A STUDY OF INNOVATIVE FINANCIAL ENGINEERING IN FINANCIAL SERVICE SECTOR

Ms.Nilam Naidu.
Assistant Professor, Indira Global Business School Pune,
Email-NilamNaidu@indiragbs.edu.in (9989650101)

Ms. Sheetal Suresh Sukate.
Shri. Shahu Mandir Mahavidyalaya Pune,
Email- sheetalsukate3506@gmail.com (9960716366)

Abstract
Financial engineering is the use of mathematical techniques to solve financial problems. Financial engineering uses tools and knowledge from the fields of computer science, statistics, economics, and applied mathematics to address current financial issues as well as to devise new and innovative financial products. Financial engineering is sometimes referred to as quantitative analysis and is used by regular commercial banks, investment banks, insurance agencies, and hedge funds. It has also aided to the innovation of processes and distribution in the financial services industry. Technology has been both source and enabler in this innovation journey. The information technology companies have a major role to play in the sustainable growth of the financial services industry.
Keywords: Financial engineering, technology, financial system

Research methodology
This paper is depending upon Secondary Sources of Data. The information is collected from Different books, journals, magazines and websites.

Objectives
1. To understand the basics of financial engineering.
2. To study the scope of financial engineering in India
3. To study the process of financial engineering.

Definition
Financial engineering involves the design, the development and the implementation of innovative financial instruments and processes, and the formulation of creative solutions to problems in finance.

Introduction
Financial engineering is an engineering discipline which deals with the creation of new and improved financial products through innovative design or repackaging of existing financial instruments. Financial engineering and innovations are seen in bonds, equity, derivatives and in fields like mergers, acquisitions and corporate restructuring. Some of the innovations in the Indian financial market are debt-oriented schemes of mutual funds, interest rate futures, interest rate swaps, currency swaps, floating rate bonds, money market mutual funds, etc.

Process of Financial Engineering
Financial engineers work at investment banks, which cater to the requirements of institutional clients. Identification of need involves the objective which the investor wants to achieve through financially

engineered products. For example, individual investors wanted to reduce their tax liability. To help achieve this objective, mutual funds managers developed debt oriented mutual fund schemes by introducing variations in mutual fund schemes. Similarly, some investor might want to increase his exposure to a particular sector like the real estate sector. So, he can invest in infrastructure funds introduced by mutual fund managers.

Process Identification of need Initial sketch of Product Complex Model Building Exercise Testing of the product Perfect product on the basis of the exercise Pricing of the Product Restructuring of the product Test Marketing Launching of the Product

Financial Engineering in "EQUITY"

Non-Voting Shares

If such kind of equity securities are issued, it would have the following benefits: It would enable management to retain their control; and It can be bought by retail investors who do not bother about voting rights, but are more concerned about dividends and returns.

Differential Voting Rights (DVRs)

In shares with DVR, investors have disproportionate voting rights. Those having less voting rights are paid higher dividends because of less control over the company. In the initial stage, all investors are offered same stock with same terms. Later on, they are allowed to exchange the same stock with less voting rights and high dividend

Employee Stock Option Plan

It is offered to employees and directors of the company to give them a sense of ownership of the company and to encourage them to participate actively in the management of the company.

Sweat Equity Shares

In this case, the entrepreneur invests his capital and the manager brings his knowledge. Over time, the manager is offered shares in lieu of salary and it is called 'sweat equity'.

Example: Mukesh Ambani had 12% sweat equity stake in Reliance Infocomm which became cause of dispute between the Ambani Brothers.

Puttable Common Stock

This is one kind of buy-back offer by the company. The company, which has good reputation in the market, charges higher premium for puttable common stock. There is no loss to the company because shareholders will not exercise option once the company performs well.

Example: Intel had issued puttable common stock.

Financial Engineering in "DEBT"

Zero Coupon Bonds

These bonds are issued at discount and redeemed at par. These bonds do not carry interest.

Dual Currency Bonds

Principal is denominated in dollars while interest is denominated in Indian Rupees. This kind of bond can be issued to Non-Resident Indians (NRIs). They could designate beneficiary in India and the amount is

remitted to designated beneficiary in India. For example, in April 2008, Adani Power issued dual currency bond amounting $1.113 bn to finance Mundra Power Project.

Floating Rate Bonds

The floating interest rate provides protection against inflation risk. The rate could be quoted as 'LIBOR + 200 Basis Points'. For example, in November 2009, Power Finance Corporation raised Rs. 11 bn via floating rate bonds. The company sold 3-year bond paying 135 basis points over one year government security and 10-year bond paying 179 basis points over one year government security.

Dual Rate Loans

In dual rate loans, fixed interest rate is charged to the borrower up to prefixed period and thereafter loan is linked to benchmark rate. For example, HDFC recently announced dual rate loan.

Financial Engineering in Hybrid Instruments'

Convertible Debentures (CDs)

CDs are converted into equity share on predetermined date at predetermined rate. Convertible debentures best suit companies which have long gestation period and are not able to raise fund through equity. In 2002, Reliance Industries issued triple option convertible debentures which can be converted into three equity shares.

Equity-Linked Debentures (ELDs)

Introduced by asset management companies to meet retail investors requirements. The interest on ELDs depends on the performance of underlying stock or index, and hence, it is not fixed . ELDs can be linked to stocks and indices by participation ratio. If it is linked to Sensex at participation ratio of 100%, then, if Sensex rises by 10%, interest on ELDs rise by 10%. In case, Sensex falls below, then investors will get back principal amount without return.

ELDs are of two types:

1. Principal protected where principal is protected while interest is linked to market; and
2. Principal is linked to market.

Gold-Linked Debentures .

- A structured product with underlying being gold and is linked to gold price.
- In case the price of gold falls, then investors get their principal back without return.
- If the price of gold rises, the investor gets principal plus extent to which there has been rise in gold prices.
- Targeted to High Networth Individuals (HNIs) and the minimum investment requirement is 5 lakhs.
- Offered by Edelweiss Capital, Kotak and Citi Group.

Non-Convertible Debentures + Warrants (NCD + Warrants)

NCD + Warrants are the new financial instruments proposed by SEBI which has two parts containing a debt portion (NCD) and an equity portion (Warrant). Exercise of warrant by the shareholder leads to dilution of control and issue of more equity. NCD + Warrants allow detaching both and trading them as separate units.

Indexed Currency Options

Issuer pays reduced principal at maturity if specified foreign currency appreciates relative to he US dollar. This means that it is risky proposition for investors who assume foreign currency risk by selling call option denominated in foreign currency.

Financial Engineering in Derivatives :

FORWARDS

Customized contract between two parties, where one party agrees to sell/buy predetermined quantity of underlying on future date. Example- currency forward contracts.

FUTURES

- Extension of forward contracts.
- It is a standardized contract between two parties wherein one party agrees to buy/sell predetermined quantity at predetermined future price on future date.
- As it is standardized contract, it is exchange traded.
- It is marked-to-market to avoid loss to clearing corporation as it acts as counterparty in futures transactions. Both parties to contract have to pay upfront margin. Example - stock futures, index futures, currency futures which are traded on National Stock Exchange.

OPTIONS

Options give its holder right but not an obligation to buy/sell contract. There are two types of options: Call and Put. There are two parties: One taking positive side and another taking negative side. Bullish outlook about the market -- buy call option Bearish outlook-- go long on put option.

SWAPS

The most popular are currency swaps. This is used when a company has taken loan in one currency and its cash inflows come from some other country. For example, an Indian manufacturer has taken loan in US$ but his major revenues are denominated in Euro. So, he should enter into swap transaction wherein he can swap dollar currency loan with euro denominated loan.

Mutual Funds

Classification According to Maturity

OPEN-ENDED FUNDS: The holder of unit of these funds can redeem them at any time to issuing company. There is no fixed maturity for these funds. Such mutual fund companies invest in secondary market, Example, ICICI Prudential

CLOSE-ENDED FUNDS Close-Ended Fund Asset Management Company has a definite target amount for the funds and cannot sell more shares after its initial offering. Its shares are issued like any other company's new issues and are quoted at the stock exchange. Example: Kotak Dynamic Asset Allocation Scheme.

CLASSIFICATION ACCORDING TO PORTFOLIO

- Bond funds
- Stock funds

- Income funds
- Money market funds
- Balanced funds
- Growth funds: Invested in growth stock which has above average growth potential.
- Performance funds: Invested in stock with high price-earnings ratio and high price volatility.

Example:

Product Level (Financial instruments)

– Launch of stock index futures to protect against rising volatility of equity;
– Launch of debt oriented schemes of mutual funds to get tax advantage;
– Launch of Forward Rate Agreement (FRA) to hedge interest rate volatility.

Company Level (Corporate finance)

– Mahindra-Satyam merger deal ;
– Vijay Mallya securitized "Kingfisher Airlines" brand to raise Rs. 2,000 cr from SBI
– Tata-Tetley Leveraged Buyout; and
– Tata's Differential Voting Right (DVR) Issue—the first of its kind in India.

INNOVATION	**MOTIVATING FACTOR**
Debt-Oriented Scheme of Mutual Fund	Tax Advantage
Partially Convertible Debentures and Fully Convertible Debentures	Pricing under Capital Control Act and Interest Rate Regulation
Zero Coupon Bonds	Tax Benefit
Puttable and Callable Bonds	Volatility of Interest Rates
Stock Index Futures	Volatility of Equity Prices
Havala Transactions	RBI Restrictions Interest
Interest Rate Swaps	Volatility of Interest Rates
Currency Swaps	Volatility of Exchange Rates
Screen Based Trading	Technology
Specialized Mutual Funds	Investor Preference
Exchange Traded Options	Volatility of Stock Prices
Project Finance	Risk Sharing

Applications

- Investment banking
- Corporate Strategic planning
- Risk management
- Primary and derivative securities valuation
- Swaps & derivatives trading or dealing
- Portfolio management
- Securities trading

Conclusion

The field of financial engineering needs much more development to ensure that investors have wider choice of investing and corporate have wider choice of financing. The new instruments should be created to ensure financial efficiency and solve the problem of financing the corporations.

This can be done by two ways:

(1) By unbundling existing products

(2) By creating new products.

The financial engineering field has emerged by creating new instruments from plain vanilla equity and debt. So, different mix of debt and equity, i.e., hybrid instruments can best serve investor's needs to avoid the extremes of high risk and low return.

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