Chapter- 1

Study Background and Research Problem Defined

1.1 Introductory Background

The origin of trading in securities in India dates back to 1793 when East India Company started dealing in loan securities. Later the enactment of the Companies Act in 1850 paved the way for the establishment of organized security trading industry. The present Bombay Stock Exchange (BSE) was established as “The Native Share and Stock Brokers Association” in 1875. To promote the development of stock market in an orderly manner Government of India introduced Securities Contracts (Regulation) Act, 1956. Till the inception of economic reforms, securities markets in India were comprised of regional stock exchanges with BSE as the major stock exchange. Introduction of economic reforms in the early 1990’s and establishment of National Stock Exchange of India Limited (NSE) which commenced trading in second half of 1994 heralded a new era in the Indian securities markets.

Since 1992 India has made substantial regulatory, structural, institutional and operational changes in the securities market to bring it on par with international standards. The objectives behind these reforms are to improve market quality in terms of enhancing market liquidity, transparency, facilitating fair trade etc.
SEBI Act, 1992 created Securities and Exchange Board of India (SEBI) as a regulator of securities market for protecting interests of investors and for developing securities market. For protecting the interests of investors, SEBI has issued the Disclosure and Investor Protection (DIP) guidelines which states the requirements for issuers, intermediaries and other market participants. SEBI has also taken the initiative of corporatization and demutualization of stock exchanges, where ownership, management and trading are with different people. NSE and Over the Counter Exchange of India (OTECI) are the first two exchanges to adopt demutualization. Later it was followed by other stock exchanges as well. Demutualization is regarded as a major step in the modernization of Indian securities market.

NSE for the first time in India introduced screen based trading system with nationwide online access. This is done with the objective of enhancing efficiency, liquidity and transparency. This trend has been followed by other stock exchanges and resulted in the disappearance of open outcry system in India. Modern technology like internet has been used extensively to take the trading platform to the premises of brokers and to the individual investors. This led to the equal access to all investors in all regions throughout the country.

To ensure efficient trading settlement, India introduced rolling settlement system. From December 2001 all stocks were placed under rolling settlement system. Initially it started with T+5 settlement period and later it has been reduced to T+3 and T+2.
Derivatives have been introduced in Indian stock market since 2000 to assist the market participants in managing risks. At present market offers index futures and index options on various indexes in NSE and BSE. It also offers single stock futures, options, interest rate derivatives and currency derivatives.

India passed Depositories Act, 1956 for establishment of depositaries in securities. Free transferability of securities of public limited companies and dematerialization of securities has helped in avoiding the settlement risk. India has set up two depositaries viz. National Securities Depository Ltd. (NSDL) and Central Depository Services (India) Limited (CDSL) for facilitating instantaneous electronic transfer of securities.

For protecting the interests of investors market regulators have devised a comprehensive risk management and investor protection system. This includes capital adequacy norms, margin requirements, monitoring of price fluctuations etc. Apart from this establishment of National Securities Clearing Corporation Ltd. (NSCCL) by NSE and Investor Education and Protection Fund (IEPF) were other measures taken to ensure financial settlement and protection of interests of investors.

Integration of Indian securities markets with rest of the world and resultant globalization is a major change that took place in the post reforms period. Permission for Foreign Institutional Investors (FII’s) to invest in Indian securities market, setting up of trading terminals abroad, permission for Indian companies to list in foreign stock markets were some of the steps taken to integrate domestic securities markets with rest of the world.
1.2 Market Microstructure

“Market microstructure is the study of the process and outcomes of exchanging assets under explicit trading rules” (Maureen O’Hara, 1995). It deals with the effect of specific trading mechanisms on the price formation process. Trading rules and the trading systems used by a market determines the type of market participants, the kind of instruments that can be traded, the timing, location and how to facilitate the day-to-day trading activities. Interest in the field of market microstructure research is mainly due to rapid changes in the technology, regulatory framework, adoption of new financial instruments, integration of domestic exchanges with the rest of the world, and advancement in internet. In developing countries globalization and competition with other markets led to the rapid changes in security trading industry.

Market microstructure studies the process by which investors latent demands are ultimately translated into prices and volumes. (Madhavan, A. 2000). Market microstructure theory is centered on a basic idea that asset prices need not equal full information expectations of value. It may be due to various frictions in the market. Market microstructure research uses specific trading mechanisms to analyze and model how price setting rules evolve. This helps to analyze the impact of different trading mechanisms on the process of price formation and also regarding the time series properties of prices. Market microstructure research, on the one hand, contributes to our understanding of returns to financial assets, on the other hand, the process by which markets become efficient.
The basic function of a market is to bring buyers and sellers together. This basic function did not change much. But market facility within which trading takes place has been greatly influenced by technology. Securities do not trade at evenly placed intervals throughout the day. Some days some securities may not be traded at all. The very process of trading can have impact on the statistical properties of financial time series. Market microstructure research is extremely useful in analyzing the behavior of markets and prices. This idea has immediate application in the regulation of markets, in designing and formulating new trading mechanisms and of course in making better investment strategies in different markets with different trading mechanisms. New and better insights come from empirical research on the market microstructure. The availability of high frequency data on prices, quotes, and other market information allows better and more realistic investigation of market microstructure impact. It provides an intellectual framework for designing and operating trading systems.

1.3 Research Problem Defined

This research work is an attempt to exclusively examine the impact of various reforms in the security market on market quality. Specifically, an attempt is made to examine the information efficiency, transaction cost and liquidity effects of market reforms. The basic aim of market reforms is to improve market quality. The adoption of new technology like internet is expected to result in faster dissemination of information and presents an equal opportunity to all investors to act on that information. Introduction of new financial instruments like derivatives provides wide range of opportunities for risk management.
and facilitates informed trading which in turn results in completeness of the market. Various regulatory changes and establishment of regulatory bodies are expected to result in transparency and reduction in malpractices associated security trading. All these structural changes in the form of reforms are undertaken to improve the quality of security market. To sum up, this study empirically examines various market microstructure changes in NSE upon the quality of the security market.

1.4 Objectives of the Study

In the light of the observations made above, this study evaluates the outcome of changes in market microstructure on market quality as measured by different criteria. More specifically the following are the objectives of the present study:

i) Market microstructure and speed of adjustment: In this objective an attempt is made to examine the impact of changes in market microstructure on speed of adjustment of asset prices to the arrival of information. It shows whether there is underreaction or overreaction in asset prices to the arrival of information.

ii) Market microstructure and private information: An attempt is made to examine the process of incorporation of private information in prices. Based on this criteria market quality will be compared over the years.
iii) Market microstructure and market liquidity: Liquidity effect of changes in market microstructure is examined in this objective. Bid-ask spreads is used as a measure of liquidity.

iv) Market microstructure and transaction cost: Market quality is examined based on implicit cost of security trading. Deviation of transaction prices from random walk is taken as measure of market quality.

1.5 Hypotheses

Keeping the objectives of the study in mind, the following two major hypotheses have been formulated:

i) Introduction of market reforms and resultant changes in market microstructure improves the market quality. Here, the term quality is used to mean informational efficiency, transaction cost and liquidity of the security market.

ii) Introduction of market reforms and resultant changes in market microstructure leads to predictable patterns in returns.

1.6 Justification of the Study

This study assumes significance due to several factors. First, fairly good amount of empirical evidence on market microstructure effects on security trading is available for developed countries stock markets. But for the emerging markets like India, there are
very few studies. India started bringing structural changes in stock market to improve transparency, efficiency, competitiveness and bringing Indian stock markets on par with international standards. India is a major emerging market which is increasingly getting integrated with rest of the world by attracting global investment. So a study of this kind assumes significance to assess the impact of these structural changes on market quality. Second, in Indian context to date there is no comprehensive study in the available literature which examined exclusively the impact of market reforms on market quality. Most of the studies have examined the impact of individual events on market quality. Third, most of the studies which have examined the impact of market microstructure on market quality based on single criteria. Different studies have used different criteria and there are no uniformly accepted single criteria to assess market quality. In this study an attempt is made to bring together most popularly used criterions under one study and assess the impact of market reforms on market quality.

1.7 Methodology of the Study

The study is conducted within the analytical framework of market microstructure and relied mostly on econometric and time series techniques for analysis. Depending upon the objectives the study has used appropriate techniques. Measuring security speed of adjustment is based on ARMA model. This methodology [due to Theobald and Yallup (2004)] has been popular in the literature. It is based on the logic that underreactions and overreactions in prices lead to a particular type of autocorrelations in the return process. Specifically, underreactions lead to positive autocorrelations and overreactions lead to
negative autocorrelations in stock returns. The ARMA model estimated from daily returns is expected to measure speed of adjustment of stock prices to new information from this standpoint.

To test the degree of incorporation of private information, autocorrelations and variance ratios are being employed. Framework for this analysis is taken from French and Roll (1986). Earlier empirical works have pointed out difference in the volatility pattern during trading and non trading periods. Based on variance ratios and autocorrelations in daily returns French and Roll (1986) established that incorporation of private information as reason for such a phenomenon. This study examines daytime to overnight returns variance ratios, opening to closing return variance ratios, autocorrelations in daily returns, opening and closing returns. Since opening and closing returns could follow distinct patterns, speed of adjustment in opening and closing prices to new information have also been analyzed.

The liquidity effect of market reforms is analyzed by using bid- ask spreads as a measure of liquidity. This is also a popular method used in the literature for measuring liquidity. Framework for this analysis is taken from Jegadeesh and Subrahmanyam (1993). A log linear regression model with proportionate quoted bid- ask spreads as a dependent variable and determinants of bid ask spreads and dummy variables as independent variables, has been used in this analysis. Determinants of spreads viz. price, volume and return variance are included in the model to account for their influence on bid- ask spreads. Then a dummy variable for each year which takes the value one for that period
and zero for rest of the period has been introduced. Liquidity effects will be analyzed by
considering the sign and significance of coefficient of dummy variable.

The impact of market reforms on implicit transaction cost is examined by a bivariate
Vector Auto Regressive (VAR) model. This methodology is first advocated by
Hasbrouck (1993). It divides the transaction prices into two components viz. random
walk component and residual stationary component. Random walk component is
identified as efficient price and residual stationary component is identified as pricing
error i.e. the difference between actual transaction price and efficient price. The standard
deviation of pricing error has been estimated as a proxy for transaction cost. It is based on
the assumption that when trade barriers are reduced actual transaction prices closely
follow efficient prices. A bivariate VAR model with returns and signed traded volume
has been used for estimating the pricing error.

1.8 Nature and Source of Data

The study uses both daily data and high frequency data depending on requirement of
different objectives. Daily data is downloaded from the official website of NSE
(www.nse-india.com) and high frequency data CD is purchased from NSE. The study is
based on 40 companies listed in NSE and are selected on basis of availability of data and
market capitalization of companies. The data set consists of daily opening and closing
prices, daily traded quantity, daily bid-ask quotes, intraday transaction prices, and
intraday traded quantity. The study period ranges from January 1995 to December 2008.
The total period is divided into three sub periods viz. 1995-1999, 2000-2003 and 2004-2008 representing different phases in the growth of NSE.

**1.9 Scope and Limitations of the Study**

This study is based on top 40 companies based on market capitalization which have been listed in NSE since its inception. In spite of the fact that same stocks are listed in BSE, NSE is preferred for two reasons. First, most of the reforms that swept Indian stock markets has been initiated by NSE and later followed by BSE. Second, NSE became largest stock exchange in the country in terms of daily turnover within one year of its commencement of trading and holds this position to this date. This study is based on companies which belong to top 100 companies in terms of market capitalization. So a study which includes all frequently traded companies listed in a stock exchange may give better picture of the subject matter.

**1.10 Organization of the Study**

The study is organized into seven chapters. The first chapter deals with introduction, background, objectives and hypotheses of the study. The second chapter contains comprehensive review of relevant literature. Chapters three to six deals with four major objectives of the study and their theoretical background, methodological issues and empirical findings. Seventh chapter presents the summary, findings and implications of the study.
Specifically, third chapter deals with measuring market quality through security speed of adjustment coefficients based on ARMA (1, 1) model. It shows the adjustment of security prices to the arrival of information. Fourth chapter presents the analysis of measuring market quality based on incorporation of private information into prices. It is based on variance ratios and autocorrelations in returns. An attempt is made to understand process of speed of adjustment in opening and closing prices.

The fifth chapter deals with measuring market quality through liquidity. Liquidity effects of changes in market microstructure are examined based on daily bid-ask spreads. The study has adopted a log-linear regression model with bid-ask spreads as a dependent variable and determinants of bid-ask spreads as independent variables. To examine the liquidity pattern over the years dummy variable is introduced which takes the value of one for that year and zero for rest of the years. Sixth chapter deals with measuring market quality through implicit transaction cost of stock trading. Transaction cost is measured based on vector autoregressive model. The seventh chapter deals with major findings, implications and conclusion of the study.