

Research Paper

Financial engineering In the Capital Market of India

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Abstract

The last three decades have witnessed a phenomenal growth in innovations in financial markets. This is of interest to all financial intermediaries including commercial and corporate banks, insurance companies and other financial institutions. Globalization, Liberalization and Privatization have added both the risk and rewards to these innovations. There exist various new financial innovations in the field of banking, insurance, capital market and mutual funds in India. Of which the innovative and risk management practices in the capital market have been discussed. Efforts are made to figure out the salient features, advantages and disadvantages of the various financially engineered products and processes. The discussion of the way ahead for India in the field of financial innovations has been made as a part of this paper.

Keywords: Crisis, Innovation, Banking, Insurance, Capital Market, Mutual Funds

Introduction

There are numerous definitions of financial engineering, but most revolve around managing and reducing financial risk. A few definitions from popular books and web sites include the following:

"The process of financial engineering can be viewed as the 'fine-tuning' of an existing financial product to improve its return or risk characteristics in light of changing market conditions. It can be considered as a process which allows existing financial products to be overhauled and restructured to take advantage of changed taxation, legal or general economic climate."

I.Role of Financial Engineers

The rapidity with which corporate finance, bank finance, and investment finance have changed in recent years has given birth to a new discipline that has come to be known as financial engineering. The field of financial engineering has attracted people with an assortment of backgrounds and perspectives. The term financial engineering means different things to different people like commercial bankers, investment bankers, corporate treasurers, corporate recruiters, financial engineers, financial analysts, and others. The field is not yet very well defined and each practitioner tends to view his or her own body of experience as the crux of that which constitutes the discipline.

"Financial engineering refers to the application of various mathematical, statistical and computational techniques to solve practical problems in finance. Such problems include the valuation of derivatives instruments such as options, futures and swaps, the trading of securities, risk management and regulation of financial markets. No single set of mathematical tools, computational techniques or financial theory describes financial engineering. Rather, it is the synthesis of a variety of these elements. Financial engineering is a practical field and a practitioners' field by its nature. It is driven in large part by practical problems that arise in the course of daily business; the nature of the problems demand that practitioners draw from as broad a palate of tools as possible to find the best solutions to their problems. A second, related definition is that financial engineering is the use of financial instruments such as forwards, futures, swaps, options, and related products to restructure or rearrange cash flows in order to achieve

particular financial goals, particularly the management of financial risk."

Objectives:

The paper endeavors to track the growth of :

- 1.New types of life insurance products,
- 2.New forms of mutual funds,
- 3.New form of residential mortgages and
- 4.New risk management instruments introduced in India.

I.GLOBALIZATION, FINANCIAL ENGINEERING AND THE CRISIS

Innovative financial products which were mismanaged by the bankers and customers are often criticized and held responsible for the Global financial crisis (2008). It should however be noted that financial engineering is a profession which is to be governed by the conduct of professionals. The passion to succeed and greed to earn supernormal profits marred the foresight of the professionals from estimating the risks associated with financially innovated products. To service the bonds backed by sub - prime mortgages, the banks started using the income stream of their prime/default free mortgages. This laid the foundation for financial crisis. Hence, there was collapse of many big players including Freddie Mac, Fannie Mae, AIG, Lehman Brothers and Merrill Lynch. Hence the crisis can be linked to the bad performance of a large number of top executives in the financial engineering profession and not to the profession of financial engineering itself.

III. LITERATURE REVIEW

According to Verghese (1990) the Indian financial system consists of gaps and deficiencies which need to be filled in. India can not afford rapid proliferation of financial products. The systemic risk arising from regulated financial innovations is significant and hence can't be ignored. Financial innovation provides opportunities for hedging risk and reducing individual transaction cost but at the same time exposes economic units to additional costs and risk by creating new risk and sometimes resulting in ballooning of transactions.

Merton (1992) saw financial innovations performing six very important functions including moving funds across time and space, pooling of funds, managing risk, extracting information to support decision making, addressing moral hazard and asymmetric information

problem and facilitating sale or purchase of goods and services through a payment system. Frame and White (2004) surveyed and summarized existing empirical literature on financial innovations. They found that regulations tend to spur a series of financial innovations. There exists a positive relation between adoption and diffusion of new technologies and institution size. There also exists a positive relationship between individual's education and income and use of the new financial technology by consumers. Financial innovators tend to gain by first mover advantages and are compensated well for their efforts. Financial innovations tend to generate welfare effects normally.

IV. FINANCIAL ENGINEERING IN INDIA

India as an emerging nation is seeing a spate of innovations in the area of financial engineering. These financial innovations are a result of number of Government regulations, tax policies, globalization, liberalization, privatization, integration with the international financial market and increasing risk in the domestic financial market. Alternative financial institutions including nationalized banks, commercial paper houses, insurance companies and investment banks play a significant role in creation, development and dissemination of new financially engineered products in the society.

a. . INNOVATIONS IN THE INSURANCE SECTOR

The pace of financially engineered innovations in the insurance industry continues to pick up even in the light of lagged overall growth. There is a sense of urgency for innovations in the insurance sector. The insurance industry at this stage also has an appetite for change. Rightly created and implemented innovation strategies can help insurance companies emerge stronger during the current global financial crisis. The following paragraphs discuss the innovations in this sector.

1. Jeevan Aastha

In the light of current global financial crisis Life Insurance Corporation of India (LIC) launched a hybrid product called "Jeevan Aastha" which combines features of Fixed Deposits/Debt, equity and life insurance product. Jeevan Aastha is a closed ended single premium product which offers guaranteed benefits to the customer on maturity and death whichever is earlier. The product offers a simple interest of 10% per annum for a ten year period and a simple interest of 9% per annum for policies with a five year term. The product also offers risk coverage equal to the basic sum assured plus guaranteed addition in the first year of the policy. If the policy holder dies after the first year then double the maturity sum assured and guaranteed addition will be payable. However, in the scenario of death during the last year of the policy, twice the maturity sum assured along with guaranteed addition and loyalty addition would be payable to the nominee. The minimum risk coverage that can be availed is Rs. 1.5 lakh. No upper limit has been fixed. The product has been bundled with income tax benefits under section 80C and section 10(10D) making this product attractive for Indian middle class. However the maturity amount will be tax free. The product has also incorporated the feature of pledging the policy for undertaking a loan. A loan can be undertaken against the policy after completing one policy year. The surrender value in no case is less than 90% of the single premium paid. The surrender value will be calculated as the discounted value of the maturity sum assured and accrued guaranteed addition. To provide flexibility, the policy also provides "Cooling off Period" whereby one can also return the policy within 15 days if one is not satisfied with the terms and conditions of the policy.

2. Market Linked Pension Product

It enables policy holder to increase premiums with the rising income. This will enable the policy holder to accumulate larger wealth and beat eroding factors like inflation. Being a market linked pension product it provides performance over the long term and ensures good living standard after retirement. It has an inbuilt risk in case the market plummets in the long run.

3. Insurance Linked Education Loan

The Indian Banks' Association has engineered a model education loan product which provides for a higher quantum of loan. In this product the insurance premium will be a part of the expenses for the loan. The product will come with a provision of top up loan for students for further studies up to Rs. 4,00,000 of the loan amount. A cap or rate of interest which will not exceed benchmark prime lending rate (BPLR) has been fixed. For loans above Rs. 4,00,000 the rate of interest will not be more than 100 basis point over the BPLR. In this product life insurance policies and mutual funds units will be treated as permissible securities for the loan. Now banks can offer multiple loans to a single family after the introduction of this product. The product will although increase the cost of the loan but at the same time enhances the security for the bank. The life insurance policy will enable banks to recover the amount of loan in the eventuality of death of the student availing the education loan. Moreover, the same life insurance policy has become permissible as security for the loan. This product now enables students to avail education loan even if their family does not own real assets like Land and Building.

4. Customized Insurance Policies

Insurance Regulatory and Development Authority (IRDA) has permitted customization of non life insurance policies. For example, in motor insurance policy now one can have facilities like a temporary replacement of car in case it breaks down or complete reimbursement of damages, even if vehicle is over five years old. The insured will have to pay extra premium for such customization. This regulatory change will give rise to large number of financially engineered innovative non life insurance products.

5. Insurance Policies with Terrorism Cover

In the light of terror attacks in Mumbai, Delhi and other metropolitan cities Optima insurance launched a free insurance policy which provides a cover of rupees one lakh in the event of death in terrorist attack. There is no premium charged for subscribing to this policy. However registration with the company is a must for availing the compensation in event of death. It is a non commercial program and is using financial innovation for fulfilling responsibilities of corporate India towards society.

6. Insurance Cover on Lost Credit Cards

Plus Extended Protection Plan is a unique product which provides credit card customers lost card insurance for the period prior to reporting the loss. The insurance policy will cover reimbursement of up to Rs 50,000 per occurrence on any of fraudulent transaction occurred on the lost card up to 12 hours prior to the customer reporting the loss to the bank. Payment and debit card or credit card can be registered for this cover. It also offers ATM assaults and robbery insurance, lost wallet protection and purchase protection. The purpose of this policy is to encourage the confidence of the people who use debit or credit card. With increasing crime rate, this product reduces the risk of the policy holder.

7. Insurance for Poor

The Universal Health Insurance Scheme (UHS)

shows the utilization of financial engineering by Indian Government for providing hospitalization cover for 10 lakh people from families below the poverty line. It will also provide medical care in rural India. The annual premium under the UHIS is Rs. 300 for an individual, Rs. 450 for a family of five and Rs. 600 for a family of seven. One can get insurance for maturity benefits and preexisting disease up to the age of 70 years.

8. Micro Insurance Products

These are financially innovated insurance product in the area of health, personnel accident cover, crop insurance and insurance for equipment for low income groups like farmers and craftsmen in the unorganized rural sector. By paying a premium of Rs 200 to Rs. 500 one can get coverage of Rs 5,000 to 50,000. Indian government has launched Aam Aadmi Bima Yojana and Rashtriya Swasthya Bima Yojana as micro insurance products.

9. Micro Insurance for Women

Life Insurance Corporation (LIC), Punjab National Bank (PNB) and Govt. of India have used financial innovation to provide life and permanent disability cover for credit linked women Self Help Groups (SHGs) linked to PNB. This life insurance scheme will have an annual premium of Rs 200 of which 50% will be paid by the insured and the rest will come from the social security fund of the Central Government. This product will benefit approximately 30 lakh SHGs. LIC and PNB will benefit with the increase in the number of people insured.

b. . INNOVATIONS IN CAPITAL MARKET

With the increased volatility in the capital market, there is a need of new financial innovations in this sector to hedge risk and increase returns. The recent financial innovations in the area of capital market in India are discussed below:

1. Currency Futures

August 2008 saw the launch of currency derivatives at National Stock Exchange. A currency future is a futures contract where the underlying is a specific foreign currency and amount. Profits and losses depend on the relative movements of the two currencies. This enables the market participants to hedge their risk in the currency market.

2. Direct Market Access (DMA) Facility

DMA facility has enabled broker to offer their client direct access to the trading system of the exchange through the broker infrastructure without manual intervention of the broker. It offers a direct control of the client over orders, reduced time lag in execution of client orders, reduced errors caused by manual order entry, greater transparency, enhanced liquidity, lower cost for large orders and gainful use of speedily executed arbitrage strategies. The disadvantage of DMA is that several severe conformity provisions under the Securities Contract (regulations) Act 1956 have been laid down for the broker. The brokers are also expected to adhere to the stringent model agreement developed by the exchanges.

3. Applications Supported by Block Amount (ASBA) Process

ASBA is an application for subscribing to an issue which contains an authorization to block the application money in the applicant's bank account. This facility has been introduced for resident retail individual investors. It has an advantage the applicant's does not lose interest for the period the money remains blocked. It has saved the banks from first transferring the money from the bank to the company and back to individual applicant's account. Hence, the ASBA process has increased the operational efficiency and reduced

the transaction costs. The disadvantage of this process is that the applicant will not have the option to revise the bid. In other words it provides only a single option as to the number and price of the shares to bid for. It can be undertaken only at self certified Syndicate Banks. This makes the availability of ASBA facility limited to only selected banks.

4. NOW Trading Gateway

Now one can access NSE cash, NSE future and option, NSE currency derivative and NCDEX commodity derivatives using the NOW terminal. It helps increasing and managing users and their roles, multi segment front-end for trading, real time access to live market data and online reports, creation of multiple hierarchy and products. It provides real time pre-trade and rule based risk management. It is advantageous as it ensures a secure and reliable trading gateway. It has lower cost and greater operational efficiency. In terms of security features it uses 128 bit SSL encrypted secure transaction and comprehensive audit trail.

5. Long Term Option Contract (LTOC)

To mitigate risk Security and Exchange Board of India (SEBI) permitted use of LTOC on S&P CNX Nifty for trading in Future and Option segments from January 2008 onwards. The advantage of LTOC introduction on Nifty is that all the existing risk management measures used for index option contract such as initial margins, short option minimum change position limit and including the right of clearing corporation to close out positions can apply to LTOC on S&P CNX Nifty also.

6. India VIX-The Volatility Index

India VIX is a volatility based index based on Nifty 50 option prices. The purpose of the index is to capture the implied volatility embedded in option prices. It shows the amount by which the underlying index is expected to fluctuate in the near future. It is based on the order book of the underlying index options. The disadvantage is that no tradable product exist which is based on India VIX.

7. Creation of Stock Exchange for Small and Medium Enterprises (SMEs)

SME have been playing a very significant role in the development process of Indian economy. They contribute around 20% to the GDP and generate an employment for 25 million people. Moreover, SMEs are not able to access funds from angel investors, venture capitalists and private equity players. The purpose of such an exchange would be to provide better focused and cost effective service to the SME sector. Security and Exchange Board of India (SEBI) is already deliberating on the issue.

8. National Spot Exchange Limited (NSEL)

The cost of intermediation in the commodity futures market is high there by reducing the marketing efficiency and gains made by a farmer. The NSEL helps in reduction of costs and enables farmers to realize better price for their produce. It is advantageous as in future market trades happen for big volumes, in tons, whereas in spot market the trading happens for 1 quintal trading lot for one farmer. Moreover, farmer does not need pan card number, ration card and other formalities, which are necessary in future trading. In future market the delivery is not guaranteed but in the spot market, the contracts are designed with compulsory delivery on T+1 and T+3 basis. However, forward contract, future contract and options will not be available on National Spot Exchange. The spot exchange for agricultural commodities is expected to offer better price discovery and correct the aberrations that exist in Local Mandi's and sometimes in future market. This is the first spot

exchange for agriculture commodities in the world.
8.9. Short selling in Government Securities

To enhance liquidity in G-Sec market it was permitted to undertake the cover leg of short sell transaction even outside the Negotiated Dealing System-Order Matching (NDS-OM) Platform. Earlier the sell leg as well as the cover leg of the transaction was to be executed only on NDS-OM Platform. It means that transaction to cover short position can be undertaken either on NDS-OM platform or on the telephone market or via purchases in primary issuance market. The disadvantage that the sell leg of the short sell transaction would have to be undertaken on NDS-OM Platform would however continue.

9. Extension of Circuit Breaker to Index based Market

Circuit breakers are normally applied to individual scripts to suspend trading in case they show excessive volatility. The same concept has been financially engineered for the exchange in case of the index movement either way at 10%, 15% and 20% with respect to some base level. The advantage of Index based market wide circuit breaker is that it provides stability to the index and enhances investor's protection.

c . FINANCIAL INNOVATIONS IN MUTUAL FUND SECTOR

With sharp fall in the stock market in 2008 the mutual fund industry has tried to use financial innovations as the basis for fighting the current market turmoil. For example, J. M. Financial launched a multi strategy fund which is an open ended equity oriented fund which will be flexible to adopt a host of strategies depending upon fund manager's view of market. The following paragraphs discuss innovations in mutual fund sector.

1. Arbitrage Fund

Even with crashing equity markets, Arbitrage Funds have been able to generate positive returns. They are equity and derivative funds providing an ideal way of realizing reasonable returns from equities with risk hedged by derivatives. The Arbitrage Fund tries to capitalize on the stock price differences between the spot market (cash segment) and the derivative market (F & O segment). The fund tries to generate returns by availing the arbitrage opportunities that arise in case there are mispricing between the spot and derivative market. The returns can be generated irrespective of the overall market movement. The stock prices in the spot and the derivative market tend to coincide on the settlement day of the derivative segment. Hence the fund manager can reverse his position by buying a contract in the future market and selling off his equity holding in the spot market. The main concern is how efficiently the assets are balanced between the spot and the derivative market. Empirically they have shown better results than debt or income funds. They provide good returns during volatile periods.

2. Collective Investment Vehicle

Various art funds can now be floated in the market after obtaining approval from SEBI. In this people can pool-in funds to fund the purchase of the art and sell it later at a premium. The return would then be divided amongst the investors. This product may be suitable for High Net worth Individuals (HNIs) and institutional investors but not for the retail investors. This product raises art as a credible asset class. Art has a very low correlation with equity markets making it ideal for a large portfolio. Till date not even a single entity has registered with SEBI as collective investment vehicle.

3. Commodity based Mutual Funds

With situation turning from bad to worse to gruesome in the equity market; the mutual funds have innovatively tried to reap the benefits of the commodity bull run. In India in 2008 many commodity based funds like Mirae Asset Global Commodity Stock Fund, ING Optimix Global Commodities Fund and the AIG World Gold Fund and many others were launched. In India, we however, do not have funds which combine equities, commodities and bonds within one fund. This type of mutual funds gives an advantage of reduced risk and high returns to an investor. It also gives a choice to an investor to look for mutual funds which invest in varied asset classes within India. The major disadvantage is the nascent stage of commodity market in India and the lack of investor knowledge in the area of commodities. Singh, Agarwal and Harilal (2008) have shown the innovative way in which equities, commodities and bonds in Indian stock market can be combined for creating efficient funds.

4. Mutual Funds and Derivative Strategy

To beat the market in current global financial crises financial engineers have innovated an equity linked fixed maturity plan mutual fund which involves taking position with minimal market risk. The fund buys one stock (or its derivative) and sells another (or its derivative). This is done by identifying the trend i.e. benefiting one company and at the same time detrimental to another. For example JP Morgan Alpha fund uses this strategy.

5. Shariah Complied Securitized Market Financing

Merrill Lynch (London) and Bemo Securities (Beirut) made a sale of \$166 million debt like certificates for natural gas producer East Cameron Gas (Houston). It was the first Shariah complied securitized market financing of US assets. It was structured in such a manner that the Islamic investors effectively get a fixed rate of return while considering themselves owner of the underlying assets. This was in conformity with Islamic rule which prohibits the earning of interest. The instrument was considered to yield only the returns which were lawful. Shariah is the Islamic law based on teaching of Koran. The rule prohibits involvement in alcohol, gambling, human cloning, conventional banks and some forms of entertainment. In India we have the S&P CNX Nifty Shariah. Across the globe there exist S&P 500 Shariah, S&P Europe 350 Shariah, S&P Japan 500 Shariah and FTSE Shariah Japan 100. The index continues to eliminate such companies which get involved in any of the activities not permitted by Shariah rules. Using financial engineering, the world has been able to increase the flow of investments across continents keeping into account the religious sentiments of the investors.

6. Fund of Funds

To achieve maximum diversification, the mutual fund industry innovated a very noble way for achieving it. The Asset Management Company (AMC) develops a mutual fund which derives its value from a pool of mutual funds which are under the management of the same company. By this, maximum diversification is achieved and risk is reduced to minimum.

7. ULIP Variants

The idea of providing an insurance cover along with mutual funds was started by DSP Merrill Lynch in 2005. Nowadays in Indian Mutual fund sector many variants of ULIPs have been financially engineered. They combine features of mutual funds, pension funds and insurance policies. ULIP variants offer a range of products appealing to different types of customers. However, this tends to increase

complexity and makes it difficult for an investor to make decision.

CONCLUSION

The current research has made a noble attempt to discuss the application of financial engineering in the banking, insurance, capital market and mutual fund sector in India. Internationalization leads to a spurt of financial innovations in India and the world. The harm that has been caused by securitized instruments backed by subprime mortgages has been widely discussed in existing literature. The review of literature discusses the factors that have contributed to the growth of financial engineering and the lessons India can learn from international experience. While discussing the innovations in the banking sector the paper has discussed 10 innovations in this sector. The banking innovations aim at making customers closer to their funds, reduce cost, improve efficiency and provide safety. The paper has presented 9 innovations in the Indian insurance sector. In the insurance sector, new innovative products provide the features of guaranteed return, safety against inflation, social security, reimbursement of medical and hospitalization expenses. The capital market innovations have the feature of investor protection, transparency, enhanced liquidity, reduced cost and mitigation of risk. For the mutual fund industry 7 innovations have been discussed. The mutual fund innovations have the feature of diversification, risk reduction and superior return in the volatile market. The existing innovative financially engineered products lack the protection against inflation. In India, there is a great need of innovations especially for senior citizens, poor people, women, rural people as well as a large middle class. There remains scope for development of insurance exchanges, credit reinsurance market, carbon market, property future, weather derivatives, freight derivatives and inflation derivatives. As long as human ingenuity challenges its present for a better tomorrow, there will always exist the scope for financial engineers and financial innovations

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