Secondary Market – Clearing and Settlement

Introduction

The securities settlement systems (SSS) in the corporate securities market in India have witnessed several innovations during the last decade. These include use of the state-of-art information technology, compression of settlement cycle, dematerialisation and electronic transfer of securities, securities lending and borrowing, professionalisation of trading members, fine-tuned risk management system, emergence of clearing corporation (CC) to assume counterparty risk etc., though many of these are yet to permeate the whole market. The discussion in this chapter is, however, largely based on the settlement systems adopted by the National Securities Clearing Corporation Limited, the only CC in the country and by the National Securities Depository Limited, the lead depository.

Core Processes

While the stock exchange provides the platform for trading to its trading members, the CC determines the funds/securities obligations of the trading members and ensures that trading members meet their obligations. The clearing banks and depositories provide the necessary interface between the custodians/clearing members (CM) for settlement of funds / securities obligations of trading members. The core processes involved in the process are:

Trade Recording: The key details about the trades are recorded to provide basis for settlement. These details are automatically recorded in the electronic trading system of the exchanges.

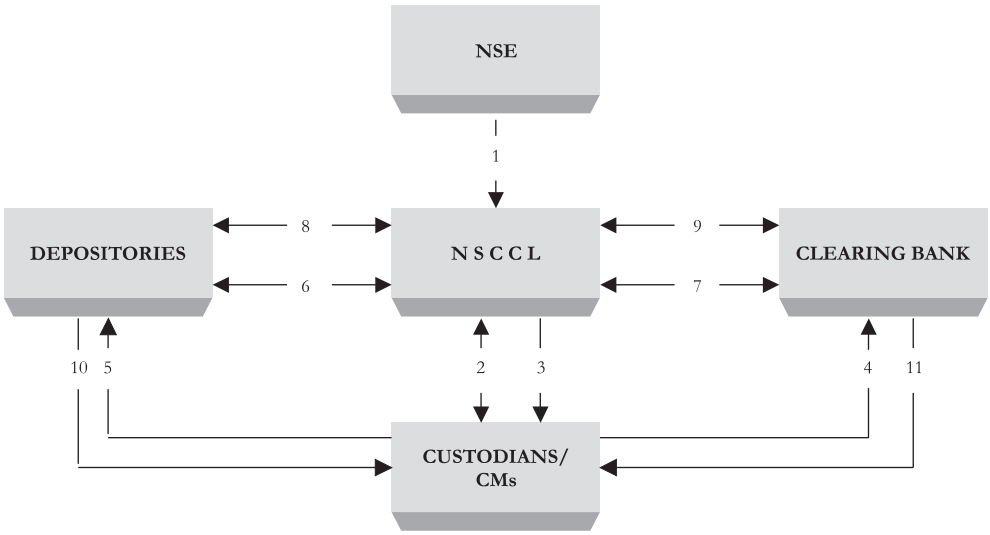
Trade Confirmation: The counterparties to trade agree upon the terms of trade like security, quantity, price, and settlement date, but not the counterparty which is always the CC. The electronic system automatically generates confirmation by direct participants. The ultimate buyers/sellers of securities also affirm the terms, as the funds/securities would flow from them, although the direct participants are responsible for settlement of trade.

Determination of Obligation: The next step is determination of what counter-parties owe, and what counter-parties are due to receive on the settlement date. The CC interposes itself as a central counterparty between the counterparties to trades and nets the positions so that a member has security wise net obligation to receive or deliver a security and has to either pay or receive funds.

Pay-in of Funds and Securities: The members bring in their funds/securities to the CC. They make available required securities in designated accounts with the depositories by the prescribed pay-in time. The depositories move the securities available in the accounts of members to the account of the CC. Likewise members with funds obligations make available required funds in the designated accounts with clearing banks by the prescribed pay-in time. The CC sends electronic instructions to the clearing banks to debit member's accounts to the extent of payment obligations. The banks process these instructions, debit accounts of members and credit accounts of the CC.

Pay-out of Funds and Securities: After processing for shortages of funds/securities and arranging for movement of funds from surplus banks to deficit banks through RBI clearing, the CC sends electronic instructions to the depositories/clearing banks to release pay-out of securities/funds. The depositories and clearing banks debit accounts of the CC and credit accounts of members. Settlement is complete upon release of pay-out of funds and securities to custodians/CMs. The settlement process for transactions in securities in the CM segment of NSE is presented in the Chart 5-1.

Chart 5-1: Clearing and Settlement Process at NSE



1. Trade details from Exchange to NSCCL (real-time and end of day trade file).
2. NSCCL notifies the consummated trade details to clearing members/custodians who affirm back. Based on the affirmation, NSCCL applies multilateral netting and determines obligations.
3. Download of obligation and pay-in advice of funds/securities.
4. Instructions to clearing banks to make funds available by pay-in time.
5. Instructions to depositories to make securities available by pay-in-time.
6. Pay-in of securities (NSCCL advises depository to debit pool account of custodians/CMs and credit its account and depository does it).
7. Pay-in of funds (NSCCL advises Clearing Banks to debit account of custodians/CMs and credit its account and clearing bank does it).
8. Pay-out of securities (NSCCL advises depository to credit pool account of custodians/CMs and debit its account and depository does it).
9. Pay-out of funds (NSCCL advises Clearing Banks to credit account of custodians/CMs and debit its account and clearing bank does it).
10. Depository informs custodians/CMs through DPs.
11. Clearing Banks inform custodians/CMs.

Risk Management: A sound risk management system is integral to an efficient SSS. The CC ensures that trading members' obligations are commensurate with their net worth. It has put in place a comprehensive risk management system, which is constantly monitored and upgraded to pre-empt market failures. It monitors the track record and performance of members and their net worth, undertakes on-line monitoring of members' positions and exposure in the market, collects margins from members and automatically disables members if the limits are breached.

Settlement Agencies

The CC, with the help of clearing members, custodians, clearing banks and depositories settles the trades executed on exchanges. The roles of each of these entities are explained below:

CC: The CC is responsible for post-trade activities of a stock exchange. Clearing and settlement of trades and risk management are its central functions. It clears all trades, determines obligations of members, arranges for pay-in of funds/securities, receives funds/securities, processes for shortages in funds/securities, arranges for pay-out of funds/securities to members, guarantees settlement, and collects and maintains margins/ collateral/base capital/other funds.

Clearing Members: They are responsible for settling their obligations as determined by the CC. They have to make available funds and/or securities in the designated accounts with clearing bank/depositories, as the case may be, to meet their obligations on the settlement day.

Custodians: Custodian is a clearing member but not a trading member. He settles trades assigned to him by trading members. He is required to confirm whether he is going to settle a particular trade or not. If it is confirmed, the CC assigns that obligation to that custodian and the custodian is required to settle it on the settlement day.

Clearing Banks: Clearing banks are a key link between the clearing members and CC for funds settlement. Every clearing member is required to open a dedicated clearing account with one of the clearing banks. Based on his obligation as determined through clearing, the clearing member makes funds available in the clearing account for the pay-in and receives funds in case of a pay-out.

Depositories: Depositories help in the settlement of the dematerialised securities. Each custodian/clearing member is required to maintain a clearing account with the depositories. He is required to make available the required securities in the designated account on settlement day. The depository runs an electronic file to transfer the securities from accounts of the custodians/clearing member to that of CC. As per the schedule of allocation of securities determined by the CC, the depositories transfer the securities on the pay-out day from the account of the CC to those of members/custodians.

Risks in Settlement

The following two kinds of risks are inherent in a SSS:

Counterparty Risk: This arises if parties do not discharge their obligations fully when due or at any time thereafter. This has two components, namely *replacement cost risk* prior

to settlement and principal risk during settlement. The *replacement cost risk* arises from the failure of one of the parties to transaction. While the non-defaulting party tries to replace the original transaction at current prices, he loses the profit that has accrued on the transaction between the date of original transaction and date of replacement transaction. The seller/buyer of the security loses this unrealised profit if the current price is below/above the transaction price. Both parties encounter this risk as prices are uncertain. It has been reduced by reducing time gap between transaction and settlement and by legally binding netting systems. The *principal risk* arises if a party discharges his obligations but the counterparty defaults. The seller/buyer of the security suffers this risk when he delivers/makes payment, but does not receive payment/delivery. This risk can be eliminated by delivery vs. payment mechanism which ensures delivery only against payment. This has been reduced by having a central counterparty which becomes the buyer to every seller and the seller to every buyer. A variant of counterparty risk is *liquidity risk* which arises if one of the parties to transaction does not settle on the settlement date, but later. The seller/buyer who does not receive payment/delivery when due, may have to borrow funds/securities to complete his payment/delivery obligations. This has been reduced by provision for stock lending and margin trading. Another variant is the *third party risk* which arises if the parties to trade are permitted or required to use the services of a third party which fails to perform. For example, the failure of a clearing bank which helps in payment can disrupt settlement. This risk has been reduced by allowing parties to have accounts with multiple banks. Similarly, the users of custodial services face risk if the concerned custodian becomes insolvent, acts negligently or commits fraud.

System Risk: This comprises of operational, legal and systemic risks. The operational risk arises from possible operational failures such as errors, fraud, outages etc. The legal risk arises if the laws or regulations do not support enforcement of settlement obligations or are uncertain. Systemic risk arises when failure of one of the parties to discharge his obligations leads to failure by other parties. The domino effect of successive failures can cause a failure of the settlement system. These risks have been contained by enforcement of an elaborate margining and capital adequacy standards to secure market integrity, settlement guarantee funds to provide counter-party guarantee, legal backing for settlement activities, business continuity plans, etc.

Settlement Cycle

The NSCCL clears and settles trades executed on NSE as per well-defined settlement cycle. The settlement cycle for the CM segment of NSE is presented in Table 5-1. The NSCCL notifies the consummated trade details to clearing members/ custodians on the trade day. The custodians affirm back the trades to NSCCL by T+1 day. Based on the affirmation, NSCCL nets the positions of counterparties to determine their obligations. A clearing member has to pay-in/pay-out funds and/or securities. A member has a security-wise net obligation to receive/deliver a security. The obligations are netted for a member across all securities to determine his fund obligations and he has to either pay or receive funds. Members' pay-in/ pay-out obligations are determined latest by T+1 day and are forwarded to them on the same day so that they can settle their obligations on T+3 day. The securities/funds are paid-in/paid-out on T+3 day and the settlement is complete in 3 days from the end of the trading day.

Table 5-1: Settlement Cycle in CM Segment

Activity	T+5 Rolling Settlement (Till March 31, 2002)	T+3 Rolling Settlement (From April 1, 2002)
Trading	T	T
Custodial Confirmation	T+2	T+1
Determination of Obligation	T+2	T+1
Securities/Funds Pay-in	T+5	T+3
Securities/Funds Pay-out	T+5	T+3
Valuation Debit	T+5	T+3
Auction	T+6	T+4
Bad Delivery Reporting	T+7	T+5
Auction Pay-in/Pay-out	T+8	T+6
Close Out	T+8	T+6
Rectified Bad Delivery Pay-in/Pay-out	T+9	T+7
Re-bad Delivery Reporting	T+11	T+9
Close Out of Re-bad Delivery	T+12	T+10

T+1 means one working day after the trade day. Other T+ terms have similar meanings.

Policy Developments

SEBI continuously reviews the working of SSS as also the risk management practices being followed by stock exchanges and their clearing corporations and rationalises them according to changing market conditions. The year 2001-02 witnessed major innovations in market practices such as introduction of rolling settlement in a phased manner and shrinkage of the settlement cycle to T+3 days, ban on deferral products, introduction of market wide circuit breaker, VaR based margining system and margining on gross basis. Major policy developments during 2001-02 and April-June 2002 are presented below:

Rolling Settlement

SEBI has been introducing rolling settlement in a phased manner. Following allegations of price manipulations, the Finance Minister announced in March 2001, that about 200 scrips would be traded in rolling settlement by July 2001. In pursuance to this, SEBI, on March 20, 2001 decided that all scrips which were included in the ALBM/BLESS or MCFS in any stock exchange or in the BSE 200 list, numbering 251 securities would be traded only in the compulsory rolling settlement on all the exchanges from July 2, 2001. This was in addition to the scrips, which were already under compulsory rolling settlement, and brought the total number of scrips in rolling settlement to 414 by July 2001. The exchanges were also advised to introduce uniform settlement cycle (Monday to Friday) in respect of remaining securities.

SEBI decided that the stocks, which are not under compulsory rolling settlement as on July 2, 2001, would be brought under compulsory rolling settlement w.e.f January 2, 2002. However, in the interest of uniformity and to ensure smooth migration from account period to rolling settlement, the commencement of rolling settlement in the remaining scrips was preponed to December 31, 2001.

The stock Exchanges were advised to ensure that the companies listed with them have established connectivity with both the Depositories on or before September 30, 2001. The scrips of such companies which have not signed agreement and established connectivity with both the depositories by September 30, 2001 shall be traded on 'Trade for Trade' settlement mode in the rolling settlement from December 31, 2001. These scrips would be moved to normal rolling settlement three months after they have established connectivity with both the depositories.

SEBI further in January 2002 decided to shorten the rolling settlement cycle from T+5 to T+3. The compulsory rolling settlement on T+3 basis commenced for all listed securities from April 1, 2002. SEBI advised the exchanges to follow the following activity schedule for the T+3 rolling settlement:

Sl. No.	Day	Description of Activity
1	T	Trade Date
2	T+1	Custodial Confirmation
3	T+3	Securities and Funds pay-in/Securities and Funds pay-out
4	T+4	Auction of shortages in deliveries
5	Not later than T+6	Auction pay-in and pay-out as soon as possible

Risk Management for Rolling Settlement

Pursuant to the discussions in the meeting of the sub-group of the Group on Risk Management Systems for Equity Markets, SEBI introduced VaR based margin in the cash market. This replaced all the margins prescribed by SEBI except MTM margin. The exchanges were advised in June 2001 the following modalities for implementation of the VaR based margin:

i For the scrips in compulsory rolling settlement, the 99% Value at Risk (VaR) based margin system would be introduced with effect from July 02, 2001 in the following manner:

- For the additional 251 scrips which will be included in the compulsory rolling settlement with effect from July 02, 2001 and 15 scrips (out of 163 scrips already in compulsory rolling settlement) having the facility of CNS, CFRS, ALBRS, BLESS, exchanges will calculate scrip-wise VaR and index-based VaR as indicated below and apply the higher of the two as the margin percentage:
  - Scrip-wise daily volatility will be calculated using the same exponentially weighted moving average methodology as is used in index futures market and scrip wise daily VaR will be calculated as 3.5 times the volatility so calculated.
  - The index-based VaR will be calculated as the index VaR times a suitable multiplier. The multiplier factor for each stock will be calculated on the first trading day of every calendar month based on average stock volatility during previous six months on a rolling basis, which in any case shall not be less than 1.75.
- For the 148 scrips already in the compulsory rolling settlement, the margin will be 3 times the daily index VaR.
- The minimum daily index VaR shall be 5% as in the index futures market at present. The higher of Sensex and Nifty VaR will be used.

While the above calculations would address 99% of the cases, it would be necessary to have an additional level of margin to address the 1% of the cases to supplement the VaR-based margins. Based on the analysis of historical data of individual stock VaRs, it was felt that additional margin of 12% may be necessary.

ii The VaR calculations will be based either on BSE Sensex or S&P CNX Nifty and

would be disseminated by the BSE and NSE daily on their web-sites by 6.30 p.m. in a downloadable format. Other stock exchanges could make their own VaR calculations based on BSE Sensex and S&P CNX Nifty or freely adopt the VaR calculations available on the sites of BSE and NSE. These would be used for the purpose of margin calculations for the transactions carried out next day. The VaR-based margin would be capped at 100% and collected on T+1 basis.

iii In addition to the VaR margin, the exchanges will also collect MTM margin. The exchanges should at their discretion impose additional margin on scrips wherever necessary to contain the risks in the market.

iv Currently, the financial institutions, FIIs, Banks and Mutual Funds are required to pay additional volatility margin on their net outstanding sale position. Since in the present model of VaR-based margin, the minimum multiplier is 1.75, positive differential between the minimum VaR (1.75 times index VaR) and the actual margin percentage calculated as above is analogous to scrip being volatile. Thus these institutions will be required to pay margin calculated on the basis of this differential for the 251+ 15 stocks for the sale side as is currently being done.

v The exchanges should place a system of direct debit of the members settlement accounts for the purposes of margin payment and the practice of payment of margin by cheque shall be completely done away with.

vi The exchanges would make suitable changes in software to implement margin calculations on gross basis.

This margining system would also be applicable in respect of remaining scrips as and when they are brought under rolling settlement.

Circuit Breaker in Rolling Settlement

SEBI decided to implement w.e.f. July 2, 2001 an index based market wide circuit breaker system, which will apply at three stages of the index movement either way at 10%, 15% and 20%. These circuit breakers will bring about a coordinated trading halt in all equity and equity derivative markets nationwide. The breakers would be triggered by movement of either BSE Sensex or the NSE S&P CNX Nifty whichever is breached earlier in the following manner:

Duration of trading halt (in minutes)

% movement in either indices in either direction	Before 1 p.m.	1 p.m. to 2 p.m.	2 p.m. to 2.30 p.m.	After 2.30 p.m.
10	60	30	30	No halt
15	120	60	Trading halt for the remainder of the day	
20	Trading halt for the remainder of the day			

These percentages would be translated into absolute points of index variations on a quarterly basis and at the end of each quarter these absolute points of index variations would be revised and be applicable for the next quarter. The absolute points would be calculated based on the closing level of the index on the last day of trading in a quarter and rounded off to the nearest 25 points in the case of the BSE Sensex and the nearest 10 points in the case of the S&P CNX Nifty.

In addition to the market-wide index-based circuit filters, it was also prescribed that there would be individual scrip wise price bands of 20% either way for all scrips in the compulsory rolling settlement except for the scrips on which derivative products are available or scrips included in indices on which derivative products are available. In respect of scrips not in compulsory rolling settlement, the existing price bands would continue to apply. Subsequently, as a temporary measure of stability, a price band of 10% was introduced on all shares on which derivative products are not available (since withdrawn).

Deferral Products

A group set up under the Chairmanship of Prof. J. R. Varma, Member, SEBI to look into the need for having deferral products in the rolling settlement recommended that the deferral products such as ALBM, BLESS, MCFS, CFRS, ALBRS, CNS should cease to be available for all the securities from July 2, 2001. SEBI and Exchanges should work towards introduction of individual stock derivatives, and these would perform hedging functions performed by deferral products. Accordingly, SEBI advised the stock exchanges on June 20, 2001 that no new deferral positions shall be permitted from July 2, 2001 onwards. All outstanding deferred positions shall be compulsorily liquidated by September 3, 2001. The exchanges were required to monitor the positions of members and announce plan for phased liquidation of positions between July 2, 2001 and September 3, 2001.

Risk Management for Equity Market

The Group on Risk Management Systems for Equity Markets met on December 19, 2001 and discussed the following issues:

i. *Corporate Governance:* The Group felt it necessary to strengthen the existing framework to help determine the role of exchanges and corporates in verifying and responding to rumours with regard to price sensitive information in order to enhance the transparency and integrity of the market. It decided to set up a group under the Chairmanship of Prof. J R Varma to look into the same.

ii *T+3 Rolling Settlement:* The Group felt that the settlement cycle could be further shortened to increase the efficiency of the market. It recommended that compulsory rolling settlement in all listed scrips on all exchanges should be introduced on T+3 basis from April 1, 2002. It further recommended that use of debit card by investors for making payment to the brokers should be permitted.

iii *Compulsory Rolling Settlement:* The Group recommended that the scrips of such companies, which have not signed agreements and established connectivity with both the depositories by September 28, 2001, shall be traded on trade-for-trade basis in the rolling settlement from January 02, 2002. The scrips would be moved to the normal rolling settlement after they establish connectivity with both the depositories. There would be no account period trading in equity in any stock exchange in the country from this date.

iv *Disclosure:* It was decided that the stock exchanges would disclose the daily scrip-wise deliverables position gross across clients for that day's trading session.

In pursuance to discussions in the meeting of the Group on Risk Management Systems for Equity Markets, SEBI took following decisions in May 2002:

i. The margin, which was imposed on the FIs, FIIs, Banks and MFs on the sale position in scrips where there was a positive differential between the minimum VaR (1.75 times Index VaR) and the actual scrips VaR, would not be levied.

ii. The price band of 10%, which was imposed on 53 stocks on which derivatives products were available, would not be applicable.

iii. A client other than FIs, FIIs, MFs had to maintain a deposit of not less than 10% of his net open position with the broker. It was decided that if the client position exceeded Rs. 5 lakh, the broker would have to collect 10% margin from the clients. Further, the certification of the collection of this upfront margin would be done by the compliance officer.

Gross Margining

SEBI decided on June 21, 2001 to extend gross margining to the entire cash market with effect from September 3, 2001. The stock exchanges were advised to make suitable changes in their system software to implement the system based margin calculation on a gross basis across clients in the cash market.

Restriction on Short Sales

Pursuant to discussions in the meeting of the group on risk Management, SEBI decided that all sales transactions effective from March 8, 2001 shall be backed by delivery unless a sale transactions was preceded by a purchase position of at least an equivalent amount in the name of the same client in the same or any other exchange. This would also apply to the proprietory trading by members. This would be on self-certification basis and would be subject to off-site inspection by the Exchange upto sub-broker and client-level. This would apply to scrips in the MCFS, ALBM, BLESS and other deferral products.

With the introduction of the rolling settlement in 414 scrips from July 2, 2001, and the fact that all deferral products would no longer be available, SEBI decided to withdraw the restrictions on short sales with effect from July 2, 2001.

No-delivery period

SEBI directed the stock exchanges to implement the decision to abolish "no delivery period" by May 1, 2002 on account of both closure/record date for corporate actions in respect of securities traded in compulsory demat mode. For implementation of the decision to abolish "no delivery period", any short delivery by any member in the previous settlement where delivery was to be on cum basis can be closed out to the extent of the short delivery if the shares cannot be acquired in auction on cum basis. The mark up price for such a close-out would be 10%. The reference price for the close out would be the latest available closing price at the exchange.

Securities Lending

Following the introduction of rolling settlement in 414 scrips on July 2, 2001 and the ban on all deferral products, the restrictions on the Securities Lending Scheme, 1997 were withdrawn.

Risk Management

There have been umpteen experiments with different risk containment measures in the recent past. These measures have been repeatedly reviewed and revised. This section, however, discusses the measures prevailing as in July 2002.

Capital Adequacy Requirements

The capital adequacy requirements stipulated by the NSE are substantially in excess of the minimum statutory requirements as also to those stipulated by other stock exchanges. The capital adequacy norms to be followed by members are presented in Table 5-2.

Table 5-2: Capital Adequacy Norms for Membership on NSE

(In Rs. lakh)

Requirement	Members of			Professional Clearing Members of	
	CM and F&O Segment	CM and WDM Segment	CM, WDM and F&O Segment	CM Segment	CM and F&O Segment
Net Worth	100	200	200	300	300
Interest Free Security Deposit (IFSD)	125	250	275	25	34
Collateral Security Deposit (CSD)	25	25	25	25	50

Note: A professional clearing member (PCM) is required to bring in IFSD of Rs. 6 lakh and CSD of Rs. 17.5 lakh (Rs. 9 lakh and Rs. 25 lakh respectively for corporate members) per trading member in the CM segment.

Source: NSE.

The deposits kept with the Exchange as part of the membership requirement are taken as base minimum capital of the member to determine his intra-day turnover limits and/or gross exposure limit. Additional base capital (ABC) is required to be deposited with the NSCCL by the member for taking additional exposure.

Trading and Exposure Limits

NSCCL imposes limits on turnover and exposure in relation to the base minimum capital of a member, which is the amount of funds and securities that a member keeps with the Exchange/NSCCL.

The members are subject to limits on trading volumes in a day as well as exposure at any point of time. Gross intra-day turnover (Buy + Sell) of a member shall not exceed 33.33 times of the base capital (cash deposit plus security deposit). Similarly, gross exposure (aggregate of cumulative net outstanding positions in each security, at any point of time) of a member shall not exceed 8.5 times free base capital up to Rs. 1 crore. If a member has free capital in excess of Rs. 1 crore, his exposure shall not exceed Rs. 8.5 crore plus 10 times of the capital in excess of Rs. 1 crore. Members exceeding these limits are automatically and instantaneously disabled by the automated trading system.

Determination of Gross Exposure: The gross exposure of a member is computed across all securities and across all open settlements. Open settlements are all those settlements for which trading has commenced and for which pay-in is yet to be completed. It is arrived at by adding up the absolute values of the products of net cumulative values and the specified adjustment factor, for all securities in which a member has an open position. For this purpose, scrips have been classified in to three groups, based on market capitalisation, impact cost and number of trades. Groups I, II and III have been assigned adjustment factors of 1, 2 and 5 respectively. The determination of gross exposure is illustrated in the Table 5-3.

Table 5-3: Determination of Exposure for Exposure Limits

Day	Net Value (buy value-sale value)			Cumulative Net Value #			Gross Exposure*
	Scrip A	Scrip B	Scrip C	Scrip A	Scrip B	Scrip C	
Day 1	-31,000	-115,000	-49,900	-31,000	-115,000	-49,900	510,500
Day 2	52,500	155,000	146,600	21,500	40,000	96,700	585,000
Day 3	-19,600	-105,000	198,000	1,900	-65,000	294,700	1,605,400
Day 4	9,900	103,000	-750,000	42,800	153,000	-405,400	2,375,800
Day 5	-29,200	-31,000	408,500	-38,900	-33,000	-143,500	822,400
Day 6	-5,000	0	-104,800	-24,300	72,000	-446,300	2,399,800
Day 7	-35,000	22,000	345,600	-69,200	-9,000	649,300	3,333,700
Day 8	36,000	54,300	320,000	-4,000	76,300	560,800	2,960,600

It is the cumulative net values of the scrip for last three days (T to T-2). For example, the exposure at the end of day 6 is cumulative open position of the scrips for days 4 to 6.

* While arriving at the exposure, it is assumed that scrips A, B and C have adjustment factors 1, 2 and 5 respectively. That is, cumulative net values have been multiplied by the adjustment factors and then the absolute values of the products have been summed up to determine exposure.

Members exceeding the gross exposure limit are not permitted to trade with immediate effect until the member's cumulative gross exposure is reduced to below the gross exposure limits as defined above or any such lower limits as applicable to the members. Alternatively, a member may bring in additional base capital resulting in enhanced gross exposure limit.

A penalty of Rs. 5,000 is levied for each violation of gross exposure limit and intra-day turnover limit, which is paid by next day. The penalty is debited to the clearing account of the member. Non-payment of penalty in time attracts penal interest of 9 basis points per day till the date of payment. In respect of violation of gross exposure limit on more than one occasion on the same day, each violation is treated as a separate instance for purpose of calculation of penalty. The penalty is charged to the members irrespective of whether the member brings in additional capital subsequently.

Early pay-in of funds/ securities: If members meet funds obligations prior to the funds pay-in day, after satisfying the applicable conditions, then the margin payable by the member is re-computed after considering the funds pay-in. The value of the advance pay-in made is reduced from the cumulative net outstanding position of the member for the purpose of calculating gross exposure.

Similarly, if members deliver securities prior to the securities pay-in day, after satisfying the applicable conditions, then the margin payable by the member is recomputed after considering the above pay-in of securities. The value of the advance pay-in made is reduced from the cumulative net outstanding position of the member for the purpose of calculating gross exposure.

On-line Exposure Monitoring: NSCCL has put in place an on-line monitoring and surveillance system whereby exposure of the members is monitored on a real time basis. A system of alerts has been built in so that both the member and NSCCL are alerted as per pre-set levels (reaching 70%, 85%, 95% and 100%) when the members approach their allowable limits. The system enables NSSCL to further check the micro-details of members' positions, if required and take pro-active action.

The on-line surveillance mechanism also generates various alerts/reports on any price/volume movement of securities not in line with past trends/patterns. For this purpose the exchange maintains various databases to generate alerts. Alerts are scrutinised and if necessary taken up for follow up action. Open positions of securities are also analysed. Besides this, rumors in the print media are tracked and where they are price sensitive, companies are contacted for verification. Replies received are informed to the members and the public.

Inspection and Investigation: As per regulatory requirement, a minimum of 10% of the active trading members are to be inspected every year to verify the level of compliance with various rules, byelaws and regulations of the Exchange. Usually, inspection of more members than the regulatory requirement is undertaken every year. The inspection randomly verifies if investor interests are being compromised in the conduct of business by the members. The investigation is based on various alerts, which require further analysis. If further analysis suggests any possible irregular activity which deviates from the past trends/patterns and concentration of trading at NSE at the member level, a more detailed investigation is undertaken. If the detailed investigation establishes any irregular activity, disciplinary action is initiated against the member. If the investigation suggests suspicions of possible irregular activity across exchanges and/or possible involvement of clients, the same is informed to SEBI.

Margin Requirements

NSCCL imposes stringent margin requirements as part of its risk containment measures. The daily margin comprises of MTM margin and VaR-based margin. The margins are computed at client level and paid by trading members on T+1 basis. Non-payment of margin attracts a penal charge of 0.08% per day. Trades done by trading members on behalf of institutions are, however, exempt from margin and exposure requirements.

Mark to Market Margin: Mark to market margin is the notional loss which a member would incur in case his cumulative net outstanding positions in all securities were closed out at the closing price of the securities at the end of the relevant day. In case the security has not been traded on a particular day, the latest available closing price at the NSE is considered as the closing price. For each security this is worked out by multiplying the difference between the close price and the price at which the trade was executed by the cumulative buy and sale open position (for buy position the close price being lower than the actual trade price and for sale position, the close price being higher than the actual trade price). The aggregate across all securities is the MTM margin payable by a member. It is calculated as under:

MTM Profit/Loss = [(Net buy quantity * Close Price) - Net Buy value] + [Net sale value - (Net Sale quantity * Close Price)]

The profit/loss across different securities within the same settlement is set off to determine MTM loss for a settlement, but set off benefits across settlements are not allowed. MTM is calculated taking into account client level positions. MTM profit of one client shall not be adjusted against the MTM loss of other clients.

In the event of the net outstanding position of a member in any security being nil, the difference between the buy and sale values is considered as notional loss for the purpose of calculating the mark to market margin payable.

Value at Risk-based Margin: The VaR rate is applied to the security-wise net outstanding position at client level to determine VaR based margin. Such margin computed is added across all clients for all securities to get the VaR margin for a member. The computation

of the VaR rate as well as the marginable exposure on which VaR rate is applied is explained below.

Computation of VaR Rate

VaR rate is a single number, which encapsulates whole information about the risk in a portfolio. It measures potential loss from an unlikely adverse event in a normal market environment. It involves using historical data on market prices and rates, the current portfolio positions, and models (e.g., option models, bond models) for pricing those positions. These inputs are then combined in different ways, depending on the method, to derive an estimate of a particular percentile of the loss distribution, typically the 99th percentile loss. The step by step computation of VaR-based margin is explained below.

Obtain the closing price of the security (for the days on which it was traded in the exchange) and closing index values for the previous one-year period. Let these be

- Closing prices of the security → CP_0, CP_1, CP_2, ……. CP_n
- Closing values of index → CV_0, CV_1, CV_2, ……. CV_n

Calculate the logarithmic returns with respect to previous day's closing price of the security/closing value of index for each day in the reference period. Logarithmic return (R_n) for day 'n' can be computed using the formula:

- For scrip → $R_n=LN(CP_n/CP_{n-1})$
- For index → $R_n=LN(CV_n/CV_{n-1})$

Compute initial volatility by calculating the standard deviation of returns for the one year period using the formula:

$$\text{Standard deviation } s_0 = \sqrt{\sum_{i=1}^{n}(\bar{R}-R_i)^2/n}$$

where $\bar{R}$ is the average return for the reference period.

Calculate daily volatility for subsequent days. For day 1, the volatility will be

$$\sigma_1 = \sqrt{\lambda(\sigma_o)^2 + (1-\lambda)R_1^2}$$

Similarly for day 2

$$\sigma_2 = \sqrt{\lambda(\sigma_1)^2 + (1-\lambda)R_2^2}$$

Where, λ=0.94, a parameter which indicates how rapidly volatility estimate changes. This value has been arrived at on the basis of the empirical study done by Prof. J R Varma.

Calculate VaR for the scrip at 3.5σ level and VaR for the index at 3σ level. A higher σ level is used for the scrip because the scrip is expected to have higher volatility as compared to the index, which is a portfolio. The volatility estimate at 3σ level represents 99% VaR.

Calculate VaR for a security or index for a particular day using the σ for both long positions and short positions.

- For scrip,
  VaR for short positions = Exponential (3.5σ)-1, and
  VaR for long positions =1- Exponential (-3.5σ).

- For index,
  VaR for short positions = Exponential (3σ)-1, and
  VaR for long positions =1- Exponential (-3σ)

To ensure that risk for all possible situations is covered, long VaR or short VaR, whichever is higher, is considered as the VaR for the scrip or index, as the case may be.

Derive index-based scrip VaR from the index VaR. The VaR Multiplier (relative volatility of the scrip as compared to that of index) is multiplied with index VaR to get the index-based scrip VaR. A minimum VaR multiplier of 1.75 has been stipulated by SEBI for the calculation of index-based scrip VaR. VaR multiplier for scrips is computed on a monthly basis by dividing 'average standard deviation of the scrip return for last six months' by 'average standard deviation of the index return for last six months'.

For the securities, which come under Group I of the SEBI classification, Index-based VaR or scrip VaR, whichever is higher, is used as the VaR for the scrip. For all other securities 3 times Index VaR is used as the VaR for the scrip. An additional margin of 12% is added to this applicable VaR. This additional margin is applied in order to safeguard against the remaining 1% cases. The total VaR margin calculated using the above steps is rounded up to the higher integer. This percentage so derived is the VaR margin rate, applicable on the open position. Maximum VaR applicable on a scrip, however, shall not exceed 100%.

NSE disseminates VaR margin rates to the members and public at large through its web-site. VaR margin rate for each security is provided on a daily basis, at the end of each trading day. These rates are applicable on the positions at the end of next trading day. A separate file is also provided on a daily basis for the VaR margin rates applicable for the institutional trades on the net outstanding sale positions at the end of next trading day. A file on the multiplier is provided on a monthly basis, detailing the multiplier to be applied on each security in the following month.

All margins are payable on trade day plus one. Members are required to compute their margin obligations and deposit the margin money in cash, bank guarantee or FDRs, rounded off to the next higher multiple of Rs.10,000.

The margins deposited in cash on a given day are released to the member on the subsequent day after adjustment for margin, ABC and any other funds dues. If a member delivers securities prior to the securities pay-in day, the margin payable by him is recomputed after considering the above pay-in of securities. The value of the advance pay-in made is reduced from the cumulative net outstanding position of the member for the purpose of gross exposure limits.

Determination of Exposure

The exposure to be reckoned for the purpose of applying VaR-based margin rates is determined in the manner illustrated in Table 5-4. It is arrived at by adding up the absolute values of the net cumulative positions for all securities in which a member has an open position, assuming the member has only two clients and no proprietary position. It is also assumed that the scrips A, B, C and D attract VaR rate of 25%, 30%, 35% and 40% respectively.

Table 5-4: Determination of Exposure for VaR Margins

Client A

Day	Net Value (buy value-sale value)				Cumulative Net Value*				VaR Margin
	Scrip A	Scrip B	Scrip C	Scrip D	Scrip A	Scrip B	Scrip C	Scrip D	for the Day #
Day 1	5,000	-115,000	-49,900	3,100	5,000	-115,000	-49,900	3,100	54,455
Day 2	52,500	155,000	146,600	-248,300	57,500	40,000	96,700	-245,200	158,300
Day 3	43,000	-105,000	198,000	-100,700	95,500	50,000	344,600	-349,000	299,085
Day 4	65,000	103,000	-750,000	969,300	108,000	-2,000	-552,000	868,600	568,240
Day 5	-29,200	-31,000	408,500	-49,900	35,800	72,000	-341,500	919,400	517,835
Day 6	-5,000	0	-104,800	96,700	-34,200	-31,000	303,700	46,800	142,865
Day 7	-35,000	22,000	345,600	294,700	-40,000	22,000	240,800	391,400	257,440
Day 8	36,000	54,300	320,000	-455,300	1,000	76,300	665,600	-160,600	320,340

Client B

Day	Net Value (buy value-sale value)				Cumulative Net Value*				VaR Margin
	Scrip A	Scrip B	Scrip C	Scrip D	Scrip A	Scrip B	Scrip C	Scrip D	for the Day #
Day 1	-31,000	13,600	122,000	69,500	-31,000	13,600	122,000	69,500	82,330
Day 2	9,800	-43,900	-33,000	59,800	-21,200	-30,300	89,000	129,300	97,260
Day 3	8,500	-59,300	94,000	64,800	18,300	-103,200	61,000	124,600	106,725
Day 4	9,900	-33,200	45,300	-25,700	18,400	-92,500	139,300	39,100	96,745
Day 5	5,940	-31,000	-115,000	-36,400	15,840	-64,200	-69,700	-62,100	72,455
Day 6	-5,000	21,500	40,000	-24,000	940	-9,500	-75,000	-60,400	53,495
Day 7	25,000	1,900	-65,000	53,000	20,000	23,400	-25,000	29,000	32,370
Day 8	36,000	11,800	38,000	48,500	61,000	13,700	-27,000	101,500	69,410

Member (Client A + Client B)

Day	Net Value (buy value-sale value)				Cumulative Net Value*				VaR Margin
	Scrip A	Scrip B	Scrip C	Scrip D	Scrip A	Scrip B	Scrip C	Scrip D	for the Day #
Day 1	36,000	128,600	171,900	72,600	36,000	128,600	171,900	72,601	136,785
Day 2	62,300	198,900	179,600	308,100	78,700	70,300	185,700	374,500	255,560
Day 3	51,500	164,300	292,000	165,500	113,800	153,200	405,600	473,600	405,810
Day 4	74,900	136,200	795,300	995,000	126,400	94,500	691,300	907,700	664,985
Day 5	35,140	62,000	523,500	86,300	51,640	136,200	411,200	981,500	590,290
Day 6	10,000	21,500	144,800	120,700	35,140	40,500	378,700	107,200	196,360
Day 7	60,000	23,900	410,600	347,700	60,000	45,400	265,800	420,400	289,810
Day 8	72,000	66,100	358,000	503,800	62,000	90,000	692,600	262,100	389,750

It is the sum of absolute cumulative net values multiplied with the VaR rate for all scrips.

* It is the cumulative net values of the scrip for last two days (T and T-1), as margins are collected on T+1 basis. For example, the exposure at the end of day 6 is cumulative open position of the scrips for days 5 and 6.

Index-based Circuit Filters

An index based market-wide circuit breaker system applies at three stages of the index movement either way at 10%, 15% and 20%. These circuit breakers bring about a coordinated trading halt in all equity and equity derivatives markets nation wide. The breakers are triggered by movement of either S&P CNX Nifty or Sensex whichever is breached earlier. As an additional measure of safety, individual scrip-wise price bands of 20% either way have been imposed for all scrips, including debentures and warrants. However, in respect of scrips for which derivative products are available or those included in indices on which derivative products are available, a daily price limit of 10% is applicable.

Any order above or below 20% over the base price comes to the Exchange as a "price freeze". NSE may suo moto cancel the orders in the absence of any immediate confirmation from the members that these orders are genuine or for any other reason as it may deem fit. The Exchange views entries of non-genuine orders with utmost seriousness as this has market-wide repercussion.

Rolling Settlement

Under rolling settlement, all trades executed on a trading day are settled X days later. This is called "T+X" rolling settlement, where "T" is the trade date and "X" is the number of business days after trade date on which settlement takes place. The rolling settlement started on T+5 basis in India, implying that the outstanding positions at the end of the day 'T' are compulsorily settled 5 days after the trade date. It has now moved to T+3 basis.

Rolling settlement was first introduced in India by OTCEI. As dematerialisation took off, NSE provided an option to settle the trades in demat securities on rolling basis. In January 2000, SEBI made rolling settlement compulsory for trades in 10 select scrips. Based on a review in February 2000, SEBI added a total of 156 scrips under rolling settlement. SEBI further added another 263 scrips under compulsory rolling settlement on all the exchanges from July 2, 2001. The remaining scrips were traded under compulsory rolling settlement from December 31, 2002.

Rolling settlement offers several advantages over account period settlement:

The account period settlement does not discriminate between an investor transacting on the first day and an investor transacting on the last day of the trading period, as trades are clubbed together for the purposes of settlement and all investors realise the securities and/or funds together. Hence some investors have to wait longer for settlement of their transactions. Under rolling settlement, the investors trading on a particular day are treated differently from the investors trading on the preceding or succeeding day. All of them wait for "X" days from the trade date for settlement. Further, the gap between the trade date and the settlement date is less under rolling settlement making both securities and funds easily convertible.

The account period settlement combines the features of cash as well as futures markets and hence distorts price discovery process. In contrast, rolling settlement, which segregates cash and futures markets and thereby removes excessive speculation, helps in better price discovery.

Account period settlement allows build up of large positions over a trading period of five days and consequently, there is a pressure to close them out on the last trading day, leading to significant market volatility. This does not happen under rolling settlement, where positions can be built during a day only.

There is scope for both intra-settlement and intra-day speculation under account period settlement, which allows large outstanding positions and hence poses greater settlement risks. In contrast, since all open positions under rolling settlement at the end of a date 'T' are necessarily settled 'X' working days later, it limits the outstanding positions and reduces settlement risk.

Till recently, it was possible to shift positions from one exchange to another under account period as they followed different trading cycles. Rolling settlement took care of this by making trading cycle uniform.

Settlement Process

The settlement process begins as soon as members' obligations are determined through the clearing process. The settlement process revolves around the clearing corporation, which with the help of clearing banks and depositories, with clearing corporation providing a major link between clearing banks and depositories ensures actual movement of funds as well as securities on the prescribed pay-in and pay-out day.

This requires members to bring in their funds/securities to the clearing corporation. The CMs make the securities available in designated accounts with the two depositories (CM pool account in the case of NSDL and designated settlement accounts in the case of CSDL). The depositories move the securities available in the pool accounts to the pool account of the clearing corporation. Likewise CMs with funds obligations make funds available in the designated accounts with clearing banks. The clearing corporation sends electronic instructions to the clearing banks to debit designated CMs' accounts to the extent of payment obligations. The banks process these instructions, debit accounts of CMs and credit accounts of the clearing corporation. This constitutes pay-in of funds and of securities.

After processing for shortages of funds/securities and arranging for movement of funds from surplus banks to deficit banks through RBI clearing, the clearing corporation sends electronic instructions to the depositories/clearing banks to release pay-out of securities/funds. The depositories and clearing banks debit accounts of the clearing corporation and credit accounts of CMs. This constitutes pay-out of funds and securities.

Settlement is deemed to be complete upon declaration and release of pay-out of funds and securities. The settlement is performed by NSCCL as per well-defined settlement cycle for rolling and account period settlement. The settlement cycles for the CM segment are presented in Table 5-1. Under Rolling Settlement, the securities/funds pay-in/pay-out takes place on T+3 day. While pay-in of securities/funds takes place at 11.00 am on T+3 day, the pay-out of securities/funds takes from 2.30 p.m. on same day. Thus settlement is complete in 3 days from the end of the last day of the trading cycle.

Dematerialised Settlement

In order to promote dematerialisation of securities, NSE joined hands with leading financial institutions to establish the National Securities Depository Ltd. (NSDL), the first depository in the country, with the objective of enhancing the efficiency in settlement systems as also to reduce the menace of fake/forged and stolen securities. This has ushered in an era of dematerialised trading and settlement. SEBI has made dematerialised settlement mandatory in an ever-increasing number of securities in a phased manner, thus bringing about an increase in the proportion of shares delivered in dematerialised form. The share of demat delivery in total delivery at NSE increased to more than 99% in value terms during 2001-02. There is an increasing preference to settle trades, particularly in high value securities, in demat form. Such high level of demat settlement reassures success of rolling settlement.

Settlement Guarantee

After the execution of trade, the NSCCL becomes the counter-party to each transaction and ensures that funds and securities obligations are met. It provides settlement on the strength of a settlement guarantee fund. A large Settlement Guarantee Fund, which stood at Rs. 1,788 crore at the end of March 2002, provides the cushion for any residual risk. It operates like a self-insurance mechanism where members contribute to the Fund.

In the event of failure of a trading member to meet settlement obligations or committing a default, the Fund is utilised to the extent required for successful completion of the settlement. This has eliminated counter-party risk of trading on the Exchange. The market has full confidence that settlement shall take place in time and shall be completed irrespective of default by isolated trading members.

Other stock exchanges have been allowed by SEBI to use trade guarantee funds maintained by them for meeting the shortages arising out of non-fulfillment/partial fulfillment of funds obligations by members in a settlement before declaring the concerned member a defaulter as in the case of NSCCL, subject to the condition that: (a) in cases where the shortage was in excess of the base minimum capital (BMC), the trading facility of the member was withdrawn and the securities pay out due to the member was withheld, (b) in cases where the shortage exceeded 20% of the BMC and was less than the BMC on six occasions within a period of three months, the trading facility of the member was withdrawn and the securities pay-out to the member was withheld. On recovery of the complete shortages, the member would be permitted to trade with a reduced exposure.

Professional Clearing Member

NSCCL admits a special category of members called Professional Clearing Members (PCM). A PCM clears and settles trades executed for their clients (individuals, institutions etc.). In such an event, the functions and responsibilities of the PCM would be similar to Custodians. PCMs may also undertake clearing and settlement responsibility for trading members. In such a case, the PCM would settle the trades carried out by the trading members connected to them. The onus for settling the trade would be thus on the PCM and not the trading member. A PCM has no trading rights but has only clearing rights, i.e. he just clears the trades of his associate trading members and institutional clients.

Direct Pay-out of Funds/Securities

NSCCL has put in place a system for giving direct pay-out to investor's account. The system is applicable for both the depositories. An investor who is expecting a pay-out is required to give his/her account details to the trading member. The trading member in turn passes on this information to NSCCL. In order to smoothen the back office work of the trading members for providing this information, a front end has been provided for creating the file through which the information is passed on to NSCCL. On the pay-out day, pay-out goes to such investors' account directly from NSCCL. In case of any wrong information provided by the trading member, the pay-out goes to the pool account of the trading member.

Settlement Statistics

The details of settlement of trades on CM segment of NSE are provided in Annexure 5-1. About 22% of trades in terms of volume and 14% in terms of value were settled by delivery during 2001-02. There has been a substantial reduction in short and bad deliveries. Short deliveries averaged around 0.6% of total delivery in 2001-02. The ratio of bad deliveries to net deliveries progressively declined to almost negligible in 2001-02. There has been a dramatic pick-up in demat settlement which accounted for more than 99% of total delivery-based settlement in value terms during the period.

During 2001-02, taking all stock exchanges together, 24.75% of securities accounting for 15.21% turnover were settled by delivery and the balance were squared up/netted out (Table 5-5). In the preceding year, 20.7% of shares accounting for 10.8% of turnover were settled by delivery. This indicates preference for non-delivery-based trades, particularly in high volume securities and reflects the impact of rolling settlement.

Table 5-5: Delivery Pattern in Stock Exchanges

(In per cent)

Exchange	2000-01		2001-02	
	Quantity	Value	Quantity	Value
NSEIL	14.43	7.68	21.30	13.98
Mumbai	33.62	16.69	31.65	19.52
Calcutta	9.81	7.24	10.55	6.69
Delhi	26.86	12.34	45.91	32.12
Ahmedabad	7.93	6.83	4.89	2.93
Uttar Pradesh	2.48	2.04	39.55	0.92
Bangalore	12.96	4.46	22.30	28.86
Ludhiana	6.64	3.44	9.65	6.20
Pune	3.26	2.50	3.95	2.94
OTCEI	22.90	31.43	62.65	0.53
Hyderabad	45.30	17.05	57.53	19.80
ICSEIL	8.69	3.77	0.53	17.43
Chennai	31.36	13.05	10.23	9.07
Vadodara	0.00	0.00	0.00	0.00
Bhubaneshwar	0.00	0.00	0.00	0.00
Coimbatore	0.00	0.00	0.00	0.00
Madhya Pradesh	4.26	2.93	6.17	5.65
Magadh	0.00	0.00	0.00	0.00
Jaipur	0.00	0.00	0.00	0.00
Mangalore	0.00	0.00	0.00	0.00
Gauhati	0.00	0.00	100.00	100.00
SKSE	0.00	0.00	0.00	0.00
Cochin	1.89	6.13	2.72	6.35
Total	**20.74**	**10.80**	**24.75**	**15.21**

Source: SEBI.

Settlement Efficiency

During last couple of years, the clearing and settlement mechanism in India has improved considerably. This is clearly evident from the benchmarks of settlement efficiency compiled by Standard and Poor's as presented in Table 5-6. These benchmarks which are expressed as a score out of 100, provide an indication of the aggregate level of post-trade operational efficiency in securities markets. The Settlement Benchmark provides a means of tracking the evolution of settlement performance over time. The Settlement Benchmark for India improved from 8.30 in 1994 to 75.8 in 2001. The Safekeeping Benchmark provides the efficiency of a market in terms of collection of dividends and interest, reclamation of excess withheld taxes, and protection of rights in the event of a corporate action. India's score for safekeeping improved from 71.80 in 1994 to 86.70 in 2001. The Operational Risk Benchmark takes into consideration the settlement and safekeeping benchmarks and takes into accounts other operational factors such as the level of compliance with the G30 recommendation, the complexity and effectiveness of the regulatory and legal structure of the market, and counterparty risk. India scored 59.1 out of 100 in Operational Risk Benchmark in 2001 as compared to 28.00 in 1994.

Table 5-6: Benchmarks of Settlement Efficiency

(Score out of 100)

Benchmark	1994	1995	1996	1997	1998	1999	2000	2001
Settlement	8.3	-16.8	-0.7	-1.2	10.0	41.9	59.6	75.8
Safekeeping	71.8	75.0	76.6	76.8	69.7	78.1	81.9	86.7
Operational Risk	28.0	0.0	16.8	23.5	47.3	43.6	51.4	59.1

Source: S&P Fact Book 2002

ISSA Recommendations 2000

The international standards have been instrumental in improving safety and efficiency of the SSS. Table 5-7 attempts to assess Indian SSS for corporate securities in terms of ISSA Recommendations, which have become universal benchmarks. The Indian SSS seems to have met most of the recommendations in spirit, if not in letters. For example, the SSS may have dominant shareholders or their boards may not be accountable to users directly, but there are systems in place in the form of executive committee or Committee on Settlement Issues to receive input from users. The key areas where substantial improvements are required to fully comply with ISSA standards are governance of SSS, messaging standards, and risk management. More importantly, the SSS model, as implemented by NSCCL, needs to be replicated for the whole market.

Table 5-7: Indian Securities Settlement Systems vis-à-vis ISSA Recommendations 2000

Governance: *The SSS (Depositories/CC) have a primary responsibility to their users and other stakeholders. They must provide effective low cost processing. Services should be priced equitably.*
Q. Are the boards that govern the SSS answerable to its users? **A.** The boards are not explicitly answerable to its users, but to their promoters and the regulators.
Q. Does any single organisation, or a sector have a large voting position at the board of the SSS? **A.** There are dominant shareholders in the depositories/CC.
Q. Is there cross subsidisation of products (e.g. international services subsidised by local ones or transaction costs subsidised by asset servicing charges)? **A.** The depositories do not charge the investors and clearing members directly but charge its participants uniformly, who are free to have their own charge structure for their clients. However, the charges levied by depositories from participants and by participants of the same depository from clients vary widely. The CC does not levy any fee directly from members, but shares the transaction fee levied by the exchanges. These charges have reduced drastically over time with increase in volumes.
Q. What process is in place at the SSS to ensure that it meets the needs of all its stakeholders (e.g. institutions, broker dealers, retail investors, issuers)? **A.** The SSS, being companies, are governed by the Companies Act, 1956 which prescribes operational and financial standards. Besides, a depository is governed by the Depositories Act, 1996 and the regulations made there under. A CC is governed by the rules and regulations made under the SCRA, 1956. They generally evolve policies in consultation with the regulator and various committees which comprise of representatives of users and eminent persons.

Q. What is the communications strategy of the SSS to its stakeholders and how is this run?

A. The SSS maintain websites and disseminate information through press releases, circulars and newsletters. They hold annual general meetings and publish annual reports detailing its actions and plans as well as financials.

Technology - Core Processing: *Securities Systems must allow the option of network access on an interactive basis. They should cope with peak capacity without any service degradation, and have sufficient standby capabilities to recover operations in a reasonably short period within each processing day.*

Q. How often, over the last twelve months, have the SSS been required to change its published settlement timetable?

A. There has been no disruption of settlement schedule drawn by CC. The depositories adhere to the settlement schedules.

Q. Do the SSS operate real time or multiple batch processing for settlement?

A. The CC settles the trades in batches. But the depositories process the batches on real time. They also do real time settlement for off-market trades.

Q. Do the SSS allow interactive communication (on line real time) with its users, enabling settlement input and amendment?

A. Though securities are settled in batches, there is online real time interactive communication between the CC and the depositories, clearing bank and clearing members/custodians. The depositories also have interactive communication with their participants, and allow demat account holders to submit delivery instructions directly on the internet.

Q. Have the SSS ever failed to recover an outage within a reasonable time and what steps have been taken to prevent a similar event in the future?

A. This has never occurred. The depositories and the CC, however, maintain disaster recovery sites.

Technology - Messaging and Standards: *The industry worldwide must satisfy the need for efficient, fast settlement by full adherence to the International Securities Numbering process (ISO 6166) and uniform usage of ISO 15022 standards for all securities messages. The industry should seek to introduce a global client and counterpart identification methodology (BIC-ISO 9362) to further facilitate straight through processing. Applications and programmes should be structured in such a way as to facilitate open inter-action between all parties.*

Q. Does the market use ISIN as the primary securities identification code?

A. The market uses ISINs for all demat securities.

Q. Are the major participants in the market linked electronically?

A. The major exchanges provide nation-wide satellite links. The exchanges are also connected to CC which is connected to clearing banks, depositories, custodians and members electronically. Paper instructions are generally not used.

Q. Do the SSS communicate using true (i.e. not bilaterally agreed on sub-standards) ISO standards for securities messaging?

A. The depositories have bilaterally agreed automatic interfaces with participants and clearing agencies. The message structure is based on SWIFT standards. ISO standards are yet to be adopted in India.

Q. Does the market operate standard identification codes for counterparties or client accounts and, if so, how do these fit into a single global identification methodology?

A. The regulator has made it mandatory for all brokers to use unique client code for all clients. The depository participants have a unique identification numbers and they, in turn, allot client identification numbers. The market is yet to adopt universal client identification/global identification methodology.

Uniform Market Practices: *Each market must have clear rules assuring investor protection by safe guarding participants from the financial risks of failed settlement and ensuring that listed companies are required to follow sound policies on corporate governance, transfer of economic benefits and shareholder rights.*

Q. Does the market have securities lending and borrowing schemes in place, and are these open to all market participants and their settlement agents?

A. There is a securities lending and borrowing scheme in place. The FIIs can lend, but can not borrow.

Q. Does the settlement system mark fail trades to market and collect margin from the failing counterparty to protect the innocent counterpart's interest?

A. The CC identifies the short deliveries and conducts a buy-in auction on the day following the payout day. The clearing member is debited on the pay-out day by an amount equivalent to the securities not delivered, and valued at a valuation price based on the closing price on the previous day. If the buy-in auction price is more than the valuation price, the clearing member is liable for the difference. All shortages not brought in are deemed closed out at the highest price between the first day of the trading period until the day of squaring off, or closing price on the auction day plus 20%, whichever is higher. This amount is credited to the receiving member's account on the auction payout day.

Q. Does the market operate a guarantee fund or have an equivalent procedure to protect against the cost of failed transactions; and which sectors of the market does it cover?

A. The exchanges maintain Settlement Guarantee / Trade Guarantee Funds and use these funds for meeting shortages arising out of non-fulfillment/partial fulfillment of the funds obligations by the members in a settlement before declaring him a defaulter. There is no limit on pay-out per incident and all legitimate claims are honoured. The exchanges can use up to 25% of their guarantee funds to cover failures of payment during the allotment of IPOs for shares offered through them. Exchanges maintain an Investor Protection Fund to take care of investor claims arising out of non-settlement of obligations by a member. There is a limit on the amount payable per investor claim.

Q. Are the stock transfer agents (share registrars) linked electronically to the depository?

A. Registrars and transfer agents are electronically linked to both the depositories. The depositories transfer securities electronically.

Q. Is there a legal maximum time period to complete ownership transfers in the books of the issuer? If so, does market practice adhere to the deadline?

A. The Companies Act, 1956 requires companies to effect the transfers within 60 days. However, the dematerialized securities are freely transferable and depositories effect such transfers instantaneously. Over 99% of securities transactions are currently settled in demat form.

Q. Are investors entitled to all benefits arising on a security from the point of purchase; and how are these rules enforced?

A. Based on the record date/book closure, the exchanges determine 'no-delivery' period during which securities are traded ex-benefits and before that cum-benefits. The purchaser gets all the benefits from the date of purchase before no-delivery period. Physical securities require registration of transfer in favour of purchaser in order to entitle him to corporate actions.

Q. Is proxy voting permissible in the market and can such proxies be lodged by post or other remote delivery method?

A. A proxy can attend and vote at the meeting of the company, but can not participate in the deliberations. The document appointing a proxy need to be deposited at least 48 hours before the meeting. It is possible for a member to caste his vote by post also.

Q. Are there binding rules in the market stating the minimum and maximum lapsed time between the announcement and completion of key events, including registration, the calling of shareholder meetings, the payment of dividends or interest, rights issues, tender offers and other voluntary corporate actions?

A. These are prescribed in the Companies Act, 1956 and the listing agreements. For example, a share transfer shall be registered within 60 days of presentation, the dividend shall be paid to shareholders within 30 days from the date of declaration, annual general meeting shall be held every year and not more than 15 months shall lapse between two such meetings, at least 21 days' notice shall be given for general meetings, etc.

Q. Are all voluntary corporate actions advised through a central mechanism assuring consistent information to all investors?

A. Ex-dates for voluntary corporate actions are announced by the exchanges. These may differ among exchanges and on the same exchange for physical and dematerialized shares. These are disseminated through the web sites of the company, exchanges and depositories.The regulator has put in place an integrated source of company information, which is accessible through a web site on lines similar to that of Electronic Data Gathering, Analysis and Retrieval (EDGAR). All company related information, which is mandatorily required to be filed by the companies with the exchanges under the listing agreement, will be available at one location in electronically interactive form.

Q. Is information on corporate actions available electronically, and is the minimum lapsed time for responding to such actions sufficient to enable all domestic and foreign investors to respond in a timely and considered fashion?

A. The exchanges notify members of corporate actions through their websites and circulars. These are also available on the web site of the company and the depositories. Generally, sufficient time is available to all investors to respond to corporate actions.

Reduction of Settlement Risk: *The major risks in securities systems should be mitigated by five key measures, namely real delivery versus payment, trade date plus one settlement cycle, the minimisation of funding and liquidity constraints, scrip-less settlement, and mandatory trade matching and settlement performance measures.*

Q. Does the market use D*v*P settlement procedures in accordance with one of the recognised BIS models?

A. The market uses a variant of BIS model 3 that settles transfer instructions for both securities and funds on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle. The CC applies multilateral netting to determine obligations of members who have a security wise net obligation to receive/deliver and a fund obligation to pay/receive. The members pay-in fund/securities to the CC which in turn pays-out funds/securities to them. The CC has full control over receipts and payments and does not make pay-out unless pay-in has been received. This is akin to D*v*P in the sense that there is no principal risk, that is, a member making pay-in is guaranteed of pay-out.

Q. Does the market have a rolling settlement cycle of T+3 or shorter for all exchange traded instruments?

A. 414 active securities are traded under T+5 rolling settlement till recently. All other securities followed account period settlement, but have moved to T+5 rolling settlement from December 2001. The market has moved to T+3 with effect from April 2002.

Q. Could the market reduce the current settlement period to T+2 or below, without increasing fails rates? If so, how would this be achieved, and what plans are there to shorten the existing settlement cycle?

A. Limited availability of EFT constrains shorter settlement cycle. EFT is available only at 15 centres covering 8,500 bank branches and that too, for values not exceeding Rs. 2 crore per transfer. The market has moved to T+3 rolling settlement from April 2002 and is expected to switch to T+1 rolling settlement by the end of 2002.

Q. Is matching of trade details achieved on trade date, at least for direct market participants; and by trade date plus one for indirect participants?

A. Trades are executed on screen and matched trade details are linked to settlement system electronically. Hence matching of trades for direct participants is instantaneous. The custodians affirm trade details on T+1 basis.

Q. Is the depository scrip-less, and, if not, is it working to enable scrip-less settlement?

A. The depositories maintain ownership records of dematerialised securities and transfer the ownership electronically in book entry form.

Q. Does the market allow partial settlements?

A. The participants accept partial deliveries.

Q. Can the depository accommodate same day turnarounds?

A. The depositories do so for off-market transactions. Since institutions are required to do only delivery based transactions on exchanges and CC processes settlement in batches, same day turnaround is difficult.

Market Linkages: *Convergence of Securities Systems, both within countries and across borders, should be encouraged, where this eliminates operational risk, reduces cost and enhances market efficiency.*

Q. Is the depository linked electronically and in real time with other segments of the core market infrastructure (e.g. trading platforms, netting systems, payment systems)?

A. The depositories have secured real time linkages with CC which is connected with trading platform, netting and payment system.

Q. Is there one or more depository or settlement system in the market?

A. Each stock exchange has its own clearing agency. There are two depositories which are linked to most of the exchanges/clearing agencies.

Q. If there are several, has a consolidation been considered? If yes, by when?

A. The consolidation of trading and settlement system is left to market forces. There are 24 stock exchanges with equal number of clearing agencies and two depositories. The law encourages multiple agencies in the interest of competition.

Q. Does the securities system allow foreign systems to establish direct links on an equal basis to local members?

A. The system does not allow external agencies to participate in the securities system.

Q. Does the securities system allow foreign market participants to become direct participants?

A. The system does not allow foreign intermediaries to become direct market participants. They become direct participants through their local subsidiaries or joint ventures with local partners.

Investor Protection: *Investor compliance with the laws and regulations in the home countries of their investments should be part of their regulators' due diligence process. Investors, in turn, should be treated equitably in the home country of their investments especially in respect to their rights to shareholder benefits and concessionary arrangements under double tax agreements.*

Q. Do domestic regulators monitor the procedures in place at their locally based cross-border custodians to assure compliance with the laws and regulations of the home countries of their investments?

A. SEBI regulates locally-based cross border custodians and RBI maintains oversight for foreign and local banks licensed to operate in India.

Q. What are the areas (e.g. benefits, investor compensation) where foreign investors are not treated in the same way as local investors?

A. The foreign investors are generally treated at par with domestic investors. However, there are ceilings on investments by OCBs, NRIs, PIOs, and FIIs. The FIIs can not engage in short selling, turnaround trading and securities borrowing.

Q. Can sales proceeds and income be repatriated without any restrictions?

A. These can be repatriated only after certain tax compliance.

Q. Are double tax agreements simple to apply, and do foreign investors receive promptly their full entitlement to dividends and interest payments?

A. The double taxation agreements are simple to apply. The dematerialisation has helped foreign investors to receive their entitlements promptly.

Legal Infrastructure: *Local laws and regulations should ensure that there is segregation of client assets from the principal assets of their custodian; and no possible claim on client assets in the event of custodian bankruptcy or a similar event.*

Q. Under local rules and regulations, what are the segregation requirements for keeping client assets and custodian assets in the depository?

A. The brokers and depository participants are required to segregate their assets from those of their clients.

Q. How are clients' assets protected in the event of insolvency of a custodian or depository?

A. The securities held with a custodian or depository can not be attached in case of insolvency, as they are not legal owners.

Q. Does local law recognise the existence of beneficial owners who may differ from the legal owner of a security?

A. The Depositories Act, 1996 explicitly created legal owners and beneficial owners for dematerialized securities. While the depository is the registered owner of the securities, the investors are beneficial owners.

Q. Does local law clearly define the point of time when a settlement, both for the security and the cash involved, achieves finality and thus cannot be unwound?

A. The settlement is complete with pay-out of securities/funds to members. In fact once a trade is executed; it is eventually be settled and can not be unwound in between.

Q. Does a pledgee have an absolute right to realise their security at all times?

A. The pledgee generally has such a right. On receipt of a notice from the pledgee, the depository records him as the beneficial owner in respect of pledged securities.

Q. Does the depository have loss sharing provisions in its rules, and how would these be applied?

A. The depositories indemnify the beneficial owners of securities for any loss caused to them due to the negligence of the depositories or their participants. The depository can, however, recover the loss from the participant responsible for loss. Besides, the depositories have taken comprehensive insurance for business risk and system risk.

Policy Debates

Straight Through Processing

The securities market world over are working towards Straight Through Processing (STP) which is considered a prerequisite to reduce the trading cycle to T + 1 day. According to a SEBI report, the benefits of STP are that it (i) reduces risk leading to fewer trade fails, (ii) improves operational efficiency in handling larger volumes, (iii) facilitates movement towards shorter settlement cycles, (iv) enables increased cross border trading (FII trades), (v) provides transparency with clear audit trail, (vi) enables better market surveillance with real time information to regulators, and (vii) increases competitive advantage of the market.

Once the exchanges are able to use the safest Straight Through Processing (STP) for connecting the broker offices with the banks and DPs on real time basis, the risks will almost vanish. Under this system, the selling client's DP account will be checked as soon as broker gets sale order through the internet for securities balances and, similarly, buying client's bank account will be checked for cash balances. Only if this check confirms availability of adequate balances of either stock or cash, the order will be routed by the broker's trading terminal for trade execution.

There are a few variants of STP. As per the Classical model, STP supports settlement of securities at gross level. The debit and credit for securities and funds takes place directly into investors' account for all the trades. However, the model is restricted since it does not support multilateral netting and may lead to enhanced risk. Alternative is to allow some electronic intervention during a trade's life cycle. Through this intervention clearing members provide the details of investors' accounts to be debited / credited on net obligation basis. This ensures that the benefits of reduced risk due to multilateral netting and shorter settlement cycle are available to the clearing corporation as well as to the clearing members. There is another approach whereby a transaction takes place only after ensuring the availability of securities / funds in investors' respective accounts.

Selection of an appropriate STP approach for a market is a function of various factors. One of the critical factors is the level of technology used / available in the market. STP for net settlement is crucially dependent on robust, secure and advanced messaging network enabling all the participants to communicate online with the clearing /depository entities. It would also require strong software support allowing participants to know their net position on a regular basis. In case of STP for gross settlement, post trade communication requirement of participants with clearing / depository entity is limited. In this case, such requirement is only for custodial confirmation. Consequently, the level of technology required will be lower than in case of STP for net settlement.

The inability of continuous connectivity across wide area networks (WAN) restricts the introduction of STP. The limited availability of EFT and absence of RTGS constrains progress in this regard.

Delivery *versus* Payment

The settlement systems are broadly of two types: deferred net settlement (DNS) and real time gross settlement (RTGS). In DNS, the clearing process nets the sell/buy positions of members over a period of time and each member settles only the net amount on a specified day. The liquidity requirements are considerably smaller under DNS. In RTGS, on the other hand, the settlement of all transactions (buy and sell) is done instantly on a gross basis. Members maintain sufficient liquidity throughout the trading cycle, as they have to settle all claims assigned to them. The RTGS is gaining popularity all over the world as it takes care of systemic risk arising out of default by any one member. RTGS, in specific context of securities settlement, means D*v*P, which completely eliminates or substantially reduces the principal risk, i.e., the risk that the seller of a security could deliver the security but did not receive payment, or the buyer of a security made payment but did not receive the delivery of the security. Thus, D*v*P system increases the efficiency of settlement arrangement.

The D*v*P system is generally preferred for large-volume transactions and internationally, it has been introduced for settlement of government securities. Several variants of D*v*P are in vogue. There are: (i) systems that settle transfer instructions for both securities and funds on a gross basis with final delivery of securities and payment of funds taking place simultaneously, (ii) systems that settle securities transfer instructions on a gross basis with final delivery of securities occurring throughout the trading cycle, but settle funds transfer instructions on a net basis with final payment of funds occurring at the end of the cycle, and (iii) systems that settle transfer instructions for both securities and funds on a net basis, with final transfer of both securities and funds occurring at the end of the trading cycle. It may be noted that D*v*P system in government securities is operating in India through subsidiary general ledger (SGL) accounts. Further progress in this regard is contingent upon implementation of electronic funds transfer (EFT) facility and RTGS in payment system.

D*v*P in securities settlement, though a difficult task, remains the ultimate goal of clearing and settlement agencies. The G 30 recommendations, which have been driving the best practices in the securities markets all over the world, specify that D*v*P should be employed as the method of settling all securities transactions, where D*v*P means simultaneous, final and irrevocable exchange of securities and cash on a continuous basis throughout the day. The ISSA also recommended implementation of real D*v*P as one of the key measures to mitigate risks in securities settlement systems. It may be emphasised that the requirement of D*v*P settlement is at the level of direct participants and not at the level of clients.

Funds Clearing

Settlement of trades requires smooth, preferably instantaneous, movement of securities and funds in accordance with the prescribed schedule of pay-in and pay-out. NSE has been endeavouring to speed up movement of both funds and securities. The securities can now move instantaneously since all the participants have accounts with either of the two depositories, which are connected to each other and are connected to the Exchange. The movement of funds is not so instantaneous as only a few banks empanelled as clearing banks by NSCCL have the facility to transfer funds electronically. As participants have accounts in different banks at different places, movement of funds among participants invariably requires clearance through RBI's payment system. Further, the funds coming in and the funds going out of a clearing bank for settlement purposes rarely match requiring movement of funds from one clearing bank to another by using the RBI clearing system. This constrains same day pay-in and pay-out. The funds do not reach the accounts of investors on the same day as the NSCCL effects pay out to the trading members. These could be addressed if the clearing corporation directly participates in the RBI's clearing.

Clearing Corporation

The anonymous order book does not allow participants to assess the counter party risk. It is, therefore, necessary that the exchanges use a clearing corporation to provide novation and settlement guarantee. NSCCL provides such novation for all trades executed on NSE. Similar facility should be provided for trades on other exchanges. It is not necessary that each stock exchange must have its own exclusive clearing corporation. It may be better if the stock exchanges use the services of a clearing corporation or a few clearing corporations, as they share the depository services. Such an arrangement allows the clearing corporation to have an overall view of gross exposure position of traders across the stock exchanges and is much better geared to manage the risk. However, to provide for necessary competition, it is essential that there are at least two clearing corporations, just as this has been ensured in the case of depositories.

The clearing corporation ensures financial settlement of trades on the appointed day and time irrespective of default by members to bring in the required funds and/or securities, with the help of a 'Settlement Guarantee Fund'. This has revolutionised the volumes in the secondary market. It is important to keep improving the value of the Settlement Guarantee Fund by adding back all the accruals to the fund, subject to administrative expenses, to retain and build up the faith that the retail and foreign investment have reposed in the settlement mechanism. For this purpose, it is necessary to exempt the income of the Clearing Corporation from the purview of income tax.

As the clearing corporation guarantees financial settlement, it is necessary that it has first lien over the assets of insolvent clearing members.

It is meaningful for a clearing corporation to net all liabilities falling due on any given day for all types of settlement. As long as the clearing corporation is a centralised legal counter-party, risk management would dictate that it nets all obligations vis-à-vis each counter-party to itself.

VaR *versus* Margin Requirements

Starting from July 2, 2001 the margin requirements for scrips in the compulsory rolling settlement mode is determined based on a scientific model, i.e. VaR model. The regulation, stated broadly, prescribes a scrip-wise 99% VaR to be computed as equal to 3.5 times the daily volatility of each scrip, with the latter being computed using the same exponentially weighted moving average method that is currently used for index futures. The daily scrip-wise margins are computed as a multiple (at least 1.5 times) of the daily VaR. The exchanges are expected to calculate and display the scrip-wise margins on a daily basis. Margins for each trading member is arrived at by summing up scrip-wise margins based on scrip-wise VaRs multiplied by their positions in each stock, and this margin is applicable for transactions to be carried out in the next day. The new margining system removes the limitation of an across-the-board margin wherein volatile stocks are inadequately covered and less volatile stocks are handicapped by more than required margin, by linking the margins explicitly to measures of risk / volatility of stock prices. Naturally, the effectiveness of the risk based margining system would critically depend upon the accuracy with which the proposed VaR model characterizes the risk of a portfolio.

A 99% VaR will indicate the **maximum** loss that a portfolio can suffer in 99% of times. Conversely, it is the **minimum** loss that a portfolio can suffer in 1% worst cases. Therefore, VaR can be interpreted as the best of the worst scenarios or the worst of the best scenarios. A related point is that two portfolios, with different catastrophic risk profiles (stream of large losses), can have the same VaR. The exchanges must, therefore,

undertake exercises before implementing the new guidelines in order to make sure that they would not be holding excessively large or small levels of margins that could adversely affect the market activity.

Another aspect of the regulation is that the daily VaR is computed scrip-wise and multiplied with each trader's position in each stock to arrive at margins to be applicable for a trader's transaction the next day. An obvious limitation of this regulation is that it treats the risk of a portfolio as equal to the sum of risks of each scrip in the portfolio, thereby ignoring the fact a portfolio is a diverse set of correlated positions. The risk of well-diversified portfolios is expected to be less than that of the sum of the risks of individual parts, and margins based on the latter will be too high for this portfolio, possibly adversely affecting the market activity. A related technical point, not often recognized, is that VaR of a portfolio could be greater or less than the sum of VaRs of individual securities in the portfolio depending upon the composition of portfolio. In particular, for portfolios consisting of options this property of lack of sub-additivity becomes important. This would mean that by setting margins based on scrip-wise VaRs, the exchanges can not be sure that they are being conservative all the time and hence safe. For the margins to be determined in a scientific manner, the SEBI must encourage the exchanges to develop models to compute the VaR of a portfolio as a whole and not by parts.

Finally, VaR is obviously related to the volatility (variance) of the underlying stock price, but it is not a measure of volatility. Under some assumptions about how stock returns are statistically distributed (the so-called normal distribution), one can compute 99% VaR as 2.33 times the stock volatility. The SEBI guidelines require daily VaR to be computed as 3.5 times the daily volatility, may be factoring in, in a crude way, for the possibility that stock returns are not normally distributed. Whether this factor is sufficient or not to account for the extreme, but rare, losses is again an empirical matter that needs to be established in the Indian context. Further, one can not be sure that the VaR model, based on historical return data, would remain stable and applicable during the 'crisis' periods for which it is designed in the first place as stock prices may behave very differently during the crisis periods than otherwise. The regulator and exchanges will have to use some other auxiliary measures to deal with such situations.

Annexure 5-1: Settlement Statistics of CM Segment

Month/Year	No. of Trades (Lakh)	Traded Quantity (Lakh)	Delivered Quantity (Lakh)	% of Delivered Quantity to Traded Quantity	Turnover (Rs. cr.)	Delivered Value (Rs. cr.)	% of Delivered Value to Total Turnover	Delivered Quantity in Demat Mode (Lakh)	% of Demat Delivered Quantity to Total Delivered Quantity	Delivered Value in Demat Mode (Rs. cr.)	% of Demat Delivered Value to Total Delivered Value	Short Delivery (Auctioned quantity) (Lakh)	% of Short Delivery to Delivery	Unrectified Bad Delivery (Auctioned quantity) (Lakh)	% of Unrectified Bad Delivery to Delivery	Funds Pay-in (Rs. cr.)	Settlement Guarantee Fund (Rs. cr.)*
Nov 94-Mar 95	**3**	**1,330**	**688**	**51.74**	**1,728**	**898**	**51.98**	**—**	**—**	**—**	**—**	**6**	**0.85**	**1.76**	**0.26**	**300**	**—**
1995-96	**64**	**39,010**	**7,264**	**18.62**	**65,742**	**11,775**	**17.91**	**—**	**—**	**—**	**—**	**179**	**2.46**	**32.17**	**0.44**	**3,258**	**—**
1996-97	**262**	**134,317**	**16,453**	**12.25**	**292,314**	**32,640**	**11.17**	**—**	**—**	**—**	**—**	**382**	**2.32**	**66.25**	**0.40**	**7,212**	**—**
1997-98	**383**	**135,217**	**22,051**	**16.31**	**370,010**	**59,775**	**16.15**	**—**	**—**	**—**	**—**	**333**	**1.51**	**72.90**	**0.33**	**10,827**	**—**
1998-99	**550**	**165,310**	**27,991**	**16.93**	**413,573**	**66,204**	**16.01**	**6,179**	**22.08**	**11,571**	**17.48**	**305**	**1.09**	**69.73**	**0.25**	**12,175**	**584**
1999-00	**958**	**238,605**	**48,713**	**20.42**	**803,050**	**82,607**	**10.29**	**26,063**	**53.50**	**67,047**	**81.16**	**635**	**1.30**	**110.13**	**0.23**	**27,992**	**1,391**
Apr-00	69	11,490	2,446	21.28	63,091	7,278	11.54	1,812	74.11	6,805	93.49	34	1.40	2.90	0.119	4,826	1,358
May-00	116	18,643	2,910	15.61	80,848	7,209	8.92	2,381	81.81	6,878	95.40	36	1.23	2.03	0.070	4,991	1,342
Jun-00	118	16,925	2,568	15.17	100,382	7,418	7.39	2,059	80.18	7,100	95.71	27	1.05	1.53	0.060	3,070	1,503
Jul-00	114	17,257	2,461	14.26	101,014	7,417	7.34	2,119	86.11	7,177	96.76	26	1.06	1.06	0.043	3,232	1,494
Aug-00	143	21,678	2,976	13.73	119,020	8,470	7.12	2,664	89.52	8,272	97.66	26	0.87	1.21	0.041	4,121	2,161
Sep-00	130	23,549	2,986	12.68	132,457	8,559	6.46	2,850	95.45	8,482	99.10	29	0.98	0.57	0.019	3,941	2,339
Oct-00	124	21,721	3,203	14.75	97,739	7,661	7.84	3,113	97.19	7,567	98.77	19	0.58	0.41	0.013	2,879	2,303
Nov-00	122	22,782	3,055	13.41	91,593	6,023	6.58	2,995	98.04	5,986	99.39	19	0.62	0.19	0.006	2,561	2,378
Dec-00	156	32,722	4,304	13.15	119,295	7,606	6.38	4,231	98.30	7,558	99.37	25	0.57	0.42	0.010	3,172	2,528
Jan-01	195	38,203	5,268	13.79	146,326	11,014	7.53	5,172	98.18	10,939	99.32	27	0.51	0.57	0.011	4,513	2,821
Feb-01	170	42,188	8,167	19.36	124,154	14,240	11.47	8,065	98.75	14,165	99.47	31	0.38	0.36	0.004	3,644	3,621
Mar-01	155	37,038	9,859	26.62	87,979	13,383	15.21	9,795	99.36	13,318	99.52	41	0.41	0.32	0.003	4,988	2,916
2000-01	**1,614**	**304,196**	**50,203**	**16.50**	**1,263,898**	**106,277**	**8.41**	**47,257**	**94.13**	**104,246**	**98.09**	**339**	**0.68**	**11.58**	**0.023**	**45,937**	**2,916**
Apr-01	87	16,323	5,643	34.57	28,226	6,083	21.55	5,620	99.59	6,070	99.79	16	0.28	0.04	0.0008	1,915	2,751
May-01	155	27,764	6,428	23.15	51,835	7,371	14.22	6,405	99.64	7,353	99.76	15	0.24	0.02	0.0003	1,976	2,620
Jun-01	127	22,797	5,134	22.52	43,136	5,960	13.82	5,114	99.61	5,945	99.75	14	0.27	0.01	0.0002	1,626	2,409
Jul-01	97	13,149	2,971	22.59	29,092	3,721	12.79	2,964	99.76	3,717	99.89	21	0.70	0.00	0.0001	1,830	2,110
Aug-01	111	15,512	3,018	19.46	28,572	3,962	13.87	3,006	99.60	3,951	99.72	31	1.03	0.00	0.0001	1,847	2,102
Sep-01	124	16,554	3,136	18.94	33,718	3,933	11.66	3,124	99.62	3,931	99.95	16	0.51	0.00	0.0000	2,068	1,870
Oct-01	145	19,775	3,485	17.62	35,225	4,247	12.06	3,477	99.77	4,245	99.95	40	1.15	0.00	0.0000	1,954	1,803
Nov-01	142	22,647	4,865	21.48	37,471	5,679	15.16	4,855	99.79	5,675	99.93	46	0.95	0.00	0.0000	2,311	1,876
Dec-01	168	29,221	5,929	20.29	53,098	7,184	13.53	5,916	99.78	7,177	99.90	48	0.81	0.00	0.0000	3,035	1,876
Jan-02	225	38,325	5,729	14.95	71,329	7,940	11.13	5,728	99.98	7,938	99.97	39	0.68	0.00	0.0000	3,440	1,837
Feb-02	170	26,866	6,600	24.57	48,823	7,982	16.35	6,600	100.00	7,982	100.00	39	0.59	0.00	0.0000	3,016	1,866
Mar-02	169	25,762	6,360	24.69	47,596	7,703	16.18	6,360	100.00	7,703	99.99	40	0.62	0.00	0.0000	3,030	1,788
2001-02	**1,720**	**274,695**	**59,299**	**21.59**	**508,121**	**71,766**	**14.12**	**59,169**	**99.78**	**71,688**	**99.89**	**364**	**0.61**	**0.08**	**0.0001**	**28,048**	**1,788**

* Balance at the end of period.