CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Introduction

There have been evolutionary changes in worldwide financial systems mostly driven by innovation. The major impetus for financial innovation has been globalization of financial systems, deregulation, and great advances in technologies. In increasingly integrated financial systems facing higher volatilities, more competition and wide varieties of risks, financial innovation has become an essence to provide new products and strategies to better suit different circumstances of time and market and to meet different requirements of participants in financial system. Financial engineering has been the phenomenon of product and process innovation in financial industry. Financial innovation and financial engineering together have improved choice of financial products to address different needs through which there have been clearly major welfare gains. The development of wide varieties of financial products and strategies has created opportunities for different participants in financial system to improve their management of risks and facilitated the smoothing of consumption and investment over time across different parts within a financial system and different financial systems. The emergence of engineered products and strategies along with all benefits has brought about different types of risks and complexities, particularly within the globally integrated financial system which has added to their complexities and risks.

Financial engineering is a cross disciplinary field of analysts to optimize and analyze various kinds of financial decision making and its evolving process has been trying to make best use of existing financial instruments to develop new varieties of products and strategies helping different participants and challenges that await them. The major application of financial engineering techniques has been in three broad areas of structured finance, hedging and risk management, and speculation and arbitrage. The explosive growth of
financial engineering and its application in different fields of financial services industry during last four decades asserts the increasing importance of this profession in the world of finance.

Then in the second part of study, with reference to

5.2 Goals and Objectives
The main objectives of this study may be classified as follows:

(I) The present study investigates the use of financial engineering techniques for funding purpose and enhancement of capital sources. For this purpose we concentrate on DR programs. Depositary Receipts (DRs) programs are investigated as an example of engineered financial instruments. The study explores the efficiency of these programs used by Indian companies to provide them with access to efficient financial markets to improve their capital sources and diversify their investor base.

(II) Given the more complexities and higher risks and volatilities prevailing in integrated financial system partially resulted from innovative products and process we investigate the essence of regulation of financial system. The study assesses the efficiency of Indian financial institutions (banking system), and various regulatory efforts to improve the quality of assets and safeguards towards financial restructuring. For this purpose the magnitude of non-performing asset (NPA) and its accumulation as one of the prominent causes of financial crisis is investigated in India’s banking system.

5.3 Methodology
The study consists of two main sections. First includes the review of literature relevant to the research, consisting of chapter one, two, first part of chapter three and four. This part is based on library study and survey of available resources. The second section of study has two distinct parts, representing the assessment of DRs of Indian origin companies to tap international markets, and the trends in the non-performing assets of commercial banks in India. This part of study is based on quantitative works.

For DR programs, the data is the DRs’ closing prices of fourteen Indian companies as sample, on weekly bases. The data is collected for the period of
04/01/2002 – 02/01/2009. The website of J.P. Morgan is used as source of the data. The sample is collected based on the availability of data for selected period for study. To assess the DR efficiency in providing issuers with access to efficient markets, host markets for DRs are investigated for random walk phenomenon through checking time series’ stationarity and unit root (Ljung-Box-Perce Q statistics, and Augmented Dickey-Fuller test). Using Box-Jenkins methodology, the appropriate univariate auto-regression model is estimated for all difference stationary time series prices for the purpose of short term forecasting evaluation.

To assess the NPA in banking system, the study uses the banking data reflected in financial statements of banks in the accounting terms as are available from the annual reports of Reserve Bank of India and its website for the period of 1999-2008 (10 years). The sample contains thirty banks from the scheduled commercial banks including; State Bank of India and its associates (8 banks), Nationalized bank (19 banks), and three Private bank. The linear panel data using fixed effects method is applied. Fixed effects method is one allowing for arbitrary correlation between the unobserved effects and observed explanatory variables. Panel unit root tests (Levin, Lin and Chu test (LLC), the Im, Pesaran and Shin (IPS) test, and Hadri Z-stat) are applied and residuals are checked for serial correlation. Software including EViews 5 and Macrofit 4.1 is used in the process of the study.

5.4 Discussion on the chapter scheme

In brief, the chapter scheme of the study is as follows: First chapter includes an introduction and deals with generalities of the research. Second chapter reviews the relevant literature regarding financial system particularly financial markets and financial engineering. Third chapter of the thesis focuses on the context of capital enhancement using structured financial instruments, specifically with reference to DR programs of Indian origin companies. Fourth chapter discusses banking system, essence of regulation and investigates the
efficiency of regulatory efforts to contain the problem of NPA. The fifth chapter presents a summary of the research.

Chapter one includes an introduction on the current study, its goals, methodology applied, and the structure of the study.

Second chapter provides review of literature on financial system, financial markets, and financial engineering techniques. First part of this chapter focuses on financial system, particularly financial markets. The chapter presents a brief introduction to financial system and markets and their common trends and also gives a functional and organizational review of financial system and markets. This chapter also reviews the major financial risks, costs, and efficiency concept in the market. The second part of this chapter is related to the different concepts of financial engineering. First, the chapter introduces the term of financial engineering and then, its origin, the major factors responsible for its tremendous growth, different tools of financial engineering, the scope of activities, and building block approach to products. Finally the application of financial engineering in three broad areas of speculation and arbitrage, hedging and risk management, and structured finance are discussed in detail, particularly with reference to structured finance.

With reference to the application of financial engineering in enhancement of capital resources and funding, the third chapter focuses on DRs. The chapter initially presents a generalized review of literature introducing the concept of DRs; its trade and different formats; the motives behind issue of DR and their advantages; and trends and evolution of the worldwide market for DR and remarkable growth of this market. The second part of the chapter concentrates on the DR programs in India and the efforts of Indian origin companies to tap international markets through the issuance of DR. In case of India, the chapter presents a historical and regulatory review with reference to DRs. The gradual modification and relaxation of guidelines for DRs have resulted in considerable increase in the number of companies and programs listed in international markets since 1992 which has made India one of the leading countries in the market for DR. Then, there is review of major incentives behind the cross listing of Indian origin companies through DRs in different formats. The last part of the
second chapter is based on a quantitative study. The work is carried out using univariate auto-regression model with the aim of assessing the efficiency of DR programs to provide Indian origin companies with access to more developed and efficient international markets to enhance their capital sources as well as investors base along with other beneficial effects. For this purpose, we examine the efficiency of host markets for fourteen Indian companies’ DR programs (as the sample).

Fourth chapter is devoted to consideration of regulatory system (checks and balances) of the financial system. With emergence of higher volatilities and risks and increasing complexities in financial systems the fourth chapter concentrates on the essence of regulation of financial system and importance of risk management efforts and risk based practices in financial system. Due to the specific and unique nature of banks in financial system and the role played by them the emphasis of this chapter is on the regulatory efforts in this part of financial system towards more protection, stability and safety of the system. There is review of banking literature, its evolving structure and functions, their major risks, banking asset-liability management, risk management and trends towards risk based practices and policies and the role of financial engineering in this evolution. There is also a brief introduction regarding the financial reengineering/restructuring in financial system and efforts towards this end partially by prudential norms. It also explains the essence of regulation, international efforts towards harmonization of financial systems, and Basel II. The second part of the chapter focuses on banking system and prudential norms in India. It starts with a review of prudential norms for the period of 1992-2008, and the efforts to compliance with Basel II norms and international best practices considering the country specific condition. The last part of this chapter is a quantitative study (based on linear panel data model) which examines the efficiency of different efforts in India to contain the problem of NPAs to improve efficiency and stability of financial system. For this purpose, the magnitude and changes of net non-performing asset in thirty banks of scheduled commercial banks (as the sample) are investigated for the period of 1999-2008.
5.5 Major findings of the study and conclusion

Findings: The findings of the research may be classified in two distinct groups as follows:

First, with reference to DR, to find out if the markets for DR programs have been efficient, following the Efficient Market Hypothesis and Random Walk Theory, we explore whether the prices of DRs of Indian origin companies follow a random walk behavior or the markets have been efficient. Then we investigate the possibility of any forecasting pattern in host market.

The results reveal that:

(I) Checking Prices of DR programs traded in the host markets stationarity, shows random walk phenomenon in all cases. The presence of random walk phenomenon emphasizes the absence of any reliable long run forecasting pattern regarding market to superior investment results.

(II) The short term and long term forecast evaluation is carried out for each difference stationary time series data (price of each DR program) through appropriate univariate auto regression model (the Box-Jenkins methodology). The large variance and bias proportion indicates that the forecasts are not tracking the variation in the actual series. This proportion has been more than 0.90 in 79% of dynamic forecast (long-term forecasting) evaluation emphasizing that there is no reliable and predictable pattern, guaranteeing a consistent forecast regarding market to superior investment results in long term which is consistent with the stationary tests results. The results of short term forecasting indicate that there may be some degree of predictable patterns in static forecasting -not so strong lasting for long period of time to offer investors a dependable way to earn abnormal return and predictable pattern, specially when these non random effects are very small relative to the transaction costs. Therefore markets for the sample companies’ DRs are consistent with random walk phenomenon, and are efficient. In other words, DRs are efficient instrument in providing sample companies with efficient and developed markets.

(III) The review of DRs of Indian origin companies listed in international financial markets reveals that four markets of NYSE, NASDAQ, LSE, and LuxSE are standing for more than 90% of the total listed DRs, asserting companies
tendencies towards some developed market through DRs to benefit more operational and informational efficiency regarding their programs. In fact beside all other incentives to cross listing, access to more developed and efficient markets has been one of the major motives that are facilitated through DR programs, particularly by firms from emerging markets to raise capital.

**Second,** to assess the efficiency of different regulatory efforts through prudential norms in India with the aim of restructuring of financial system we examine the success of these efforts to contain the problem of non performing assets in thirty scheduled commercial banks (as sample).

The review of general regulatory efforts along with the result from the study of trends and magnitude of NNPA in sample banks for the period of study (i.e. 1999-2008) may be summarized as follows:

(I) The best fitted equation is given below:

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Y = 125876.0 - 5100.2 X_1 + 0.386 X_{2(t-1)} + 1.2874 X_3 + 0.041 X_4 - 0.037 X_5
\]


With R-squared of 0.93, F-statistic of 92.21, Prob. (F-statistic) of 0.0. The t-statistic for all regression coefficients-as are presented under the corresponding coefficients-are more than two and with considering corresponding p-values, all coefficients are meaningful and acceptable (statistically insignificant) at 1% significant level.

Where:

- Y stands for Net Non Performing Asset of sample banks
- The constant term stands for unobserved effects as in fixed effects methods
- X_1 represents the Capital to Risk Asset Ratio (Tier-I) (%)
- X_{2(t-1)} is a lagged variable representing the magnitude of provisions & contingencies with one year lag.
- X_3 is public sector advance/total advance (%)
- X_4 is the amount of term loans
• \( X_3 \) refers to the amount of secured advances

The estimated equation coincides with the theoretical expectation regarding the different explanatory variables in the model and NNPA as the dependent variable.

**II** During the period under investigation, the average capital adequacy ratio (CARA) for the sample banks has increased from 10.99 in the year 1999, to 12.10 in 2008. While the average Tier I capital ratio shows small changes during the period of 1999-2008 through which sometimes a declining trend can be discerned also, Tier II capital ratio (i.e. supplementary capital) has increased from 2.6 to 4.31 in this period providing banks with more flexibilities to satisfy prudential minimum requirement. Provisions and contingencies as a percentage of total advances, has declined from 2.34% to 1.32% for the same period. During the period of 1999-2008, the public sector advances as a ratio of total advance has increased from 11.38 to 19.55, the amount of term loan advance has increased from Rs.345173 lakhs to Rs.3839115 lakhs, and its amount as a percentage of total advances has increased from 33.42% to 56.48%. While the amount of secured advances has increased for the period of 1999-2008, from Rs.924775 lakhs to Rs.5239156 lakh respectively, but as a percentage of total advances, it has declined from 91.44% to 80.34%. All these may refer to the better credit assessment and accurate asset classification process by banks to avoid the risky and doubtful advances and therefore more qualified assets.

**III** In the sample banks, NNPA has declined from Rs.80916 lakhs for the year 1999, to Rs.68556 lakhs in the year 2008(growth rate of -15%). In the same period, NNPA as a percentage of total advances has also declined from 8.23% to 0.75% (growth rate of -91%). The NNPA has declined in spite of increase in some risk factors during the period of study such as tendency towards higher ratios of public sector advance, term loan, and lower ratios of provisions and secured advances. There has been negative or predominantly decelerating trend of NNPA as a percentage of total advances. The trend indicates the success of some of the preventive and corrective measures used by regulators and banks to contain the problem of NPA.
5.6 Conclusion
Based on the findings of the research, conclusions are presented below:

First, with reference to the study of DR programs we may conclude that:

DR is an example of financial engineering activity in the field of creation of new products (financial instruments) and strategies which can be used for enhancement of capital resources. In fact, with identifying the needs from both sides (issuers and investors), and knowledge regarding the associated risks, financial engineering shape any type of asset, in formalized form to address different requirements. Financial Engineering has been providing wide varieties of financial instruments and strategies to address the end users’ requirements. While some of these products have been successful and accepted in marketplace and have achieved widespread uses, some have failed and discontinued. To be successful, the new products must feature distinguishing characteristics of product itself, the underlying market and potential size of demand for such characteristics and the regulatory environment. The distinction of the value of new financial products is the main factor to provide demand and growth of market for the innovative products.

The review of market for DR programs shows remarkable growth in worldwide DR markets which has been driven by increasing demand for this instrument. The fast growth of market for DRs, increasing number of countries and companies engaged in DRs, particularly from emerging countries assert the success of this innovative product to overcome some limitations in cross country investment; provision of wider capital base; changing the pattern of risk and reducing it; and providing safer equity baked by companies’ shares, all in an efficient manner. Particularly, for fast growing emerging economies, DRs have been approved to be an efficient tool for providing extra sources of capital through international markets. In other words, the ability of DR programs to meet different requirements of investors and issuers has been the main forces behind the increasing demand for this instrument.

The results of the study of host markets for the sample DR programs (issued by Indian companies) have been consistent with the random walk idea, asserting the efficiency of the markets. In fact, using DRs has enabled the
companies to tap developed and efficient international market at lower cost and risks to enhance their capital resources. The efficiency of DR as an instrument used for tapping efficient international market may be clearer when we consider the following facts. By the end of 2008, four stock exchanges (NYSE, NASDAQ, LSE, LuxSE) accounted for 94% of all new sponsored DR programs listed on exchanges, and 98% of total Sponsored DR listed on exchanges. During the same period, 97% of worldwide trading value of DRs, has been in three exchanges viz. NYSE, NASDAQ, and LSE.

Therefore, along with all incentives behind the use of DRs, the access to more efficient and developed market can be an important motive for companies especially from emerging markets to enhance their capital resources and diversify their investor basis. The markets with naturally wide investor bases which are interested in investment in foreign companies’ shares while avoiding the risks associated in direct investment in their markets, better performance, and higher liquidity. Toward this end, DR has been a favored instrument for these companies.

Financial Engineering has proved to be an important profession within the financial services industry, and has evolved it in different dimensions. Nowadays, there are wide varieties of engineered financial instruments and strategies prevailing in financial system to fit the various needs including funding and enhancement of capital sources available for different firms. Growing market for these products driven by demand forces assert the efficiency of financial engineering techniques in providing these services in a formalized form.

In the process of globalization, integration and linkages become critical to success of any financial system. Such integration becomes seamless and transparent when financial market offers wide array of instrument with varying structures for portfolio diversification and risk management, indicating increasing importance of financial innovation and engineering. However, innovative products and strategies besides all their benefits are risky instruments which need to be controlled properly from internal and external perspective. The major risk of financial engineering products and strategies
arises from not properly understanding and incorrectly using them, that calls for knowledgeable and highly skilled people and specialized institutions operating in this field. The intermediaries creating, and end users employing the products must have sufficient knowledge in control related dimensions of different products to prevent unexpected losses. This should be along with efficient internal controls of financial institutions and external control through efficient supervisory and regulatory efforts to prevent or reduce accompanied risks.

Second, the study of sample Indian banks and the review of regulatory efforts and guidelines assert that a lasting solution to the problem of NPAs can be achieved only with proper credit assessment and risk management mechanism. The responsibility of containing the factors leading to NPAs rests with banks themselves at the first step. However, in a situation of liquidity overhang, the enthusiasm of the banking system to increase lending may compromise on asset quality, raising concern about their adverse selection and potential danger of addition to the stock of NPAs. This necessitates that banking system should be equipped with prudential norms to minimize if not completely to avoid the problem of NPAs.

The success to contain the problem of NPAs and to improve the stability of financial system can be attributed to the number of corrective measures applied by the central bank and banking system which is summarized below:

- The banking system to contain the problem of NPAs, as preventive measure, has initiated organizational restructuring, improvement in the managerial efficiency and skill upgradation for proper assessment of credit worthiness. The banks have put in place rigorous and appropriate credit appraisal mechanism to avoid NPA.
- The curative measures so far attempted include Debt Recovery Tribunals, Lok Adalats, Asset Reconstruction Company, Corporate Debt Restructuring, circulation of information of defaulters, recovery action against large NPA, and credit information bureau.
- The Reserve Bank’s broad approach to financial sector restructuring has been to develop institutional and financial infrastructures and lay down appropriate regulatory and supervisory regime to ensure financial
stability consistent with overall objectives of growth with price stability. The pack of reforms has been contingent upon putting in place appropriate systems and procedures, technologies, and market practices with the aim of increasing capacity to meet the growing demand of economy. One of the challenges for the financial sector in the context of inclusive growth has been how to extend itself and innovate to meet the demands for financial inclusion and respond adequately to new opportunities and risks.

While NPA and its accumulation has been one of the permanent factors in financial crisis, the management of this problem is just a part of general approach towards the restructuring of the system. The asset quality and soundness parameters of Indian banking sector have improved significantly in recent years and now are comparable with global levels. The resultant improvements assert some efficient efforts towards the restructuring of the financial system which are elaborated below:

- With emerge of globalization; India has followed the process of gradual harmonization with the international best practices. All banks have migrated to the risk approaches under Basel II, from March 31, 2009. Following international norms, the RBI has been continuously upgrading risk management practices in banks and supervisory process so as to meet the challenges arising from financial innovations and simultaneously laying down robust arrangements deal with stress in the financial system.

- As the strength of individual institutions is often the first line of defense against any crisis, the policy initiatives’ focus has been increasingly on the need for banking institutions to adopt and promote strong corporate governance, integrity, internal control and risk management practices specially liquidity risk and ALM.

- There has been considerable improvement in the supervisory process exercised by a quasi-independent Board carved out of RBI’s Central Board. The regulatory guidelines are supplemented by moral suasion and supervisory review.
• The emphasis has been on credit quality, improvement of credit delivery system and development of related innovative channels, intensified skill development in human capital. Due to these efforts, the quality of asset of Indian banking sector have improved significantly and are comparable with global levels.

However, review of various norms reveals that financial stability in India has been achieved through perseverance with prudential policies preventing institutions from excessive risk taking, and financial markets from becoming extremely volatile and turbulent. If in contrast to global situation, India has been, by and large, spared of global financial contagion resulting from sub-prime turbulence; it is for variety of reasons. The credit derivatives market in India is in an embryonic stage. The originate-to-distribute model in India is not comparable to the ones prevailing in advanced markets. There are restrictions on investments by residents in such products issued abroad. The securitization at Indian banks occurs at a very low level due to the stringent RBI guidelines, and regulatory guidelines on securitization do not permit immediate profit recognition. Obviously, in a globally integrated financial markets and financial services industries, countries with the most efficient regulation (but not necessarily the least regulation) are likely to be more successful.

5.7 Recommendation and policy implication

Based on the present research study and its findings, the following recommendations are made to help the policy-makers.

(I) It is clear that there are important limitations on the capacity of financial system to deliver all the benefits of financial innovation. But equally it would be wrong to jump to the opposite extreme, given there are clearly major welfare gains from improved choices of products and better matching of risks. Financial engineering technique plays a critical role in increasingly integrated financial systems. It materializes the innovative products and strategies that provide financial systems with comparative advantages to operate efficiently and improve their competitiveness in the intensified worldwide competition.
(II) Without any doubt, the maintenance of financial stability is the key challenge for regulators. Therefore, any effort towards greater efficiency and competitiveness within financial sector has to be balanced with the need for protection and stability. The regulation of financial system should be towards a stable, resilient, competitive and responsive system. Such a system should improve the flexibilities to diversification and risk management to meet the circumstances and needs in financial system empowering financial system to withstand in the worldwide competition and financial crisis contagions.

(III) Creating diversified financial landscape that is capable of sufficiently meeting the financial needs of various sectors, will improve resource allocation and risk distribution in the economy. The outcome will be more focused financial institutions that lead to the greater specialization within the financial sector and they will facilitate the innovation and cost effective prices needed by economy.

(IV) Maintaining financial stability and development of financial sector are shared responsibilities of all stakeholders. To facilitate this role in fulfilling responsibilities and in making informed decisions, enhancements should be instituted to improve the transparency, comparability, relevance and timeliness of information relating to financial institutions’ operation and financial condition. More regulatory focus should be on the need for adherence to strong corporate governance, integrity, internal control and risk management practices, and promoting highly skilled and agile senior management to drive the strategic direction to strengthening of financial institutions as the first line of defense in any financial crisis.

(V) The performance gap between domestic financial institutions and foreign financial institutions should be reduced to enhance their capacity and efficiency to compete with foreign players. This ensures a smooth transition towards greater liberalization in financial sector without accumulation of risks. The capacity of domestic financial institutions may be facilitated through:

- Industry wide consolidation exercise providing the basic foundation to subsequent capacity building and efficiency improvement initiatives to allow the merged entities to strengthen capacities and benefit from greater group synergies;
Empowering financial institutions on the flexibility (for instance, revenue capacity and business diversification) brings about new operating models, leading to the creation of specialized and customized business centers offering specialized and customized products and services;

Application of technological advances facilitating enhanced delivery channels;

Improvement of risk management and enhancement of product development capabilities which bring about proliferation of specialized and new products;

Availability of highly skilled and agile senior management to drive the strategic direction and position their institutions to maximize the opportunities presented by the changing environment plays a vital role in improvement of efficiency and capacity of financial institutions.

Customers as another player in financial system, have a key role in fostering development, innovation and market discipline within the financial sector. Therefore, to empower them with greater responsibility, focus should be on the improvement of level of financial literacy along with the development of a comprehensive consumer protection infrastructure.

To strengthen the resiliency, competitiveness and efficiency of financial system should be balanced with a comprehensive approach to preserve financial stability of the system. This approach should be encompassing supervisory frameworks, prudential standards and risk management principles that are aligned with international best practices, focusing on:

- Enhancing capacity and skills of personnel involved in regulatory and supervisory activities.
- Access to timely, accurate and relevant data and information.
- Evolving the regulatory approach towards more principle based regulation, adaptive to changing market circumstances and business practices, reduce the regulatory burden and do not inhibit innovation and development.

In line with structural and operational changes, supervisory approach should evolve to adopt the increased complexities and enhance the
effectiveness of supervision. Supervisory activities should be on a rigorous risk based framework providing for structural and forward looking approach in assessing banking risk profiles and the effectiveness of risk management system.