
 - Independent agents for investments - **BCB** and CVM
 - Insurance and pension entities:
 - Private closed pension funds - SPC
 - Private open pension funds - SUSEP
 - Insurance companies - SUSEP
 - Capitalization companies - SUSEP

- Health insurance management companies - SUSEP
- Portfolio management entities:
- Mutual investment funds - **BCB** and CVM
- Investment clubs - CVM
- Foreign investors portfolios - **BCB** and CVM
- Consortium managers for self-acquisition of durable consumer goods and services - **BCB**
- Liquidation and clearing systems:
- SELIC: Special system for liquidation and custody of government bonds - **BCB**
- CETIP: Center for the custody and financial liquidation of private issues - **BCB**
- Stock exchange clearing system - CVM

TOTAL ASSETS AND NET WORTH OF FINANCIAL INSTITUTIONS

Values in US\$ thousands

	Dec-88			Jun-94			May-98		
	Value	%	Qt.	Value	%	Qt.	Value	%	Qt.
<u>MULTIPLE BANKS</u>			5			209			175
TOTAL ASSETS	22.781.044	7,9		186.107.169	47,1		339.124.729	48,1	
NET WORTH	2.540.553	10,2		18.399.530	43,1		32.499.309	50,6	
<u>COMMERCIAL BANKS</u>			98			35			32
TOTAL ASSETS	130.479.828	45,4		91.763.934	23,2		134.600.060	19,1	
NET WORTH	10.632.530	42,7		7.909.717	18,5		7.748.863	12,1	
<u>DEVELOPMENT BANKS</u>			13			9			9
TOTAL ASSETS	28.802.859	10,0		30.228.096	7,6		56.754.383	8,1	
NET WORTH	4.709.790	18,9		9.342.186	21,9		9.671.394	15,0	
<u>INVESTMENT BANKS</u>			49			17			22
TOTAL ASSETS	12.045.037	4,2		11.975.610	3,0		9.529.176	1,4	
NET WORTH	1.966.307	7,9		1.466.486	3,4		1.579.881	2,5	
<u>CONSUMER FINANCE COMPANIES</u>			102			42			50
TOTAL ASSETS	2.603.253	0,9		1.386.177	0,4		3.394.717	0,5	
NET WORTH	974.807	3,9		395.727	0,9		718.362	1,1	
<u>LEASING COMPANIES</u>			54			72			83
TOTAL ASSETS	3.298.983	1,1		8.782.125	2,2		33.955.489	4,8	
NET WORTH	585.624	2,3		1.709.506	4,0		3.927.727	6,1	
<u>BROKERAGE COMPANIES</u>			259			288			231
TOTAL ASSETS	11.925.394	4,2		8.976.950	2,3		9.525.438	1,4	
NET WORTH	642.862	2,6		1.113.321	2,6		1.972.172	3,1	
<u>DEALER COMPANIES</u>			419			376			229
TOTAL ASSETS	13.716.761	4,8		9.623.614	2,4		13.296.503	1,9	
NET WORTH	532.183	2,1		552.311	1,3		803.714	1,3	
<u>CREDIT COMPANIES</u>			55			24			22
TOTAL ASSETS	14.156.683	4,9		4.134.838	1,0		8.205.243	1,2	
NET WORTH	636.53	2,6		569.069	1,3		963.585	1,5	
<u>SAVING BANKS</u>			6			2			2
TOTAL ASSETS	47.240.904	16,5		41.923.292	10,6		93.522.657	13,3	
NET WORTH	1.680.317	6,7		1.115.120	2,6		3.690.261	5,7	
<u>CREDIT UNIONS</u>			598			912			1.167
TOTAL ASSETS	100.549	0,0		394.891	0,1		2.606.297	0,4	
NET WORTH	26.628	0,1		159.497	0,4		708.525	1,1	
Total Quantity			1.658			1.986			2.022
Balance of Total Assets	287.151.295	100,0		395.296.695	100,0		704.514.693	100,0	
Overall Balance of Net Worth	24.928.131	100,0		42.732.468	100,0		64.283.795	100,0	

**TOTAL ASSETS AND NET WORTH OF MUTUAL FUNDS AND CONSORTIUM
MANAGEMENT COMPANIES**

Values in US\$ thousands

	Dec-91			Jun-94			May-98		
	Value	%	Qt.	Value	%	Qt.	Value	%	Qt.
MUTUAL FUNDS			394			955			2.726
TOTAL ASSETS	12.173.624	92,0		38.669.376	97,5		189.801.647	99,1	
NET WORTH	11.814.682	94,5		35.094.964	97,9		172.979.876	99,4	
CONSORTIUM MANAGEMENT COMPANIES			522			469			403
TOTAL ASSETS	1.055.780	8,0		982.109	2,5		1.660.868	0,9	
NET WORTH	691.767	5,5		739.752	2,1		997.908	0,6	
Total Quantity			916			1.424			3.129
Balance of Total Assets	13.229.404	100,0		39.651.485	100,0		191.462.515	100,0	
Overall Balance of Net Worth	12.506.449	100,0		35.834.716	100,0		173.977.784	100,0	

III - Payment Instruments and Networks:

The key feature of a payment system is the way payments are effected. The principal payment instruments used in Brazil are cash, checks, collection orders, and Documents of Credit - DOCs. Networks include direct deposit and direct debit services, ATMs, credit cards, and home banking services:

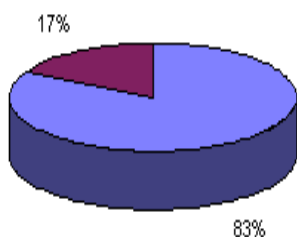
Cash:

As with developing countries, cash remains a significant part of the payment system, especially in the consumer sector. Because the central bank does not have an extensive branch network, the Banco do Brasil provides coin and currency delivery and collections for the country's banks. Settlement for coin and currency activities are made on a same-day basis through the reserves maintained at the central bank. The central bank does not verify the adequacy of reserves before currency shipments are made.

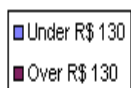
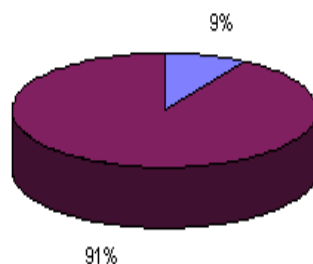
Checks:

Checks are the most widely used payment instrument in Brazil, and are used as a means of making immediate payment and as a form of credit. Small value checks (less than R\$130) represent a large percentage of the total volume of checks cleared but only a small one of the value.

Volume of Checks in June/98



Value of Checks in June/98



During the period of hyperinflation, savings were very limited. Consumers had incentive to consume rapidly before inflation raised the price of goods and services. Because of limited availability of consumer credit through the banking system, retail merchants would often let clients buy goods on time by letting them pay for items with a series of three to four checks, all but one of which were postdated. The merchant would submit each of the postdated checks for collection on the agreed upon date (usually monthly to coincide with receipt of the consumers payroll payment). This practice was not limited to high ticket items, but was used for purchases as small as R\$20.

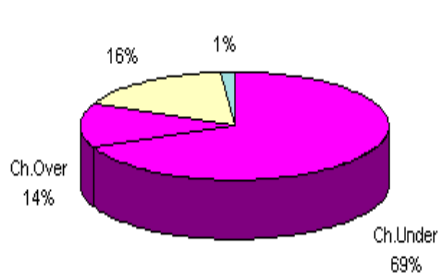
Collection Orders ("Bloquetos"):

Collection Orders, called "Bloquetos", are barcoded remittance documents used to make bill payments, and are handled much like European GIRO payments. A client receiving a "bloqueto" (bill for goods or services) takes it to a bank and pays cash or writes a check to authorize payment through his/her account. Banks charge the payee a fee. The collecting bank captures the bar code information, key in the amount, and clear the item electronically.

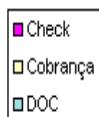
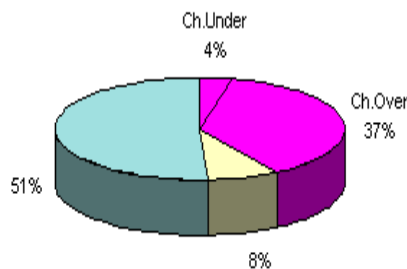
DOC:

A Document of Credit or DOC is used to make interbank credit payments; intrabank transfers of funds between different accounts of a client, and client payments when accounts are kept at the same banking institution by both parties to a transfer. All DOCs are electronic and are processed only by banks, although they can be initiated in paper form by a client. That is, in either case, they are truncated locally and cleared and settled electronically through the national clearinghouse.

Volume in June/98



Value in June/98



Direct deposit and direct debit services:

Direct deposit and direct debit services exist in Brazil, although not on an interbank basis. Both the paying and receiving parties must have accounts at the same bank. To facilitate bill paying, utility companies often maintain accounts at several major banks.

ATMs, debit cards and electronic checks:

Competition for ATM transactions is fierce in Brazil, and all of the major banks operate their own ATM networks, with as many as 600 ATMs not shared with other banks. Shared ATM networks do exist, but are used largely by the smaller banks participating in the network. The state-owned banks also have a network that is shared only by state owned banks. The reliance on proprietary ATM networks would appear to be expensive for the banks to maintain, and reduces the level of client convenience. About 11,000 ATMs are available 14 hours per day, 55,000 cash dispensing machines at supermarkets and additional 53,000 serving machines are available at bank branches. A large percentage of banking services (as high as 50 percent for the larger banks) are provided on a self-service basis. Debit cards (with PIN) offer online or next-day electronic check services.

Credit cards:

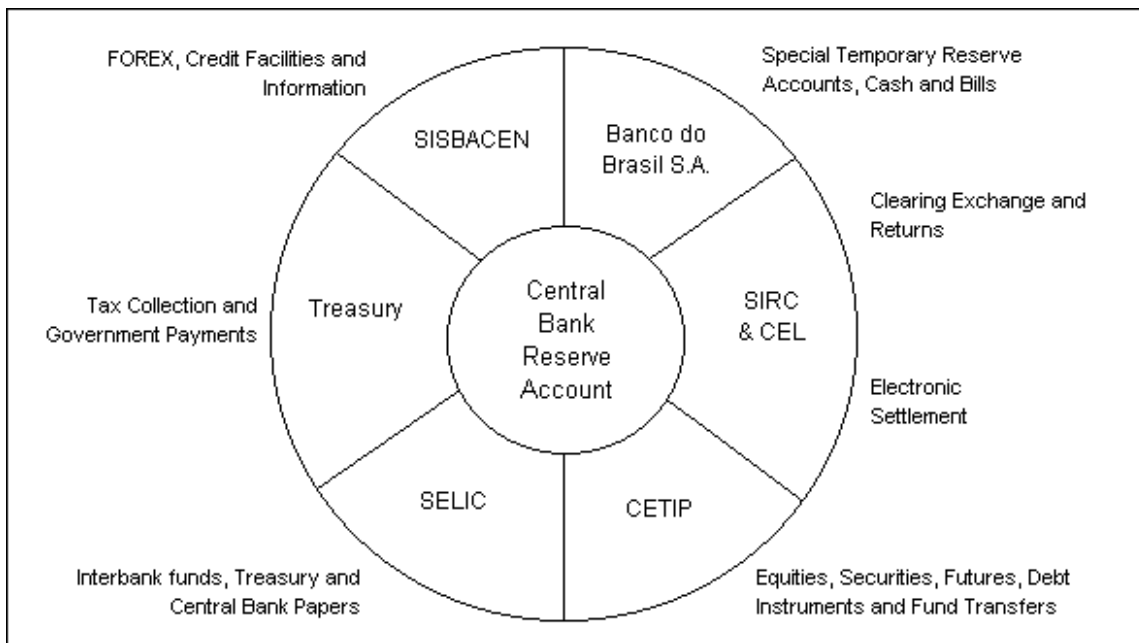
Credit card use in Brazil is low but growing. Because of the historically high levels of inflation, merchants received deep discounts on their credit card merchant deposits to allow for the float associated with the monthly billing cycle, and were thus reluctant to accept payment by credit card. With the reduction in inflation, credit card payments are becoming more acceptable. Debit cards (with PIN) offer online or next-day electronic check services.

Home banking services:

Brazil's major private banks are very sophisticated in their home banking service offerings. Many target the nation's affluent consumer class, recognizing that members of this class are often both technologically literate and concerned about managing their financial position. Several banks offer products such as home banking via a personal computer and the number of subscribers (580,000 clients) and the level of subscriber usage appear to be growing rapidly. Many banks are still test marketing such products, however, and do not currently attempt to recover the cost of the product through service charges. Payments initiated through home or telephone banking are processed electronically on an interbank basis (e.g., through a DOC). Phone banking is also widely used as 63 percent of bank branches offer this service to over 23 million clients.

IV - The Organization of Brazil's Payment System:

Brazil's payment system includes several different systems and institutions. The system is highly automated, with separate systems for clearing and settling checks and credit payments (clearinghouses), government securities (SELIC), private securities, state, local and municipal securities (CETIP), government payments, and foreign exchange.



Central Bank:

The Central Bank of Brazil serves two principal functions in the payment system. By law, the central bank has regulatory authority over the payment system, and is responsible for all regulations and standards for payment systems. The central bank also provides interbank settlement services for all payment activity in the country, since, banks in Brazil are precluded by law from holding (correspondent) balances with each other. The central bank also sets the fees for electronic clearing and currency deliveries, and has the authority to approve other clearinghouse fees.

Each bank maintains a single reserve account at the central head office in Brasilia, where about 240 such accounts are maintained. Reserve requirements are high (currently 83 percent of demand deposits and 20 percent on other deposits) as are penalties for reserve deficiencies so that reserve deficiencies are rare.

In certain cases banks are permitted to hold a voluntary account with Banco do Brasil. Funds in this account count toward reserve requirements, and can be used only for currency and coin transactions.

The central bank does not make the market for foreign exchange, nor is it involved in the settlement of the foreign currency leg (generally U.S. dollars). It does settle the domestic currency leg of foreign exchange transactions on behalf of Brazilian banks, and conducts foreign exchange transactions on its own behalf..

Banco do Brasil:

Because the central bank does not have an extensive branch network, Banco do Brasil provides coin and currency delivery and collecting to the country's banks. Settlement for coin and currency activity are made on a same-day basis through the reserves maintained at the central bank. The central bank does not verify the adequacy of reserves before currency shipments are made.

Banco do Brasil, a state-owned commercial bank, is authorized by law to operate the clearinghouses, and thus serves as the primary operator of the nation's payment system. Since 1969 Banco do Brasil has been operating the Regional Integrated Clearing System for checks (SIRC). Over the years, the bank has expanded the type of payment instruments cleared, expanding into "bloquetos" and DOCs in the 1970s, fostered the integration of the check clearing system with the introduction of the National Clearing System (CNC) in 1983, and promoted increasing automation of the clearing operation with the Electronic Clearing (CEL) in 1988 and more recently with the electronic DOC.

Commercial banks receive an interim report from Banco do Brasil with the partial result of the clearing, as well as a final report at the closing of the clearing cycle, informing them of changes in the balances of their reserve accounts at the central bank (which can be checked on line through SISBACEN). The aim is to achieve an automated closing of the clearing involving exchange of documents (FAC) as well as the electronic clearing being tried in São Paulo (FACEL) in order to increase the speed, simplify the process, avoid inconsistencies and mistakes. Banco do Brasil maintains a unique centralized reserve account at the central bank in Brasília and sends the information for final posting of these accounts.

SIRC and CEL:

The net settlement position for each clearinghouse is computed by Banco do Brasil. Brazil's clearinghouse network is made up of four types of clearinghouses:

- a. 345 local clearinghouses with "normal access", meaning that they can communicate with their respective state capitals within two days or less;
- b. 157 local clearinghouses with "difficult access", or 4.3 percent of the municipalities in Brazil, meaning that they require more than 2 days to send their clearing documents to the state capital;
- c. 84 integrated regional clearinghouses (SIRC), which centralize the processing of clearing documents of 3,289 other cities and towns; and
- d. a national clearinghouse in São Paulo (with Rio de Janeiro as back up).

All banks must be represented at the national clearinghouse either directly (in the case of the 46 largest banks by volume of documents cleared) or indirectly (represented by a participating bank or one of the four banking associations). Banco do Brasil is also represented at the national clearinghouse, for a total of 51 seats representing the 240 banks in the system. Settlement for clearinghouses activity is made on a multilateral net basis through the reserves held at the central bank. The national clearinghouse in São Paulo provides clearing and settlement services for all nonlocal /regional checks and for all collection bloquitos and DOCs.

Both the regional (local and SIRC) and national clearinghouses have two daily exchanges for clearing documents. The first session deals with the physical exchange of documents (listing number and amounts) and/or electronic information (for noncheck payment instruments) among participating banks; the second session deals with returned documents. The sending bank is entirely responsible for the accuracy of the information delivered to the payer bank through the operator.

The primary clearing operates between 5:30 p.m. and 11:00 p.m. for high value checks deposited that day. These items are settled on a net basis in next day funds (t+1). The second exchange occurs between about 11:00 a.m. and noon, and processes low value checks from the previous day. This settlement is made on a net basis in same day funds with next day finality. Returned items can be exchanged during either of the daily or evening exchanges. DOCs and "bloquitos" are exchanged only during the night session.

The "clearing cycle" starts with the clearing session in the evening and the evening session for returned items. The combined result (partial clearing) amended by the daylight special clearing session (for checks under R\$ 130) and the daylight session for returned items completes the cycle, yielding the final clearing balance for each participant (DRC), which will affect its reserve account at the central bank

Checks are exchanged and cleared locally when both the bank of first deposit and the paying bank have a branch within the local clearing area, regardless of the location of the branch of the paying bank on which the check is drawn. If both the depositing and the paying banks are in the same local clearing area, the checks are exchanged and settled on a net basis through the banks' reserve accounts. It is then the responsibility of the paying bank to get the check to the branch on which the check is drawn for signature verification purposes. The settlement for the item will be next day for all local items, but the returned item deadline-and hence the hold put on the

depositing client's funds-will depend on the distance between the point of deposit and the check writer's branch. The typical deadlines for returned items are next day for local items and three to six days for nonlocal items.

If the depositing and paying banks do not have branches in the same local clearing area, the checks are sent to the nearest regional clearinghouse. If both banks have branches there, the checks are exchange and settlement takes place the next day, as with local items. If the paying bank does not have an office in the regional clearing area (SIRC), the checks drawn on that bank are sent to the national clearinghouse in São Paulo. There, all banks must participate in the clearing. Hence for the São Paulo area, all checks are local and settled next day. As with locally cleared items, checks drawn on branches outside of São Paulo will have returned item deadlines and holds on client accounts based upon the time it takes to return the check to the paying branch for signature verification (typically three to six days).

Each clearinghouse computes its own net settlement and each settlement is transmitted to the national clearinghouse, which computes a single nationwide net settlement for transmission to the central bank for posting to the reserve accounts.

SELIC:

The Special System of Custody and Liquidation of Federal Securities (SELIC) is an electronic system controlled and operated by the central bank of Brazil to register transactions and maintain in book-entry form federal bonds and bills issued by the Treasury and the central bank. It also registers transactions in securities issued by state and local governments. SELIC settles on a **same-day** net basis through the central bank. The electronic system keeps the record of purchases and sales and the inventory of securities under the name of each of the 240 banks and 1,000 nonbank financial institutions linked to the system and enables same day settlement of transactions through the reserve accounts of the central bank. Since intermediaries have on average 10 to 15 accounts, SELIC handles over 4,500 client accounts. All securities were dematerialized in 1977, when SELIC recalled all paper-based securities, reissuing them in electronic form.

The SELIC system operates from 9:00 a.m. to 6:30 p.m. daily, recording about 10,000 transactions, worth about R\$70 billion, each day. SELIC also keeps track of interest and redemption payments and public offerings, and updates the respective reserve accounts of the participating financial institutions at the end of the day. A significant concentration of transaction volume occurs at the end of the day. Settlement for SELIC transactions is made on a net basis at the end of the day. Only banks can participate in the settlement; nonbank direct participants must settle through a bank.

SELIC has three subsystems: the free movement subsystem, the special movement subsystem and the financial liquidation subsystem. Under the free movement subsystem normal transactions (buying, selling, and borrowing or lending of securities) are processed and the title to the securities transacted is updated on-line by the system. The special movement subsystem handles securities that are immobilized as a result of liens or guarantees offered pursuant to a legal or regulatory requirement, and includes securities kept as part of the banks' legal reserve requirements. These reserves are modified based on the liquidation by the central bank of the different reserve requirements calculated over a variety of deposits and loans collected or granted by banks at the end of each reserve period. The financial liquidation subsystem handles the transfer of funds among the banks' reserve accounts at the central bank resulting from the operations in the other two subsystems.

At the end of each day SELIC determines and reports to participants the net daily balance of the operations and the new starting position of each institution (Final Financial Position Report). SELIC also reports to each institution the record of transactions of the custodian bank (the net securities position, reflecting the algebraic sum of operations processed on their own account), as well as the account of transactions processed on behalf of clients and subcustodian banks. SELIC does not have intraday overdraft monitoring and control capabilities.

In 1993, the central bank authorized commercial banks, multiple service banks with commercial portfolios, and savings banks to register through SELIC interbank transactions affecting their reserve positions at the central bank with same day settlement (next day finality), without a corresponding movement in their securities position (although most interbank transactions are collateralized). These money market operations are known as

interbank deposits. The minimum term for such deposits is 1 day on preset operations and ninety days on postset operations.

SELIC users include primary issuers of securities (the national Treasury, the central bank and state and local governments) and all participants in the secondary market (the central bank; commercial, multiple service, investment, development, and savings banks; credit, finance, and investment institutions; leasing companies; mortgage companies and mutual funds; and any other entities authorized by the central bank to operate in the market).

In the event of technical failure, SELIC can use CETIP as a backup (for capacity reasons SELIC cannot backup CETIP).

CETIP:

Central Custody and Financial Clearing of Securities (CETIP), a private securities trading and transfer system, was launched in 1986. The system is operated as a nonprofit organization by its 747 owners, which include most banking and nonbanking financial institutions in Brazil. It is subject to supervision by the central bank. CETIP handles transactions of more than 1,200 participants, processing about 20,000 transactions worth about R\$53 billion a day. It also handles more than 120,000 request for information daily.

CETIP centers around three integrated modules: custody (in electronic book-entry form), trading (with buyers and sellers keying their operations into the system for crosschecking and confirmation purposes) and financial clearing (through a clearing bank designated by each participant).

Membership in the CETIP is open to all financial institutions authorized by the central bank. In addition to the Rio head office CETIP has three other branches (São Paulo, Belo Horizonte and Porto Alegre). Its hours of operation are from 8:30 a.m. to 8:00 p.m., with the clearing information sent to the central bank in electronic form at 11:00 p.m. to debit/credit banks' next day reserves. In case of failure by one of the participants there is an unwinding procedure for transactions undertaken on the participant's own account (transactions on behalf of clients are final). Delivery versus payment (DVP) is achieved in (t+1) when final settlement takes place. Securities lending is not allowed (i.e., no free transfer of securities). As in SELIC's case, CETIP does not have intraday monitoring and control capabilities.

CETIP is used to buy and sell state and municipal debt, corporate bonds, and bank certificates of deposits (CDs), gold transactions, posting of debentures, foreign exchange transactions, mortgages, and to transfer reserves in next day funds for the settlement of stock exchange and commodities and futures exchange transactions. All CETIP securities are held in book-entry form and require confirmation of the transaction from both the buyer and the seller.

Treasury:

With the adoption in 1987 of a new integrated system of financial administration of the funds of the federal government (SIAFI) and the adoption of a single consolidated Treasury account at the central bank (at the end of 1988), the operations of the government were significantly centralized and streamlined. The accounting information flows through the SIAFI to over 5,000 administrative units of the government linked to a computer network through which the appropriations made by the Treasury to the ministries are allocated and sent. When these units need to make payments they issue "banking orders" through the agency of Banco do Brasil, where they keep their accounts. The consolidated information is transmitted by Banco do Brasil to the Central Bank, which debits the single Treasury account and credits the funds to Banco do Brasil, which transfers the money to the agency where the administrative unit making the payment has its account. The administrative units then make their payments. Taxes paid at bank branches are sent to the bank's head office to be transferred to the central bank, which credits the Treasury account.

SISBACEN:

The information System of the Central Bank (SISBACEN) provides 24-hour a day access to a vast amount of information produced by the central bank. The system has about 60,000 authorized users, including all units of the central bank, 1,118 financial institutions, and 183 government agencies. The main subsystems include over 500 databases, including central bank directives, general information, exchange rates, interest rates, and economic data. SISBACEN integrated to other domestic (including SELIC, CETIP, SIAFI, SERPRO, and SISCOMEX), and international (SWIFT) networks. SISBACEN is also used for foreign exchange trading.

V - Brazilian Payment System Needs:

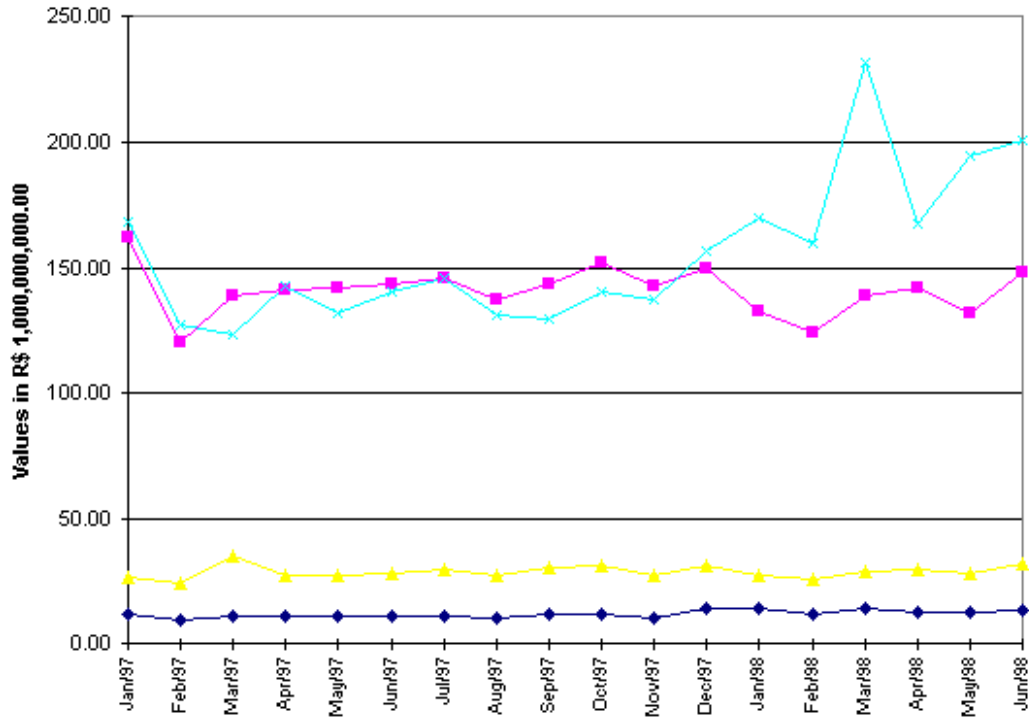
Payment systems are a key part of the infrastructure supporting economic activity. Without an efficient method of exchanging payment, commercial activity would be severely constrained. On the other side, problems in individual financial institutions may well first be manifested in the payment system. The payment system can then transmit this instability from one institution to another. Good payment system design can contain these effects but bad payment systems design can exacerbate them. So central banks have an interest in payment system design to reduce the risk of a domino effect, i.e., one bank failure causing other failures.

Instrument	Clearing System	Settlement Timing	Settlement Mechanism
Check	Clearinghouse	next day	Net Settlement
"Bloqueto"	Clearinghouse	next day	Net Settlement
DOC	Clearinghouse	next day	Net Settlement
Central Bank Paper	SELIC	same day	End of day net
Treasury Paper	SELIC	same day	End of day net
State Government Paper	CETIP/SELIC	next day	End of day net
Municipal Government Paper	CETIP/SELIC	next day	End of day net
Corporate Bonds	CETIP	next day	End of day net
Bank CDs	CETIP	next day	End of day net
Foreign Exchange	SISBACEN (reais), Fedwire and CHIPS (US\$)	t + 2	Gross Settlement
Equities	CETIP	t + 4	Net Settlement
Future and Derivatives	CETIP	t + 4	Net Settlement

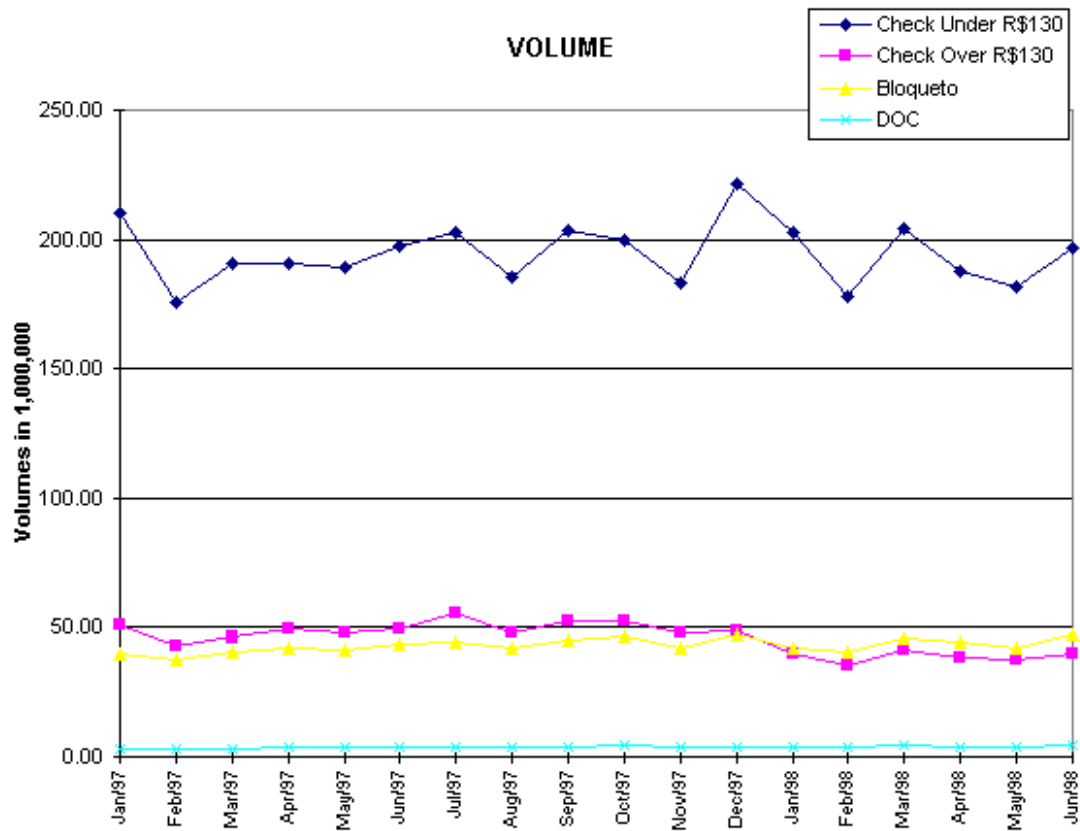
The table above resumes the Brazilian payment and settlement system, describing the clearing system, settlement timing and settlement mechanism of each payment instrument.

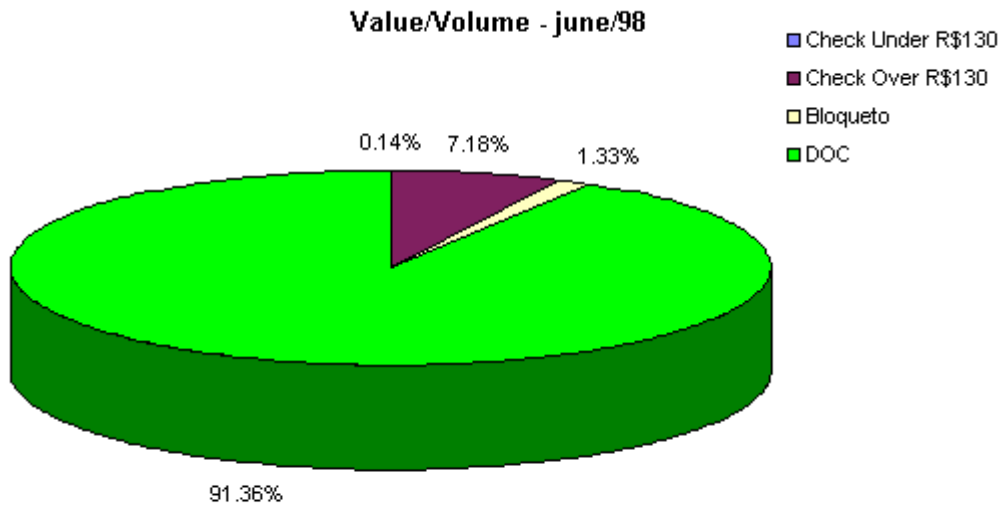
The following Figures show each amount (value and volume) of the documents that are processed in the Brazilian clearinghouses. They also show the proportion between the value and the volume of each payment type.

VALUE



VOLUME





The DOCs are easily identified as the "best mechanism" the Brazilian financial market found to settle its large-value transactions. They represent a very small volume of transactions but with a very large value associated to them. And, as it is shown in the table, these transactions are electronically made but, as well as the high value checks, are settled on a net basis in next day funds (t+1).

During the past ten years a number of countries have decided to introduce Real-Time Gross Settlement (RTGS) Systems for large-value interbank funds transfers. In the Group of Ten (G-10), all countries are now using RTGS systems, once Canada has recently started its operation. Moreover, the central banks of the European Union have collectively decided that every EU member state should have an RTGS system for large-value transfers and that these domestic RTGS systems should be linked together to form a pan-EU RTGS system (the TARGET system) in order to support stage three of economic and monetary union.

The use of RTGS is also growing outside those groups. For example, RTGS systems are already in operation in the Czech Republic, Hong Kong, Korea and Thailand, and it is reported that, among others, Australia, China, New Zealand and Saudi Arabia will introduce RTGS systems in the near future. The question is: why not Brazil? The data prove the need and the rapid advances in information technology increase the possibility of a real-time payment processing.

VI - Large-Value Transfer Systems:

The safe and efficient operation of large-value transfer systems has a bearing not only on the markets they directly serve but on a nation's whole financial system. In addition, large-value transfer systems have an international role to play, as they, in combination, provide the ultimate settlement vehicle for important cross-border markets in multiple currencies. The international goods and financial markets depend critically on national large-value transfer systems to settle obligations in the currencies in which trading is conducted.

For these reasons, the design and operation of large-value transfer systems are major concerns for policymakers and banking practitioners. In developed market economies, attention has recently been focused on strengthening these systems. Establishing at least a rudimentary large-value payment capability is a priority in developing market economies because it is needed to support emerging financial markets and will help to create conditions for improved execution of monetary policy by the central bank.

Different payment mechanisms can be distinguished by the businesses they support and the clients they serve, as reflected in the value of the payments processed. As a result of the wide variation in the value of payments, payment mechanisms have become quite highly specialized.

In general, the interbank, securities, and business-to-business, or wholesale markets, give rise to payments whose large size and critical timing place them in the category of large-value payments. Participants in these markets naturally seek bank payment services and payment mechanisms that can meet their needs for reliability, security, accuracy, and timeliness. To meet these needs, specialized large-value transfer systems have evolved.

Models of Large-Value Transfer Systems:

Three general models of large-value transfer systems will be exemplified here. The distinctions among them are related to the following characteristics:

1. operator of the system: the central bank or a private organization such as a clearinghouse;
1. type of settlement: gross or net; and
1. credit facilities: whether the system provides intraday credit and whether operational controls are in place to help manage such credit extensions.

The first general model of a large-value transfers system is a gross settlement system operated by the central bank without intraday credit (loans that have a duration shorter than one business day; say, a few minutes or hours). In a gross settlement system operated by the central bank, agreement to honor a payment order when the funds in the account of the paying bank are insufficient to settle the payment results in an extension of credit. This is so regardless of whether the paying bank would fully fund the payment before the end of the business day, that is, repay the intraday loan. In the general model where the central bank does not agree to provide credit, a payment order will be honored only if funds are on deposit at the time the payment order is made. Otherwise, the payment order is returned to the originator (rejected) or held until covering funds become available during the day (pending or queued). This type of system implies real-time computer processing and operational controls that permit the central bank to prevent use of intraday credit. An example of such a system is the Swiss Interbank Clearing System.

The second general model of a large-value transfer system is a gross settlement system operated by the central bank with intraday credit. In this model, the central bank will honor payment orders during the day even if an ordering bank's account does not contain sufficient funds to settle the transfer. Intraday credit is generally provided with the expectation that the covering funds will be deposited in the account before the end of the business day. The central bank's willingness to extend intraday credit, however, is not unlimited. Financial and operational controls will be employed to govern the amount of intraday credit extended. An example of such a system is the Fedwire funds transfer system in the United States.

The third general model of a large-value transfer system is a deferred net settlement system. In such a system, settlement does not occur payment-by-payment, but at designated times during the day. Between-or at-designated settlement times, payments exchanged between banks are multilaterally netted, resulting in one net obligation for each net debtor bank that is due at settlement time.

Netting systems act to reduce, perhaps significantly, the intraday liquidity needed to settle large payments. In a netting system, these liquidity needs are met by the de facto extension of credit among participants in the system. However, this credit is extended by the originators and receivers of payments over the system, not by the operator of the system. Some deferred net settlement systems are operated by the central bank, whereas others are operated by the private sector. An example of the former type of system is BOJ-NET in Japan. An example of a privately operated system is CHIPS in the United States.

Swiss Interbank Clearing System (SIC):

SIC is the best example of a gross settlement system providing final settlement in central bank money without any extension of intraday credit whatsoever. From its inception in 1987, it was designed as a no-overdraft system. It operates on the principle that all payment orders will be processed only if they can be fully funded from a bank's account held at the Swiss National Bank. If funding is not available, the payment order will be

queued and held until covering funds become available, up to the end of the operating day. At the end of the operating day, payment orders in the queues are canceled

Numerical Example of Operation of Swiss Interbank Clearing System

Transaction	Payment Orders	Settlement Amounts	Current Account Balance	Unsettled Balance (Net Receipt)
Opening of business	-	-	10	0
1	Receive 20	Receive 20	30	0
2	Pay 30	Pay 30	0	0
3	Pay 10	0	0	-10
4	Receive 20	Receive 20	20	0
		Pay 10	10	0

The table is a simple numerical example of how SIC functions. Assume an opening of business balance in the account of the bank of 10 monetary units. Assume further that the first transaction of the day is the receipt of a payment order equal to 20 monetary units. Because SIC is a gross settlement system, the bank's current balance held at the Swiss National Bank is immediately increased to 30 monetary units. The second transaction is an order to pay 30. Because there are sufficient balances in the account at the Swiss National Bank, this payment order is accepted and settled immediately, reducing the current account balance with the Swiss National Bank to zero. The third transaction is an order to pay 10 monetary units. In the instance, the amount settled is zero, as the Swiss National Bank will not agree to process the transaction because there are insufficient funds in the account to settle the payment order. Instead, the transaction is placed in queue, resulting in an unsettled balance of minus 10. Finally, the fourth and last transaction of the operating day is the receipt of 20 monetary units. The receipt of 20 monetary units is settled immediately and results in a positive account balance of 20, which triggers release of the one payment order in the queue and elimination of the unsettled balance of 10. The end-of-day result of this activity is a current account balance of 10 and an unsettled balance of zero.

The SIC system is designed to process as many payment orders as possible following the principle "by priority level and first-in, first-out for a given priority level". The amount of funds held in the account of the originating institution must be sufficient to cover the payment that is at the head of the queue of unfunded payment orders, should such a queue exist. If there are unsettled balances outstanding at the end of the SIC business day, the payments in the queue will be purged, and the institution will be forced to resubmit the orders on the following day. An institution is, however, permitted to attach a priority to a payment order in its SIC queue.

One important feature of SIC is that the institution designated as the intended receiver is notified of the amount of pending receipts. Further notification is received when a payment order is settled. In the numerical example discussed above, therefore, the intended receiving institution is informed of the amount of the third transaction, an order to pay 10, at the time the order is made. Only after the fourth transaction of the day, however, does the receiving institution receive funds and notification that the payment order is settled. Perhaps as important, institutions can use a real-time inquiry feature to monitor the current status of all payment messages.

Fedwire:

Fedwire began in 1918 as a simple telegraph system that was used to transfer balances between accounts held at Federal Reserve Banks. Settlement is final when the Federal Reserve Bank holding the account of the originating institution agrees to process a payment order. The Federal Reserve permits daylight overdrafts over Fedwire, within limits. Institutions are expected to perform a self-assessment of their creditworthiness and

operational capabilities and to establish a Fedwire cap, which is based on a multiple of their tier 1 capital, if they have overdrafts that are large in relation to their capital.

In the numerical example illustrated in the next table, the opening of business balance held at the Federal Reserve Bank is again 10 monetary units. The first transaction is the receipt of a Fedwire transfer of 20 monetary units, which is immediately settled and reflected in the account balance at the Federal Reserve Bank, which is increased to 30. The second transaction of the Fedwire day is a payment order of 30, which draws the account balance down to zero.

Numerical Example of Operation of Fedwire Funds Transfer System¹

Transaction	Payment Orders	Settlement Amounts	Current Account Balance	Unsettled Balance (Net Receipt)
Opening of business	-	-	10	0
1	Receive 20	Receive 20	30	0
2	Pay 30	Pay 30	0	0
3	Pay 10	Pay 10	-10	0
4	Receive 20	Receive 20	10	0
5	Pay 25	0	10	-25
6	Receive 5		5	15

¹ Sender debit cap equals 12.

This example assumes that the originating bank's debit cap is 12 monetary units. Consequently, the third transaction of the day, which is a payment order of 10, is processed by the Federal Reserve and settled immediately, even though this payment order results in a negative account balance of minus 10. The cap is not binding because the amount of the payment order does not exceed the debit cap. By agreeing to process the payment order, the Federal Reserve essentially agrees to lend intraday funds to the bank originating the payment so that the transaction can be settled.

The fourth transaction of the day is the receipt of 20 monetary units, which rebuilds the account balance to 10 and extinguishes the intraday loan. The fifth transaction of the day is a payment order of 25. In this case, the positive current balance in the Federal Reserve Bank account (10 monetary units) combined with the institution's cap (12 monetary units) results in total capacity of 22 monetary units, an amount insufficient to settle the transaction, which is valued at 25 monetary units. Assuming, for the moment, that the Federal Reserve Bank monitors the institution in real time, the transaction will not be settled but will either be (a) rejected back to the sender or, (b) pending for subsequent processing once the account is funded. Because the payment order of 25 cannot be funded, unsettled balances in the system (assuming that the transaction is pending) equal minus 25 monetary units.

Finally, the Fedwire day ends with the sixth transaction, which is the receipt of 5 monetary units. The positive account balance increases to 15, which, combined with the cap, increases capacity to 27 monetary units, an amount sufficient to fund the pending transaction of 25 even though the result is a negative balance of minus 2. If the Fedwire day ends and the institution's balance is negative, as in this example, the implication is that the institution was unable to raise funds in the market to meet its Fedwire payment obligations for the day. The institution must then obtain a discount window loan from the Federal Reserve to bring its account into balance.

The Board of Governors of the Federal Reserve System has decided to price intraday overdrafts incurred by depository institutions using Fedwire. Pricing of intraday overdrafts is an extremely complex subject and raises a host of legal, operational, and monetary control issues. Pricing became effective in April 1994.

The operation of SIC and Fedwire highlights an important contrast between systems that do and do not provide credit. In particular, a "no-overdraft" system like SIC imposes tighter liquidity management constraints on banks than does Fedwire, through which the central bank provides intraday credit. Banks and other financial market participants that place a premium on timely settlement are likely to describe a no-overdraft system as being less efficient than a system like Fedwire, which permits intraday overdrafts. Their intraday credit needs cannot currently be efficiently met except through the payment mechanism they use. In short, the SIC system does not "lubricate" the payment system with intraday credit, and consequently many transactions are queued. In contrast, the Federal Reserve has historically been a generous provider of intraday credit over Fedwire, and Fedwire caps have historically not been binding.

Although Fedwire may be more efficient in terms of the timeliness of settlement for interbank transactions, this enhanced efficiency comes at a cost. The cost takes the form of the increased credit risk absorbed by the Federal Reserve in operating Fedwire. Moreover, because the abundant intraday credit has been provided free, banks have overused intraday overdrafts provided by the Federal Reserve, resulting in the absorption by the central bank of a certain amount of credit risk that should more appropriately be shouldered by the private sector.

BOJ-NET:

The Bank of Japan is somewhat special among central bank operators of large-value transfer systems because it supports two distinctively different system, both operating under the name BOJ-NET. On the one hand, BOJ-NET offers, like SIC, a gross real-time settlement service without intraday overdrafts. BOJ-NET is, however, different from SIC in that, if sufficient funds are not available in the account to settle the obligation, the payment order is automatically rejected, rather than queued.

The gross, real-time, no-overdraft service provided over BOJ-NET is not heavily used in comparison with the other services provided by the Bank of Japan. More heavily used by banks and other financial firms holding accounts at the Bank of Japan is the BOJ-NET designated-time net settlement system, which is estimated to handle 50 times the transfer volume that the gross real-time BOJ-NET system handles. The following table has a numerical example illustrating the operation of this system.

Numerical Example of Operations of BOJ-NET Designated-Time Net Settlement System

Transaction	Payment Orders	Settlement Amounts	Current Account Balance¹	Unsettled Balance (Net Receipt)
Opening of business	-	-	10	0
1	Receive 20	0	10	20
2	Pay 30	0	10	-10
3	Pay 10	0	10	-20
4	Receive 25	0	10	5
Designated settlement time		5	15	0

¹ Balance held in the settlement account at the Bank of Japan

Assume again that an institution, this time using the BOJ-NET designated-time settlement, has an opening of business balance in its account at the Bank of Japan of 10 monetary units. The first transaction of the day is the receipt of 20 monetary units and, because this is a designated-time system, the amount settled is zero - the

account balance remains unchanged at 10, and total unsettled balances increase from zero to 20 monetary units. Next, assume that a payment order valued at 30 is originated. Again, there are no changes in the account balance, there is no final settlement associated with the transaction, but the unsettled net balance of the institution in question falls to minus 10 monetary units. The process is repeated for a payment order of 10 with the unsettled net balance falling further to minus 20 monetary units. Finally, the last transaction before the designated time is the receipt of a payment valued at 25 monetary units, which increases the net unsettled balance to 5. Accordingly, at the designated settlement time, the total net amount to be settled for the institution is 5, which increases its balance in the settlement account of the Bank of Japan to 15, while unsettled balances fall to zero.

There are no formal procedures currently in place for the BOJ-NET designated-time net settlement system to address an institution's inability to meet its settlement obligation. The Bank of Japan has discretion to provide the institution in question with credit or to delete the institution's payment orders from the settlement. Although this room for discretion gives the central bank flexibility in forestalling systemic disruption of financial markets, it may invite moral hazard among participating institutions if central bank credits are expected to be granted easily.

Clearing House Interbank Payments System (CHIPS):

The Clearing House Interbank Payments System is operated by the New York Clearing House and processes primarily international payments. The last numerical example could apply to CHIPS, as CHIPS operates under a netting arrangement similar to the BOJ-NET designated-time net settlement system. CHIPS differs from BOJ-NET in that there is one end-of-day settlement, not a series of designated settlement times during the day. Moreover, CHIPS is a privately operated payment system in which final settlement is achieved by funds transfer on Fedwire. CHIPS operations are governed by a set of risk controls that have been adopted by its members. In particular, CHIPS participants have adopted a system of bilateral credit limits and sender net debit caps that limit both individual participant exposure and the entire system's vulnerability to credit risk.

Under CHIPS bilateral credit limits, each participant establishes the maximum net amount it is willing to receive from another participant and this limit is enforced automatically, in real time, by the CHIPS computer system. Further, there is a sender net debit cap in place that limits the amount that any one participant can owe to the entire CHIPS system. Each participant's sender net debit cap is equal to 5 percent of the sum of the bilateral credit limits established by each of its counterparties in CHIPS. Essentially, then, participants are able to limit their exposures bilaterally to participants they judge to be questionable financial condition and, in the process, the entire CHIPS system's exposure to that participant is limited.

All CHIPS participants agree to participate in a scheme for guaranteeing the daily settlement, if a participant with a large settlement obligation ever fails to meet that obligation. The settlement guarantee is combined with a loss-sharing arrangement to govern the distribution of the burden of funding a failure to settle among the members of CHIPS. CHIPS maintains significant liquidity to permit the mobilization of cash on very short notice to allow the system to settle in a timely fashion if a participant unexpectedly fails to meet its net debit obligation. The liquidity arrangements include a pool of U.S. Government securities collateral held in escrow at the Federal Reserve Bank of New York.

The next table is a profile of the four systems above described, which comprise SIC, Fedwire, BOJ-NET and CHIPS.

Summary Profile of Four Large-Value Transfer Systems

	Swiss Interbank Clearing System (SIC)	Fedwire	BOJ-NET Designated Time Net Settlement ¹	Clearing House Interbank Payment System (CHIPS)
Type of system	Gross settlement system without central bank credit	Gross settlement system with central bank credit	Multilateral net settlement system without central bank credit	Privately operated multilateral net settlement system
Year started	1987	1918	1988	1970
Governing body	Swiss National Bank	Federal Reserve System	Bank of Japan	New York Clearing House
Operating day ²	18:00 day <i>t</i> to 16:15 day <i>t+1</i>	0:30 to 18:30	9:00 to 17:00	7:00 to 16:30
Settlement time(s) ²	Continuous	Continuous	9:00; 13:00; 15:00; 17:00	Before 18:00
Type of participants	Banks	Banks	Banks, securities firms, and money market brokers	settling and nonsettling banks
When is payment settled finally and irrevocably on books of central bank?	When account of sending bank has been debited and account of receiving bank credited	When payment order is accepted for processing	As time designated by originating institution	By 18:00
What happens if there are not sufficient funds in originator's account at time of settlement?	Payment order is queued until sufficient funds have accumulated in sending participant's account	For institutions subject to real-time monitoring, account balance with Federal Reserve Bank is continuously monitored. If overdraft amount reaches a predefined cap, transaction is either rejected or pending until covering funds are received	Sending participant borrows from Bank of Japan, subject to regular lending policy. In theory, netting can be unwound.	Settlement is guaranteed against failure of largest net debtor defaulting on its obligation by participants in arrangements and a loss sharing procedure is in place to back up guarantee
Bilateral credit limits	None	None	None	Each participant determines maximum amount it is willing to receive from each other participant
Sender net debt caps	N/A	There is a limit to amount of daylight overdraft that is set as a multiple of capital according to a participant's self-assessment based on its creditworthiness and operational controls	None	There is a limit on what one participant may owe entire CHIPS system at any time of day equal to 5% of sum of bilateral limits assigned by other participants

¹ BOJ-NET also offers a gross real-time settlement capability without credit, which operates in a manner similar to SIC

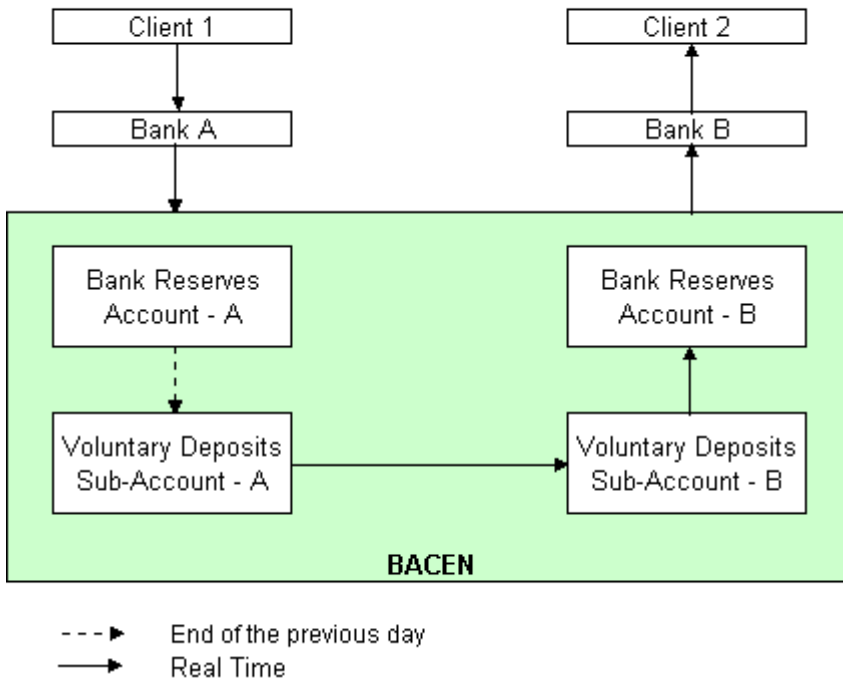
² All times are local times

VII - Study of a Brazilian RTGS System:

The Department of Banking Operations of the Central Bank of Brazil - DEBAN is developing a project to introduce a RTGS in Brazil called STER - Electronic Transfer of Reserves System, which mechanism is based on the development of a payment subsystem to transfer funds in real-time by voluntary deposits.

STER comprehends the creation of a sub-account from the Banking Reserves Account (BRA) where the transfers are allowed, always ordered by the title-holder of the sub-account, from this sub-account to its own BRA or to another same nature sub-account of another financial institution.

ELECTRONIC TRANSFER OF RESERVES SYSTEM - STER



The figure above describes the procedures to Client 1 make a same-day payment to Client 2. In the previous day of the transaction ($t-1$), Bank A has to provide its Voluntary Deposits Sub-Account (VDSA) with sufficient funds to support all the next day ($t+0$) operations, that execute the following steps:

Client 1 (current account at Bank A) makes a transfer to Client 2 (current account at Bank B):

1. Bank A debits the current account of Client 1;
2. Bank A debits its VDSA and credits the VDSA of Bank B;
3. Bank B debits its VDSA and credits its BRA;
4. Bank B credits the current account of Client 2.

The study has also defined some rules to prevent risk:

- the funds transfer from the BRA to the VDSA can be ordered between 5:30 pm and 7:30 pm, but the Bank Reserves System will process before all the entries commanded during the day, and after that will check the balance. The transfer will only be accepted by the system if the BRA could afford the debit;
- in case of a negative balance in the BRA, funds will be transferred automatically from the VDSA (until the limit of the VDSA balance), to cover or at least to reduce this negative balance;
- during the day, the debit transfers commanded in the VDSA will only be processed if the balance at that moment have the sufficient funds;
- the debit transfers, after processed, cannot be canceled.

The idea of the STER creation is extremely recent. The studies are still in a primary stage and there are too many aspects to be largely discussed before its implementation. Unfortunately, the financial crisis that has affected Asia, and more recently Brazil, has slowed down all this process. Nowadays, the efforts of the Brazilian Government are especially directed to recover the economy. However, the studies of the Central Bank in this area must continue, once the issue of ensuring an efficient mechanism for supporting economic activity is one of its main functions.

VIII - Conclusion:

Brazilian Payment System is highly efficient in terms of speed, reliability and client convenience. There are questions, however, about whether the risk control measures are adequate, given the high volumes and values of funds transferred through the payment system.

Despite the sophistication of its payment system, Brazil lacks a system that facilitates the intraday movement of funds between bank clients. SELIC operates in a same day settlement mode but is not a pure funds transfer system, as security ownership must be transferred along with the funds. Under certain circumstances CETIP will allow a pure funds transfer system, but CETIP transfers next day funds with two day finality, and DOCs, checks and "bloquetos" are all settled in next day funds. Also, DOCs were "elected" by the financial market as the best large-value transfer payment instrument.

Thus, the creation of an online real time funds transfer system is one of the goals that the Central Bank needs to achieve in the new future. Its efforts in this direction were slowed down by exogenous variables, but progress still continues to be made.

Finally, this paper expects to have achieved its objective of describing the Brazilian Payment System, seen by the central bank's perspective, and locating the more recent studies Central Bank is developing in the large-value transfers area in the context.

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