

## IV. FINANCIAL INFRASTRUCTURE

In the last twenty years, rapid technological progress, decrease in restrictions and globalization of financial markets have led to a rise in financial activities. These increasing financial activities have contributed to an increase in the volume and value of domestic and cross-border payments. The increasing number and value of transactions within the payment systems highlight the importance of these systems.

In this context, the existence of secure and efficient-functioning national payment systems is crucial as it relates to the monetary policy practices of central banks, financial stability and economic progress.

In the report on “Central Bank Oversight of Payment and Settlement Systems”, issued by the Committee on Payment and Settlement Systems (CPSS), BIS, it is noted that there are a number of payment and settlement systems operating safely and efficiently without the intervention of public sector. However, the report also emphasises that overseeing such systems is useful to mitigate the systemic risks arising from payment systems, to ensure coordination among the participants and to prevent monopolies regarding these systems.

This section presents the recent developments in the Turkish Interbank Clearing-Real Time Gross Settlement System(TIC-RTGS), through which real-time settlement of transactions in New Turkish Lira are realized; the Turkish Interbank Clearing-Electronic Securities Transfer and Settlement System (TIC-ESTS), which facilitates the dematerialized and real-time transfer and settlement of securities in electronic form; the cheque clearing system that enables clearing of cheques on accounts among banks and the card based payment system.

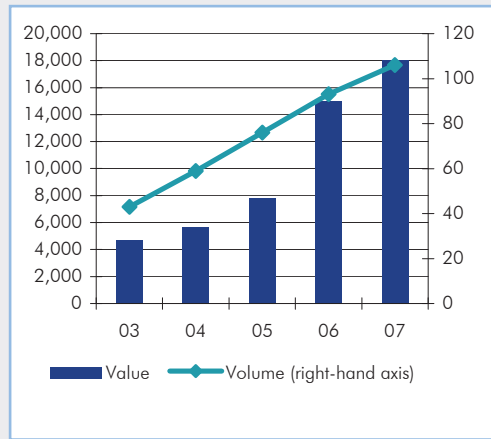
### IV.1. Turkish Interbank Clearing-Real Time Gross Settlement System (TIC-RTGS) and Electronic Securities Transfer and Settlement System (TIC-ESTS)

The TIC-RTGS, which is owned and operated by the CBRT, is considered a systemically important payment system because, being the only large-value interbank payment system as well as settling all other payment systems in Turkey, it processes an extremely high value of transactions.

The ETIC-ESTS, which works in an integrated manner with the TIC-RTGS, ensures the transfer and settlement of participants' securities. Transactions in the TIC-ESTS system are performed with the Delivery versus Payment (DvP) principle, in which the delivery of securities and settlement of payments are realized simultaneously.

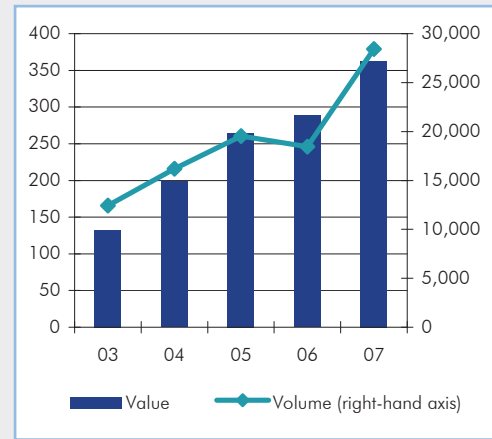
In Turkey, According to the "TIC-RTGS/ESTS Operating Rules" only the banks operating under the Banking Law No.5411 can participate in these systems.

**Chart IV.1**  
Volume and Value of TIC-RTGS Transactions  
(Billion YTL, Million)



Source: CBRT

**Chart IV.2**  
Volume and Value of DvPa<sup>1</sup> Transactions in  
TIC-ESTS (Billion YTL)



Source: CBRT  
(1) DvP: Delivery versus Payment

Transaction value of TIC-RTGS rose by 19.9 percent in 2007 compared to the previous year and reached YTL 18,041 billion. The number of TIC-RTGS transactions performed in 2007 increased by 13.9 percent compared to the previous year, reaching a total of 106 million (Chart IV.1).

In 2007, the value of DvP transactions through TIC-ESTS increased by 25.7 percent while the number of transactions mounted by 54.1 percent and reached YTL 363 billion and 28.4 thousand respectively (Chart IV.2).

Since there are no upper and lower limits for the value of transactions to be performed through TIC-RTGS, both large and small value payments are processed through it. Therefore, the number of TIC-RTGS transactions is higher than that of many European countries. As of 2007 the ratio of payment transactions of small amounts (below YTL 3,000) to the total number of transactions in TIC-RTGS was 77 percent. On the other hand, value of TIC-RTGS transactions to the GDP ratio reveals that Turkey is behind European countries. However, the value of TIC-RTGS transactions, which was 12.1 times the GDP in the previous year, reached 20 times the GDP in 2006 and continued to rise in 2007 reaching 21.1 times the GDP (Table IV.1). The financial markets in Turkey are not as developed as those in the countries compared, and this is considered to be one of the reasons why the value of TIC-RTGS transactions and the ratio of this value to the GDP are low compared to other countries.

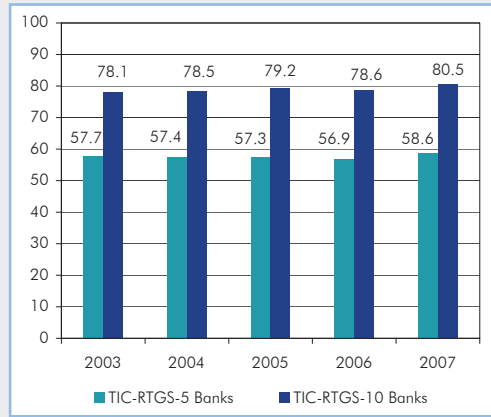
**Table IV.1**  
**Real Time Gross Settlement (RTGS) Systems-Country Comparison**

Country-Name of Paym. Sys.	2002	2003	2004	2005	2006
Belgium (ELLIPS)					
Transac. Volume (Million)	1.7	1.8	1.8	1.8	1.7
Transac. Value (Billion USD)	12,573	15,307	18,233	21,448	24,373
Transac. Value/GDP	49.9	49.4	50.6	57.2	61.4
France (TBF)					
Transac. Volume (Million)	3.8	3.9	4.0	4.3	4.6
Transac. Value (Billion USD)	86,003	108,750	134,697	151,425	169,587
Transac. Value/GDP	58.9	60.4	65.3	71.0	75.4
Netherlands (TOP)					
Transac. Volume (Million)	4.8	4.9	5.0	4.7	4.8
Transac. Value (Billion USD)	23,519	29,669	36,878	38,126	40,146
Transac. Value/GDP	53.7	55.1	60.5	60.3	59.9
Germany (RTGS-Plus)					
Transac. Volume (Million)	31.9	32.8	34.1	35.8	37.9
Transac. Value (Billion USD)	117,616	145,123	157,005	172,023	189,140
Transac. Value/GDP	58.2	59.4	57.2	61.7	64.9
Switzerland (SIC)					
Transac. Volume (Million)	177.0	192.7	209.1	256.4	317.1
Transac. Value (Billion USD)	28,767	33,202	33,762	32,956	35,781
Transac. Value/GDP	103.1	102.2	93.0	88.6	92.2
TARGET					
Transac. Volume (Million)	64.5	66.8	69.4	76.3	83.3
Transac. Value (Billion USD)	373,434	478,474	558,091	613,614	676,602
CLS					
Transac. Volume (Million)	1.7	19.3	32.6	47.9	61.5
Transac. Value (Billion USD)	23,790	220,574	379,506	545,838	714,320
Turkey (EFT)					
Transac. Volume (Million)	33.9	43.0	58.7	76.4	93.1
Transac. Value (Billion USD)	2,214	3,122	3,986	5,806	10,528
Transac. Value/GDP	9.6	10.2	10.2	12.1	20.0

Source: BIS, CBRT

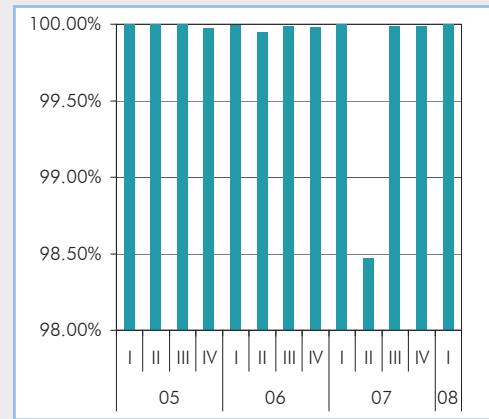
The concentration ratio, which indicates the share of banks' transactions within the total transactions in TIC-RTGS with regard to number of transactions, marked an increase in 2007 compared to the previous year's in terms of the first five and ten largest banks and reached 58.6 and 80.5 percent, respectively (Chart IV.3).

**Chart IV.3**  
Concentration in the Number of Transactions in the TIC-RTGS Accounted for by Five and Ten Largest Banks (%)<sup>1</sup>



Source: CBRT  
(1) CBRT transactions are excluded.

**Chart IV.4**  
Availability Ratios of TIC-RTGS-ESTS System (%)



Source: CBRT

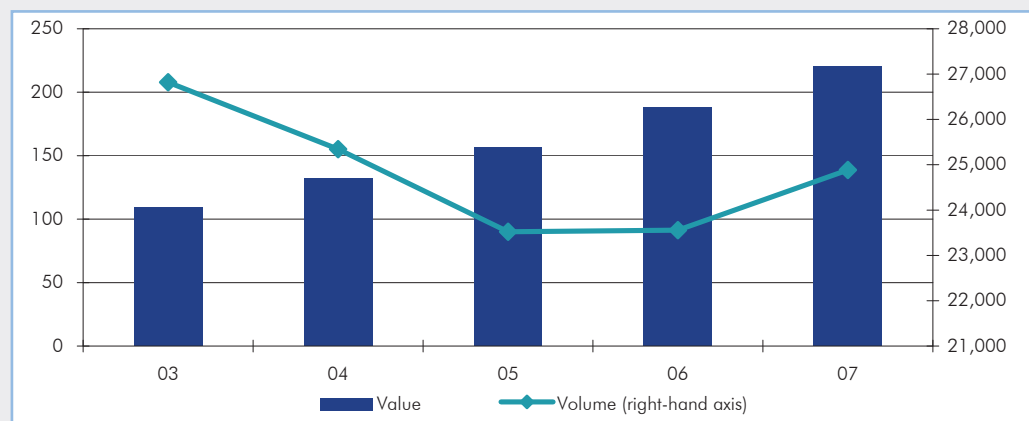
The availability ratio, which indicates the continuity of the payment system and which is the ratio of the time span that the participants can access the system to the total working hours, was 99.61 percent on average in 2007 for the TIC-RTGS (Chart IV.4). The decline observed in the availability ratio of the TIC-RTGS in the second quarter of 2007 stemmed from an operational failure (breakdown in hardware) that occurred at 2:23 p.m. on May 14, 2007 and continued for the rest of the day. After taking prompt contingency measures, the system started end of day transactions on May 15, 2007 at 00:30 a.m.

## IV.2. Cheque Clearing System

The cheque clearing operations, which play an important role in payment systems, are carried out by the Interbank Clearing Houses Center (ICH) under the oversight of the CBRT.

As of year-end 2007, out of 41 banks that participated in the interbank cheque clearing operations, 7 were engaged only in physical presentation of cheques whereas the remaining 34 were also engaged in non-physical presentation.

**Chart IV.5**  
Volume and Value of Cheques Transacted in ICH (Billion YTL, Thousand)



Source: CBRT

The number of cheques, which were subject to the cheque clearing process in ICH, rose by 5.6 percent compared to 2006, amounting to 24,886 thousand in 2007. In the given period, the value of cheques increased by 17.1 percent and reached YTL 220.5 billion (Chart IV.5).

In the cheque clearing system, after the completion of the provision process, the debit and credit positions of the participants are determined by multilateral netting.

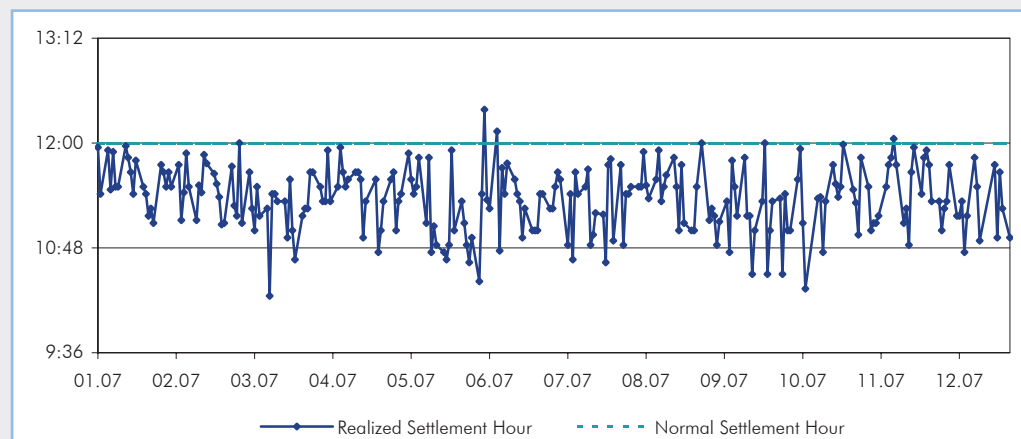
**Table IV.2 Cheque Clearing System-Netting Ratio**

	2003	2004	2005	2006	2007
Netting Ratio (%)	70.42	71.92	71.96	74.79	77.82
Transaction Value (Billion YTL)	109.5	131.9	156.2	188.3	220.5
Liquidity Saving Ratio (Billion YTL)	77.1	94.8	112.4	140.8	171.6

Source: CBRT

Since the cheque clearing system operates according to the multilateral netting method, the liquidity requirements of participants stemming from their cheque transactions is decreasing. The netting ratio of transactions realized through the cheque clearing system increased compared to the previous year and reached 77.8 percent in 2007 (Table IV.2).

**Chart IV.6 Settlement Hours of Cheque Clearing System-2007**



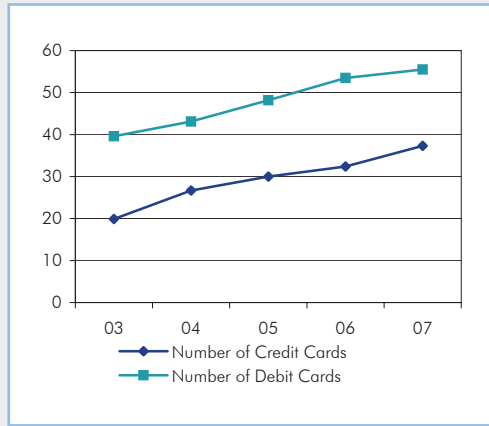
Source: CBRT

In the cheque clearing system, in order to finalize settlement all banks that become debtor as a result of netting, have to fulfill their obligations no later than 12:00 on the following business day. In 2006, settlement in the cheque clearing system was delayed four times, for a total of 95 minutes, as participants performed their obligations later than the due time. On the other hand, in 2007, delays in the cheque clearing system occurred three times, and the total duration of delays amounted to 34 minutes (Chart IV.6). While the average settlement time in the cheque clearing system was 11:27 a.m. in 2006, it was 11:22 a.m. in 2007. Consequently, in 2007 favorable developments were observed in the cheque clearing system regarding both the number and total duration of delays in settlements and the average time of settlement.

### IV.3. System of Payment by Cards

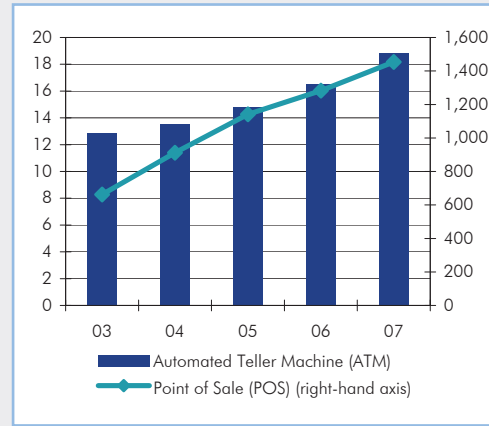
The settlement of debit and credit cards, which are two leading non-cash payment instruments, are executed by the Interbank Card Center (BKM).

**Chart IV.7**  
Number of Credit Cards and Debit Cards  
(Million)



Source: BKM

**Chart IV.8**  
Number of ATM and POS  
(Thousand)

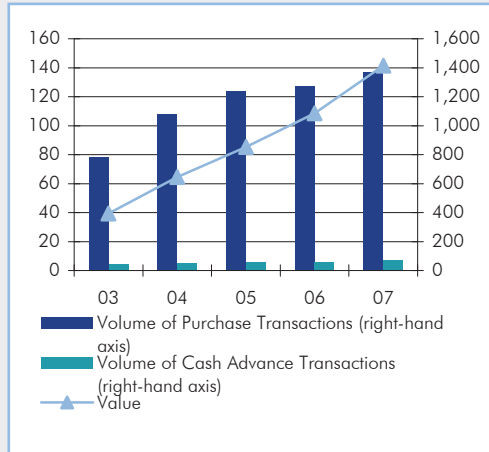


Source: BKM

As is the case in the world, the number of debit and credit cards marked considerable annual increases in Turkey. The number of credit cards, which was 32.4 million by the end of 2006, rose by 15.1 percent by the end of 2007 reaching 37.3 million. The number of debit cards in the same period reached 55.5 million with an increase of 3.7 percent (Chart IV.7).

Due to the widespread use of debit and credit cards, the number of point of sale (POS) devices and automated teller machines (ATM) have been increasing continuously in recent years. The number of POS devices and ATMs increased by 13.3 and 13.9 percent compared to 2006 and reached 1.5 million and 18.8 thousand respectively in 2007 (Chart IV.8).

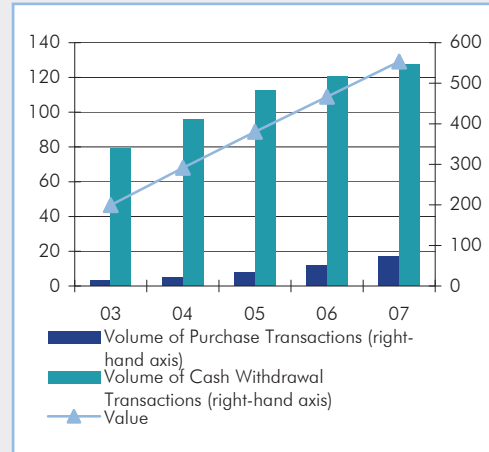
**Chart IV.9**  
Volume and Value of Credit Card Transactions  
(Billion YTL, Million)<sup>1</sup>



Source: BKM

(1) Domestic and international use of domestic credit cards

**Chart IV.10**  
Volume and Value of Debit Card Transactions  
(Billion YTL, Million)<sup>1</sup>



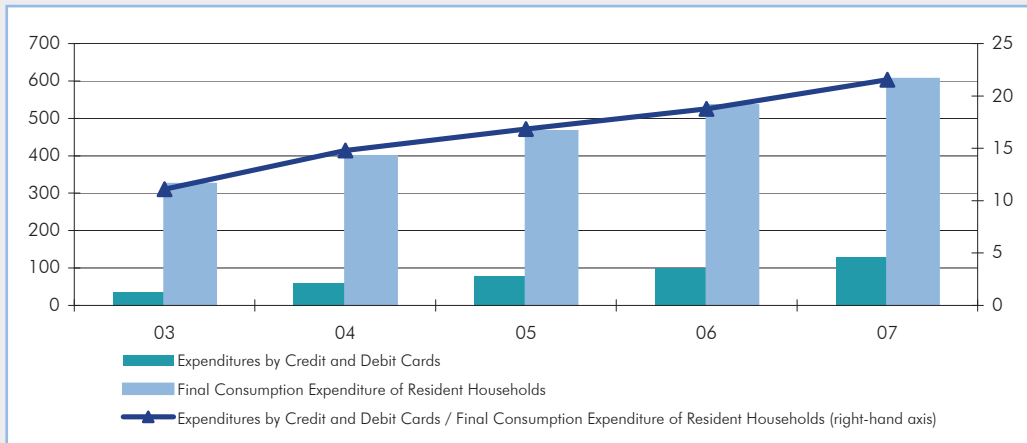
Source: BKM

(1) Domestic and international use of domestic debit cards

Credit cards are widely used in Turkey. The volume of credit card transactions rose by 8.2 percent and reached 1,444 million while the value of credit card transactions increased by 30.5 percent amounting to YTL 141,468 million in 2007 compared to the previous year. The share of purchasing transactions within total credit card transactions in 2007 was 94.9 percent in volume and 90.5 percent in value (Chart IV.9).

By analysing the volume and value of debit card transactions, it is observed that, in parallel with credit cards, there is a year by year increase in the use of debit cards. On the other hand, this analysis also reveals that debit cards are mainly used for withdrawing cash rather than purchasing. Out of the 619.7 million debit card transactions in 2007, 88.1 percent comprised cash withdrawal transactions (Chart IV.10).

**Chart IV.11**  
Expenditures by Credit and Debit Cards and Final Consumption Expenditures by Resident Households<sup>1</sup> (Billion YTL, %)



Source: TSI, BKM

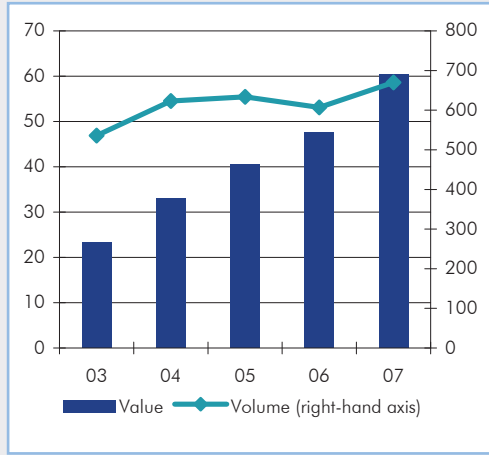
(1) Domestic and international use of domestic credit and debit cards are taken into consideration for the calculation of expenditures by credit and debit cards.

In Turkey, it is observed that the share of the debit and credit card usage within the total expenditures has increased over the years. While the ratio of expenditures made by debit and credit cards to final consumption expenditures of resident households was 18.8 percent in 2006, it continued to rise and reached 21.5 percent in 2007 (Chart IV.11).

BKM was established in 1990 with the partnership of 13 public and private Turkish banks for the purpose of carrying out the interbank clearing of debts and credits of cardholders stemming from their card transactions. It also aims to provide solutions to common problems within the system and to develop the rules and standards of credit and debit cards in Turkey.

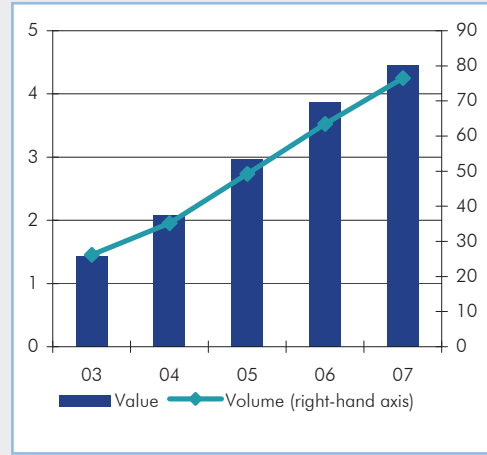
Debit and credit cards can be used via POS devices or ATMs of the issuer banks, as well as the devices of other banks that have agreements with member merchants. When debit and credit cards are used via ATMs or POS devices not belonging to the issuer bank, the clearing and netting of transactions are made through the BKM; while the settlement is realized on the BKM's accounts at the CBRT.

**Chart IV.12**  
Volume and Value of Credit Cards Processed in the Card Clearing System (Billion YTL, Million)



Source: BKM

**Chart IV.13**  
Volume and Value of Debit Cards Processed in the Card Clearing System (Billion YTL, Million)



Source: BKM

The volume of transactions which were subject to credit card clearing process rose by 10.3 percent compared to the previous year and reached 669.8 million; while the value of transactions increased by 27.2 percent amounting to YTL 60.4 billion in 2007 (Chart IV.12).

According to the BKM data, the volume of transactions which were subject to the clearing process of debit cards rose by 20.5 percent compared to the previous year and reached 76.5 million, while the value of transactions increased by 15 percent reaching YTL 4.5 billion in 2007 (Chart IV.13).

**Table IV.3 Card Clearing and Settlement System–Netting Ratio (%)**

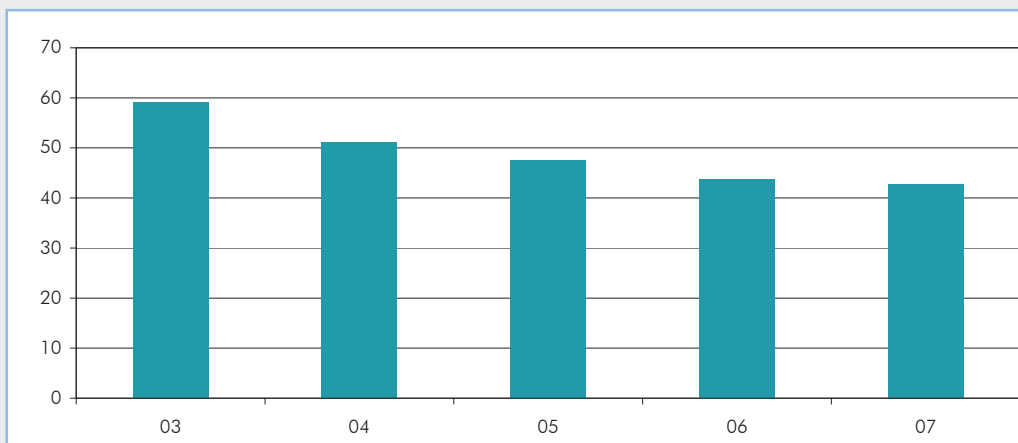
	2003	2004	2005	2006	2007
Clearing and Settl. of Credit Cards					
Netting Ratio (%)	77.7	78.6	77.7	81.7	78.3
Transaction Value (Billion YTL)	23	33	41	48	60
Liquidity Saving (Billion YTL)	18	26	32	39	47
Clearing and Settl. of Debit Cards					
Netting Ratio (%)	59.7	59.4	58.3	60.8	64.0
Transaction Value (Billion YTL)	1.4	2.1	3.0	3.9	4.5
Liquidity Saving (Billion YTL)	0.9	1.2	1.7	2.4	2.9

Source: BKM

As is the case with the cheque clearing system, the card clearing system also operates according to the multilateral netting method and therefore reduces the liquidity requirements of participants stemming from card transactions. The netting ratio of credit card transactions realized through the system decreased to 78.3 percent and the liquidity requirement relating to credit card transactions decreased by YTL 47 billion in 2007. This same ratio was 64 percent for debit card transactions and YTL 2.9 billion of liquidity was saved (Table IV.3).



**Chart IV.14**  
**Ratio of Value of Credit Card Transactions Subject to Clearing Process to Total Value of Credit Card Transactions (%)**



Source: BKM

The ratio of the value of credit card transactions subject to clearing to total transactions for credit cards, which was 59.1 percent in 2003, decreased to 42.7 percent in 2007 (Chart IV.14). This decline also indicates that as a result of promotions, tendency to use credit cards via POS and ATM devices of the issuer banks has increased.

**Box 14.**  
**Assessments Regarding Payment Systems in the Financial Sector Assessment Program for Turkey**

The Financial System Stability Assessment (FSSA) Report, which is prepared subsequent to the joint Financial Sector Assessment Program (FSAP) of the IMF and the World Bank, and includes assessments about the financial sector, has been published on the IMF web site<sup>1</sup>.

In the Report, the TIC-RTGS/ESTS and the cheque clearing system are considered as systemically important payment systems.

The Report notes that, within the framework of its tasks relating to financial stability, the CBRT attaches great importance to promoting the security and efficiency of payment and settlement systems. It also states that systemically important payment systems are highly consistent with the core principles set out by the BIS-CPSS Committee; that the payment and settlement systems are technically efficient and reliable and that they are supported by the appropriate regulatory framework and effective oversight. In addition, a sound legal framework is ensured regarding the payment systems.

The Report highlights that regarding the TIC-RTGS/ ESTS systems, arrangements related to the intraday liquidity facility, queuing facilities with priorities and gridlock resolution mechanisms to reduce liquidity risk for participants are in line with international practices. It also states that the security, operational reliability and standards of emergency arrangements are high and that participation in the payment systems is fair, objective and publicly available.

Moreover, the report emphasizes that the readily available system information is sufficient for use by participants to fully understand the financial, operational, and reputational risks that they will be exposed to through participation in the TIC-RTGS/ESTS . Besides, it is noted that no unsettled transaction remains at day-end and that the CBRT is not exposed to credit risk, as the intraday liquidity facility is provided by the CBRT against collateral.

It is assessed that the cheque clearing system is functioning smoothly; that technological developments are introduced to the system to reduce settlement cycle and a new system is put into effect to facilitate image transfer. It is also added that the cheque clearing system is robust and operationally reliable and that it allows participants to manage liquidity and credit risks proactively.

The Report also underlines that the definition of payment finality in payment systems is not explicitly laid down in CBRT Law and that mechanisms need to be developed to prevent the unwinding procedures in the event that a participant fails to fulfill her obligations in the cheque clearing system. It is also added that whereas the cheque clearing system satisfies market needs, settlement cycle could be further shortened via technological facilities. Lastly, the report concludes that consumer protection policies regarding payment systems need to be established.

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(1) <http://www.imf.org/external/pubs/ft/scr/2007/cr07361.pdf>