

# Question Paper

## Security Analysis-II (212): January 2005

### Section D: Case Study (50 Marks)

This section consists of questions with serial number 1 - 5.  
Answer all questions.  
Marks are indicated against each question.  
Do not spend more than 80 - 90 minutes on Section D.

### Case Study

Read the case carefully and answer the following questions:

1. Perform Michael Porter Analysis of the Indian Pharmaceutical industry.  
(10 marks) [< Answer >](#)
2. Using ratio analysis technique, comment on the financial status of Sun Pharma based on the financial statements given in the case.  
(12 marks) [< Answer >](#)
3. Based on the information given in Annexure-I and the financial statements of Sun Pharma, determine the required return on the share of Sun Pharma, according to CAPM. Using the rate thus determined, calculate the perpetual dividend growth rate required by the company according to the dividend discount model to support its current stock price of Rs.423.65. The risk free rate is 6.00%.  
(10 marks) [< Answer >](#)
4. Future estimates of growth rate in earnings, payout rate and beta of Sun Pharma have been depicted in the figures given in the Annexure II. If the risk free rate of return is 6.00% and the risk premium of the market is 4.5%, you are **required** to calculate the intrinsic value of the Sun Pharma stock.  
(10 marks) [< Answer >](#)
5. Comment on whether the signals given are for 'buy' or 'sell' based on the technical analysis charts given in Annexure-I (Refer to points A, B, C and D).  
(8 marks) [< Answer >](#)

India ranks 14<sup>th</sup> among drug producing countries, in value terms, and 5<sup>th</sup>, in volume terms, with a 8 percent share of the global pharmaceutical production market. The Indian pharmaceutical industry has been growing at a compounded annual growth rate (CAGR) of 15.8 percent for the last five years. Today, the industry employs approximately 2.86 mn people and has around 20,053 units and total production of Rs.197.37 bn.

### Industry Classification

The industry is classified into the organised and unorganised sectors. There are around 250 manufacturing and formulation units in the organised sector, which accounts for 70 percent of the total sales. The organised sector can be further classified, on the basis of management control, into multinational companies (MNCs) and Indian companies. In the case of all bulk drugs, their intermediates and formulations; foreign investments are permitted up to 74 percent through the automatic approval route. The share of MNCs, which once dominated the Indian pharmaceuticals market, has dropped from 75 percent in 1971 to 35 percent, while Indian companies have gained from a mere 20 percent share in 1971 to over 65 percent.

The products manufactured by the pharmaceutical industry can be broadly classified into bulk drugs and formulations. Bulk drugs are the key acting ingredients that have medicinal properties and form the basic raw material for the manufacture of formulations. They can be produced through alternate processes using drug intermediates and fine chemicals. Formulations are specific dosage forms of a bulk drug or of a combination of different bulk drugs. The Indian market has more than 100,000 drugs and around 2,400 licensed manufacturers. Bulk drugs constitute nearly 19.1 percent of the market and formulations account for the balance of 80.9 percent.

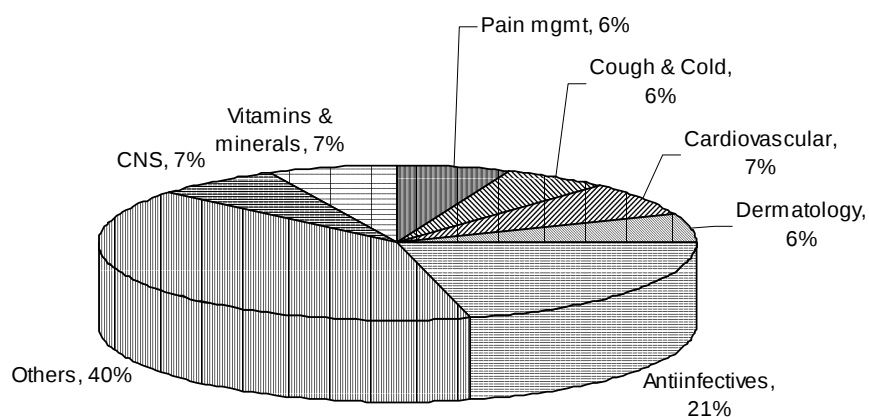
Formulations are further classified into prescription medicines (ethical formulations) and over-the-counter medicines (OTC formulations). The former are those that can be dispensed by a chemist only to patients who have a prescription from a qualified medical practitioner, while the latter can be dispensed even in the absence of a prescription (e.g. drugs for cough and cold, analgesics, etc.). Ethical formulations prepared using a bulk drug under patent (product patent) are called branded formulations. A branded formulation is usually marketed by a

single pharmaceutical company, which holds the patent rights for the bulk drug.

On the other hand, formulations, which do not contain any patented bulk drug, can be manufactured by more than one single company and are known as generics. In developed countries, where the patent structure is regulated, generics can be manufactured only after the expiry of a patent. However, in India, the patent regime is yet to be implemented.

The total size of the domestic formulations market is Rs.159.6 bn and is characterized by fragmentation with respect to therapeutic segments. The antibiotics segment is the largest, accounting for around a 16.4 percent share of the domestic retail market. Vitamins and mineral supplements come next, with a domestic retail share of 7.1 percent. Currently, the top 18 therapeutic segments account for around 88 percent of the domestic retail share.

**Main Therapeutic Segments: % share**



The industry is witnessing an increasing tilt towards high-margin, high-value added, third-generation therapeutic segments comprising cardiovasculars, non-steroidal anti-inflammatory drugs (NSAIDs), psychiatric, diabetic, diagnostics, etc. Increased life expectancy and industrialization raise the incidence of diseases such as Alzheimer's disease, arthritis, heart disease, and lung cancer.

#### Major Players

Pharmaceutical companies have increased significantly their market capitalisation since 1999, and now account for about 20 percent of Indian companies' total market capitalisation. Foreign investment in this sector has virtually doubled in five years. Indian companies are rapidly acquiring marketing companies in the West to drive up exports, which have risen fivefold.

| MNCs               | Domestic bulk drug and Formulation manufacturers | Domestic bulk drug manufacturers |
|--------------------|--------------------------------------------------|----------------------------------|
| Glaxo-Wellcome     | Ranbaxy                                          | Aurobindo Pharma                 |
| Novartis           | Cipla                                            | Orchid Pharma                    |
| German Remedies    | Dr Reddy's Laboratories Ltd                      | Cheminor Drugs                   |
| Pfizer             | Nicholas Piramal India Ltd                       | Aarti Drugs                      |
| Rhone Poulenc      | Wockhardt                                        | Lupin Chemicals                  |
| Parke Davis        | Cadila Healthcare                                | Shasun Chemicals                 |
| Smithkline Beechem | Sun Pharma                                       | Alembic Chemicals                |
| E Merck            | Lupin Lab                                        | Vitara Chemicals                 |
| Hoechst Marion     | Ajanta Pharma                                    | Siris                            |
| Knoll Pharma       | Ipca Laboratories                                | Paam Drugs & Pharmaceuticals     |

MNCs are present primarily in the formulations segment and have a negligible presence in the bulk drug market. They enjoy strong brand identity, following their ability to support high marketing expenditure as well as significant global presence. MNC affiliates have been reluctant to introduce new drugs in India due to the process patent regime. New launches have been deferred until 2005.

Domestic pharmaceutical companies include bulk drug producers as well as formulators, depending on the mix

of each of the business in the company's product basket. In this industry, the level of integration is key to operating efficiency. Reverse engineering and a low cost structure have enhanced the competitiveness of the Indian players vis-a-vis MNCs. Indian pharma players have a strong presence in the high margin export market. Domestic bulk drug producers are characterized by significant overcapacities. This, combined with threats from cheap imports, has led to strong competition in the bulk drug segment. This leads to low price realisations in the bulk drug markets. This segment is highly fragmented, comprising over 20,000 units.

Many Indian firms have established an international niche. Ranbaxy is already the world's second-largest manufacturer of cefaclor (the world's largest selling antibiotic, at \$1 bn a year). Similarly, Lupin is the world's largest producer of ethambutol, an anti-TB drug, and Dr. Reddy's Laboratories is the second-largest producer of ranitidine, an anti-ulcerant. These companies show the potential for other firms to successfully exploit the international generics market. If giant multinationals aggressively market patented drugs in India, Indian companies can enjoy strong sales in the reverse direction by exporting generics that are, by definition, beyond patent.

## **SUN PHARMA**

### **Business Profile**

Established in 1982, Sun Pharmaceuticals Ltd. (Sun Pharma) is among the top 3 players in the therapeutic segments of neurology, psychiatry, cardiology and gastroenteritis in the pharma market. It is also present in anti-diabetics, orthopaedics, paediatrics, oncology and ophthalmology. Formulations sales make up 70% of the total revenues, and bulk drugs the rest. Some of the leading products of the company include Cardivas (cardiovascular), Repace (CVS), Muvera (orthopedic) and Pantocid (gastroenterology). Exports contribute approximately 30 per cent to the company's revenue. Its DPCO coverage is only 13 per cent.

The company has a 40% stake in Caraco Ltd. a Detroit-based company focusing on generics market. This investment has given it an entry into the attractive US market. Also, in 1998-99, brands with annual sales of about Rs.500 mn were acquired from Natco Pharma to augment Sun Pharma's presence in the therapeutic areas of respiratory, cardiology, neurology-psychiatry and gastroenterology. The company also acquired Milmet Labs, a leading player in ophthalmology, in 1998-99. Sun Pharma Exports, earlier a partnership company, has now been made a wholly owned subsidiary called Sun Pharmaceutical Exports Ltd. It merged Gujarat Lyka Organics Ltd (GLOL) with itself effective from April 1, 1999 in which it had acquired stake in 1995-96. The Gujarat Lyka plant at Ankleshwar has US FDA approval and has facilities for making bulk cephalosporins. The company also has a controlling interest in MJ Pharmaceuticals (a firm specialising in the manufacture of cephalosporins), which it acquired along with the Gujarat Lyka stake in 1995-96, and Tamil Nadu Dadha Pharma Limited.

### **Recent Developments**

During March 2003, the board of directors approved the merger of Sun Pharmaceutical Advanced Research Centre Ltd. (SPARCL), a wholly-owned subsidiary company, with itself. The board of directors of the company also approved the merger of Pradeep Drug Company Ltd. (PDCL) with the company with a swap ratio of 1:500 (one equity share of Sun Pharma for every 500 equity shares of Pradeep Drug company).

For FY 2003 net sales grew 22% to Rs.748 cr and net earnings increased by 27% to Rs.171 cr. However, in the next couple of years, its topline growth is likely to reduce to roughly 17% p.a and bottomline should grow at similar levels due to stagnant margins and slight increase in tax rate. SP has responded to the increased competition in its core segments by also increasing its focus on other attractive segments like diabetes, ophthalmology and gynaecology. Cardiology, neurology, psychiatry and diabetes constitute 70% of its domestic formulation turnover and this proportion is the highest for any pharma company in India. Thus even though industry growth is lower (roughly 11% - 13% pa) this high share should enable them to grow faster.

The Co. has also been very aggressive in new product launches and are likely to keep up this momentum going forward with roughly 30 launches expected in FY 2004-05. Further, the company's strong relationships with doctors and the requirement for perpetual treatment in most of its focus areas bodes well for SP in the long-run. Sun Pharmaceutical Industries Ltd. has reported an excellent performance for the year ended March 31, 2004. The highlights of 2003-04 performance are:

Strong growth of 26.6 per cent in domestic formulations.

27.1 per cent growth in bulk exports.

Formulations export business has declined by 16 per cent.

OPM improved from 24.7 per cent to 25.9 per cent.

PAT grew by 27.5 per cent to Rs 172.33 crore.

Sun Pharma continues to build on its lead across therapy areas and is ranked first with psychiatrists and neurologists. The company is now ranked third with cardiologists, and gastro enterologists, and 6<sup>th</sup> with

orthopedics, 17<sup>th</sup> with oncologists and 4<sup>th</sup> with ophthalmologists.

Six of Sun Pharma's specialty brands feature in top 300 list of pharma brands. Four of company's new launches feature among the list of the top 30 brands introduced in 2002. Sun Pharma ranked 2<sup>nd</sup> in terms of the value of new launches (37 new products were launched totalling to Rs.18.59 crore and accounting for 5.67% market share of new products). Across Sun Pharma's nine specialty divisions, over 35 new products were launched during the year. In the CNS area, 11 new products were launched and six in the area of asthma/allergy.

The company has set up and began production at new plant in Dadra, a tax haven. This 120,000 sq.ft, 240 crore tablets-per-year capacity plant with Rs 25 crore investment is designed and built to exacting international regulatory standards including the USFDA and UKMCA. Additional production capacity was created at Ahmednagar (Rs 5 crore investment) and Silvassa (Rs 3 crore). Sun Pharma has made improvements in the way Natco Pharma brands were being distributed. This has resulted in some savings for the company. In the beginning of 2003-04, Sun Pharma has redeemed its preference capital of Rs.17 crore, which accounts for one-third of the total preference capital of the company. The company has also repaid Rs.7.5 crore loan of Gujarat Lyka Overseas Ltd. which was formally merged with Sun Pharma. Recently, the proposal for fresh capital infusion in Detroit-based Caraco Pharmaceutical Laboratories has been turned down by Sun Pharmaceuticals.

The performance and profile of Sun Pharma has caught the attention of foreign generics companies, like Teva, Ivax, Pliva, Ratiopharm and Sandoz GmbH. These companies are eyeing Sun Pharma as an acquisition target to tap its cost advantage and research & development skills to develop and manufacture off-patent drugs destined for the West.

#### **Future Plans**

In the domestic market, the company expects to grow at a rate that is twice that of the industry average over the next two years. It expects to reach a position among the top 3 in all the speciality therapy areas that it competes in. The company has been restructuring the product offering in several markets across South East Asia, Middle East, Africa, CIS where it already has product registrations in place.

Sun Pharma also expects to begin selling bulk active to Caraco as well as other generic companies once the regulatory clearances are in place. Sun Pharma expects to file for 5-6 abbreviated new drug applications (ANDAs).

Going ahead, Sun Pharma expects to maintain 15-20 per cent topline growth through aggressive new product innovation and intensive marketing. Export formulations business is also expected to grow on the back of increased focus on branded products, new registrations to CIS, China, Sri Lanka and Malaysia and infusion of right talent in overseas marketing team.

The company is all set to change the general perception of it focusing more on reverse engineering by stepping up R&D spent from 4.3 per cent (Rs 32.2 crore in 2001-02) to 5 per cent of sales. A new state-of-the-art drug discovery campus is being built in Baroda, with estimated outlay of Rs.40 crore in the projects planned. This 16-acre site, housing 150 additional scientists will be commissioned over next two years. A new site is being purchased for expansion of product development labs in Bombay. This R&D centre with proposed area of 50,000 sq.ft will service North American and European markets, a high priority area.

### **Financial Statements of Sun Pharma Ltd.**

#### **Income Statement**

**(Rs. in million)**

|                         | <b>2004</b> | <b>2003</b> | <b>2002</b> | <b>2001</b> | <b>2000</b> |
|-------------------------|-------------|-------------|-------------|-------------|-------------|
| Operating Income        | 7,933.20    | 6,964.30    | 5,609.60    | 4,404.76    | 3,339.60    |
| <b>Expenses:</b>        |             |             |             |             |             |
| Material Consumed       | 3,233.50    | 3,168.40    | 2,446.00    | 2,107.50    | 1,653.75    |
| Manufacturing Expenses  | 323.40      | 250.90      | 274.90      | 192.68      | 85.36       |
| Personnel Expenses      | 498.50      | 419.50      | 371.50      | 291.45      | 271.22      |
| Selling Expenses        | 687.00      | 621.00      | 506.10      | 396.64      | 332.95      |
| Administrative Expenses | 546.70      | 473.20      | 396.80      | 346.45      | 273.62      |
| Expenses Capitalized    | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        |
| Cost of Sales           | 5,289.10    | 4,933.00    | 3,995.30    | 3,334.72    | 2,616.90    |
| Operating Profit        | 2,644.10    | 2,031.30    | 1,614.30    | 1,070.04    | 722.70      |

|                        |          |          |          |          |        |
|------------------------|----------|----------|----------|----------|--------|
| Operating Profit       | 2,644.10 | 2,031.30 | 1,614.30 | 1,070.04 | 722.70 |
| Other Recurring Income | 50.60    | 56.00    | 58.10    | 36.42    | 105.70 |
| PBDIT                  | 2,694.70 | 2,087.30 | 1,672.40 | 1,106.46 | 828.40 |
| Interest Expenses      | 9.40     | 36.10    | 76.50    | 9.61     | 119.45 |
| Depreciation           | 191.40   | 173.80   | 162.10   | 129.35   | 86.69  |
| Other Write Offs       | 0.00     | 0.00     | 0.00     | 70.08    | 12.03  |
| PBT                    | 2,493.90 | 1,877.40 | 1,433.80 | 897.42   | 610.23 |
| Tax Charges            | 214.20   | 160.00   | 94.50    | 66.38    | 19.50  |
| PAT                    | 2,279.70 | 1,717.40 | 1,339.30 | 831.04   | 590.73 |

#### Balance Sheet

(Rs. in million)

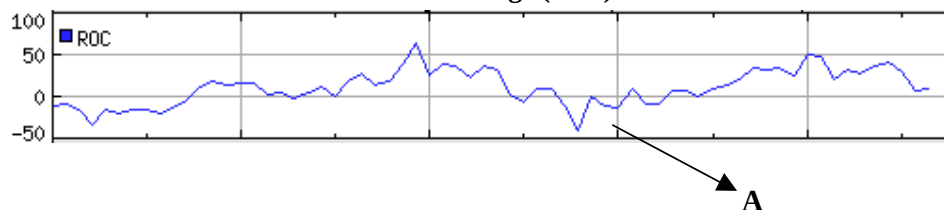
|                                        | 2004            | 2003            | 2002            | 2001            | 2000            |
|----------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <b>SOURCES OF FUNDS</b>                |                 |                 |                 |                 |                 |
| Owners' Fund                           |                 |                 |                 |                 |                 |
| Equity Share Capital                   | 465.20          | 467.70          | 467.50          | 154.22          | 154.21          |
| Share Application Money                | 0.00            | 0.20            | 0.20            | 4.78            | 0.00            |
| Preference Share Capital               | 123.65          | 0.00            | 327.20          | 490.75          | 501.75          |
| Reserves & Surplus                     | 6,340.00        | 4,888.50        | 3,858.60        | 2,997.44        | 2,507.54        |
| Loan Funds                             |                 |                 |                 |                 |                 |
| Secured Loans                          | 17.85           | 89.10           | 131.50          | 367.19          | 466.82          |
| Unsecured Loans                        | 15.50           | 33.20           | 225.60          | 118.98          | 203.50          |
| <b>Total</b>                           | <b>6,962.20</b> | <b>5,478.70</b> | <b>5,010.60</b> | <b>4,133.36</b> | <b>3,833.82</b> |
| <b>USES OF FUNDS</b>                   |                 |                 |                 |                 |                 |
| Fixed Assets                           |                 |                 |                 |                 |                 |
| Gross Block                            | 3,403.40        | 3,004.90        | 2,674.80        | 2,311.81        | 1,889.86        |
| Less: Revaluation Reserve              | 0.00            | 0.00            | 0.00            | 0.00            | 0.00            |
| Less: Accumulated Depreciation         | 1,090.00        | 915.10          | 784.10          | 613.28          | 372.44          |
| <b>Net Block</b>                       | <b>2,313.40</b> | <b>2,089.80</b> | <b>1,890.70</b> | <b>1,698.53</b> | <b>1,517.42</b> |
| Capital Work-in-progress               | 673.90          | 368.40          | 91.30           | 130.61          | 129.88          |
| Investments                            | 856.10          | 825.30          | 396.80          | 501.14          | 560.19          |
| Net Current Assets                     |                 |                 |                 |                 |                 |
| Current Assets, Loans & Advances       | 4,872.60        | 3,258.80        | 3,487.90        | 2,481.87        | 2,252.67        |
| Less: Current Liabilities & Provisions | 1,753.80        | 1,063.60        | 856.10          | 678.79          | 696.42          |
| <b>Total Net Current Assets</b>        | <b>3,118.80</b> | <b>2,195.20</b> | <b>2,631.80</b> | <b>1,803.08</b> | <b>1,556.25</b> |
| Miscellaneous expenses not written off | 0.00            | 0.00            | 0.00            | 0.00            | 70.08           |
| <b>Total</b>                           | <b>6,962.20</b> | <b>5,478.70</b> | <b>5,010.60</b> | <b>4,133.36</b> | <b>3,833.82</b> |
| Note:                                  |                 |                 |                 |                 |                 |
| Book Value of Unquoted Investments     | 546.80          | 521.40          | 59.80           | 179.44          | 179.35          |

|                                     |            |            |            |            |            |
|-------------------------------------|------------|------------|------------|------------|------------|
| Market Value of Quoted Investments  | 1,122.90   | 1,512.00   | 253.80     | 323.74     | 374.81     |
| Contingent liabilities              | 1,190.30   | 1,154.40   | 736.60     | 172.36     | 410.68     |
| Dividends Paid (Rs. in million)     | 930.48     | 233.87     | 233.78     | 154.23     | 123.38     |
| Number of Equity shares outstanding | 93,048,478 | 46,774,537 | 46,756,018 | 15,422,833 | 15,422,833 |

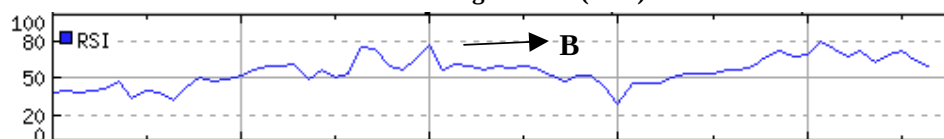
#### Annexure I

#### Technical Analysis Charts of Sun Pharma

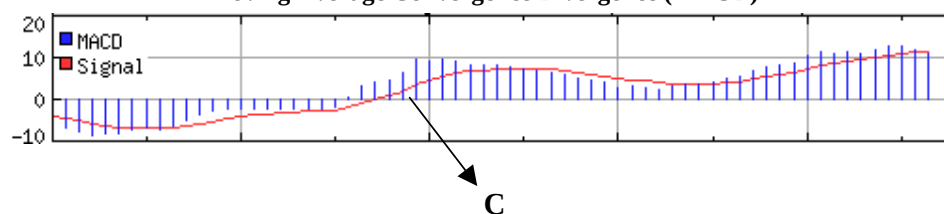
##### Rate of Change (RoC)



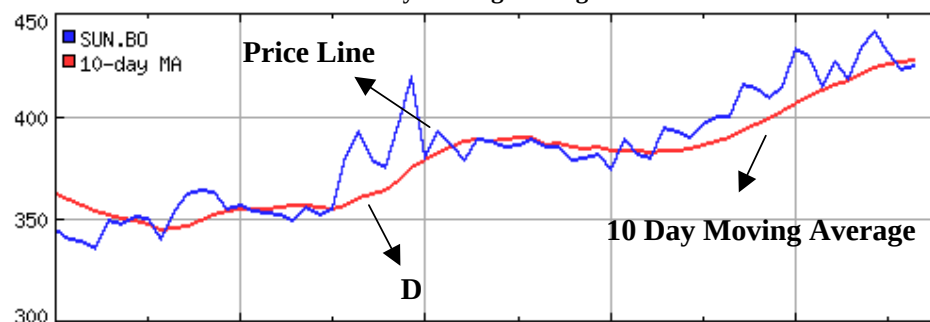
##### Relative Strength Index (RST)



##### Moving Average Convergence Divergence (MACD)



##### 10-Day Moving Average



#### Risk Return Information about Sun Pharma

##### Beta Vs. Expected Return

| Beta | Expected Return (%) |
|------|---------------------|
| 0.25 | 9.50                |
| 0.50 | 10.90               |
| 0.75 | 11.50               |
| 1.00 | 12.50               |

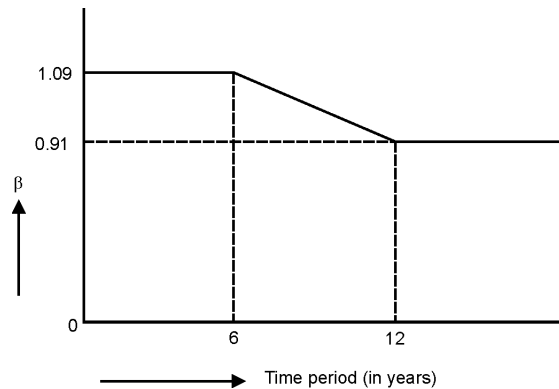
|      |       |
|------|-------|
| 1.25 | 13.90 |
| 1.50 | 14.50 |
| 1.75 | 16.00 |
| 2.00 | 17.50 |

#### Movement of Stock Price and the Market

| Date             | Stock price of Sun Pharma (Rs.) | S&P CNX 500 |
|------------------|---------------------------------|-------------|
| January 01, 2001 | 524.90                          | 1254.30     |
| June 29, 2001    | 550.70                          | 1107.90     |
| January 01, 2002 | 573.20                          | 1055.30     |
| June 28, 2002    | 557.85                          | 1057.80     |
| January 01, 2003 | 601.00                          | 1100.15     |
| June 30, 2003    | 344.55                          | 1134.15     |
| January 01, 2004 | 595.65                          | 1912.25     |
| June 30, 2004    | 365.50                          | 1505.60     |

#### Annexure-II

Futures estimates of growth rate in earnings, payout ratio and  $\beta$  of Sun Pharma



**END OF SECTION D**

#### Section E : Caselets (50 Marks)

This section consists of questions with serial number 6 - 11.  
 Answer **all** questions.  
 Marks are indicated against each question.  
 Do not spend more than 80 - 90 minutes on Section E.

#### Caselet 1

Read the caselet carefully and answer the following questions:

- The caselet says that the fundamental valuation tools fail to satisfactorily explain the swings in the prices. Discuss the reasons for the same.

(8 marks) < [Answer](#) >

7. Does historical price patterns really help an investor in making investment decisions? Give reasons and discuss the assumptions for the same.

(8 marks) < [Answer](#) >

There are many ways to value shares, but most of these suggest that Wall Street is still expensive. What is a share worth? On one level, the answer is simple enough: whatever you can sell it for. But to be told that a share is worth whatever price the market sets for it is not all that helpful. What investors really want to know is how and why the market arrives at that price, to provide them with clues about whether the share is likely to go up or down in future. In other words, what is the fundamental value of a share?

There is a classic formula that explains the underlying value of a share, and by extension of a market as a whole. It is known as the dividend-discount model, and it is a staple of the capital-asset pricing model, which in turn is a basis of corporate-finance theory. A share is worth the sum of all its prospective dividend payments, discounted back to their net present value.

Stock market analysts employ several other valuation tools, especially to compare the present and past values of equities and markets. The best-known is the price/earnings ratio or multiple, which divides share prices by profits, or its inverse, the earnings yield. Either can be calculated on a historical or a prospective basis. A second measure is the dividend yield on its own. Then there is the price-to-book ratio, which measures a company's stock market value against the book value of its assets. And there is Tobin's q, a ratio of the stock market value to the replacement cost of its tangible assets—an attempt to measure what it would cost to recreate a company from scratch.

Other measures are employed to compare equity values with those of other financial assets. The dividend or earnings yield, for example, can be compared with bond yields. At one time analysts liked to do this by quoting the yield gap (though this became inverted when dividend yields fell below bond yields in the 1950s) or the yield ratio, both of which relate share to bond yields.

Yet, another much-cited variable is the “equity risk premium”, which measures the extra return that (risky) shares must, in theory offer over the (risk-free) return that is available on government bonds. The premium is generally calculated for a market as a whole. But there are also measures of volatility applied to individual shares. The best-known is “beta”, which measures a share's volatility relative to that of the market as a whole. Small-company shares, in particular, usually have a higher beta, because they are riskier and less liquid. That should translate into higher returns.

If shares have a fundamental value, how is it possible to make sense of swings in the prices? None of these indicators is, however, wholly satisfactory.

For one thing, markets reflect crowd behaviour; for many investors, the best guide to what may happen next is what has just happened, a belief in “momentum investing” that seems bound to turn most bull markets into bubbles. From tulips to railways to electricity to the Internet, crowd behaviour has created financial bubbles on the “bigger fool” theory: that a share is worth buying, even if it looks expensive, so long as there is reason to hope that somebody else will pay even more for it in future. Markets do not, in any case, seem to learn from history; at best, a generation that has been burnt does learn its lesson, but the next generation promptly forgets it.

## Caselet 2

**Read the caselet carefully and answer the following questions:**

8. The caselet mentions that Foreign Institutional Investors (FIIs) have lately become very dominant in the Indian Stock Market. Is this beneficial for stock market in India? Discuss.

(8 marks) < [Answer](#) >

9. Some critics hold the opinion that small investors have not been marginalized but they have cut themselves off from the market because they lack resources and/or the capacity to take risk. Comment.

(9 marks) < [Answer](#) >

The recently released Economic Survey 2003-04 said that the equity market comprising both spot and derivatives is marked by fairly small transaction size which points to substantial participation from retail investors. If large institutional traders were dominant, the average trade size would be much larger. The household investor surveys conducted by the Society for Capital Market Research and Development (SCMRD) during 1997-2002 indicated that the retail investor base has been shrinking almost persistently since around 1997. The SEBI-NCAER survey of Indian investors has also shown that the number of individual shareholders declined from 23 million in 1998-99 to 19.5 million in 2000-01.

India opened its stock market to FIIs in September 1992. As at end-March 2002, about four-fifth of FII investment emanated from the USA, UK and Western Europe. FII flows were consistently positive for the first few years reflective of buoyant stock market conditions but turned negative in September 1997 for the first time during the Asian crisis. Although, there have been a few periods of net outflows during brief episodes of foreign exchange market volatility, they were quickly reversed, once stability returned to the financial markets.

The net inflows from foreign institutional investors (FIIs) into equity markets amounted to Rs.8,273 crore during 2001-02 as compared with Rs.9,683 crore during the previous year. Cumulative investments by FIIs which stood at Rs.57,038 crore (US\$ 14.9 billion) as at the end-March 2002 increased to Rs.1,00,112 cr. as at the end-March 2004. Lately, FIIs have become dominant in the Indian stock market.

According to a survey conducted by SCMRD, the total number of share holders in the country was 90-100 lakh in 1990 which increased to 1.5 crore by mid 1993 and there after to 2 crore by the end of 1994, after which it remained at the same level up to the end of 1990s. Most of the increase in the number of investors took place during 1991-94. According to the survey, 49% of the shareholders at the end of 2000, had for the first time entered the market before the end of 1990, 44% entered during 1991-94, 6.8% during 1995-96 and 0.8% after 1997.

According to a study, titled “Why Ordinary Investors Remain Disenchanted” conducted recently by SCMRD with Vivek Financial Focus Ltd and authored by Dr.LC Gupta, Navin Jain and Utpal Choudhury, about one per cent of individual shareholders are exiting from the markets each year, while the net addition to share owning population is zero or negative. In a country, where less than five per cent of the population owns shares, this is a disturbing pointer to the state of the capital market.

The data on when the respondents became shareowners for the first time shows that the biggest addition to the investor population happened in the period of 1986-90 (when nearly 24 per cent of the respondents first bought shares) and 1991-92 (17 per cent). Only, 8.2 per cent of those surveyed came into the market in 1993-94 after the securities scam, despite the primary market mania. The percentage of new entrants dropped to single digits (7.1 and 6.8) in the succeeding two years of the IPO boom and only 3.8 per cent of those surveyed had started investing during the incredible bull run leading up to the Scam of 2000. Only two per cent of those surveyed said they had started investing after that.

A startling fact revealed by the survey is that a majority (56.6% to be precise) of the shareholders preferred to continue holding shares in physical form. Nine of the sample companies had over 3 lakh shareholders each. In five out of these nine, over 75% of shareholders held paper certificates. There were 21 sample companies having 1-3 lakh shareholders each. In five companies out of these 21, over 60% of the shareholders held paper certificates. Out of 130 companies, there were 96 (i.e., two-thirds of the total sample) in which over 25% of shareholders held paper certificates.

In the primary market also, the retail participation is only marginal. During 1998-2003, an amount of approximately Rs.50,000 crores has been raised through public offers of capital. Of the total amount, a meager 5 percent or Rs.2,500 crores was offered to small investors. The corresponding figure in the case of book building IPOs was only 3 percent.

Some critics hold the opinion that small investors have not been marginalized but they have cut themselves off from the market because they lack resources and/or the capacity to take risk. Is anybody listening to the grief-struck voice of the small investors?

### Caselet 3

**Read the caselet carefully and answer the following questions:**

- 10.** The caselet conveys the idea that beta is useful for short-term investments but it offers limited help for long-term investment decisions. Do you agree? Discuss.

**(8 marks)** < [Answer](#) >

- 11.** The caselet says that the past beta values did not provide enough evidence to suggest that high beta stocks deliver better returns in rising markets. In this context, discuss the limitations of beta as a statistical tool.

**(9 marks)** < [Answer](#) >

Investments that carry higher than average risks should also offer the opportunity to earn much higher returns. In reality, however, it is not very easy to strategize investments which adhere to that principle. Firstly, there are too many variables that affect stock returns. And there is more than one way of calculating risk, making risk-reward assessment a complex exercise. Secondly, there is no variable except for earnings forecast that can really hand out predicting power to stock analysis. All return and risk metrics are based on past data, and can provide little clue about the future.

Beta essentially tells you how much a stock has moved in relation to the Index for a defined time period. You

can also access beta figures from the NSE website. Ideally, you would want to go with a stock that can beat the Index always—rise more when the markets are bullish and fall less when the markets are in a bear grip. The next best alternative is to adopt a strategy based on your risk-taking ability and stick to it. So, if your risk-taking ability is high, you could invest in for a portfolio that is more sensitive than the market.

In case of FMCG stocks, beta values have been steady for the past five years, displaying low volatility and high defensive strength. The sector's beta has never exceeded '1', meaning that the movement in the sector has always been lower than the Index. Over a period, however, the beta for the sector has been falling steadily. Compared to 0.85 in March '98, the beta has fallen to 0.53. Pharma stocks have shown lower beta values on an average. More interestingly, its beta value has been declining continuously since 2001, as the market turned its focus to pockets like auto and oil sectors. Currently, the beta for the sector stands at 0.36.

In sharp contrast, the technology sector has commanded high beta values ever since it gained recognition on the bourses. Since the quarter beginning March 2000, beta for the sector has been 50% higher than that of the Index. For the whole of 2001, the beta for tech stocks remained very high as fears of a US recession and the September 11, terror attacks rocked the stock market, making stocks extremely volatile.

Beta values for individual stocks can drastically vary, based on market conditions. It could also beat the market three times over some other time. For instance, there are perverse cases like Himachal Futuristic, where beta values have ranged between 0.28 to 4.14. The unusually high beta is a reflection of market manipulation during the Ketan Parikh scam. Even within a particular sector, the beta of various stocks varies quite widely. A comparison of beta values based on respective sectoral indices shows that a stock can actually be absolutely insensitive to the sector Index.

An analysis of past beta values across sectors does not provide enough evidence to suggest that high beta stocks deliver better returns in rising markets, or fall more steeply in falling markets. This is primarily because beta values change radically, based on market moods. The fact is that beta values are very useful to ascertain the riskiness of stocks and positioning a portfolio based on your risk appetite, but it may not be a good idea to buy stocks based on beta estimates alone.

Or you can add stocks that have the complementary element of risk, thereby reducing the combined systematic risk of the portfolio. If an investor has a portfolio of highly volatile stocks like Zee Telefilms and NIIT, which had a beta of 1.88 and 1.99 respectively during the past one year, it makes sense to reduce overall portfolio risk by adding defensive stocks like Asian Paints and Cipla as they have beta of around 0.3 only.

Since beta values change quite fast, investors can't do without altering their portfolio constantly to keep the portfolio beta in check. For traders and short-term investors, however, the beta is a powerful tool. One needs to be conscious of risk, to adjust it according to the expected returns from any investment. It's not all about mathematics, otherwise, the best mathematician would have been the richest man in the world today.

**END OF SECTION E**

**END OF QUESTION PAPER**

# Suggested Answers

## Security Analysis-II (212): January 2005

### Section D : Case Study

1. **Michael Porter** Analysis of the Indian Pharmaceutical Industry:

**Threat of entry:**

- It is high due to relatively less stringent patent laws.
- Economies of scale are low as the cost of manufacture of reverse engineered product is significantly less thereby making the threat of entry high.
- Product differentiation is not available for bulk drugs nor is the customer brand loyalties resulting in high threat to entry.

**Intensity of Rivalry among Existing players:**

- There are 20,000 big and small players in the Indian Pharmaceutical Industry which indicates high level of competition & rivalry.
- As more and more products move from patented to generic category rivalry is going to intensify.

**Bargaining Power of Buyers**

- Bargaining power of the buyers as a group is low
- For companies producing bulk drugs the buyers are the companies producing formulations which do exercise some bargaining power.

**Bargaining Power of Suppliers**

- The raw material is chemicals in form of active ingredients and compatible substances and packaging materials whose suppliers exercise little bargaining power.
- Pharmaceuticals is an industry where the companies are heavily based on discovery of new molecules and the commercial exploitation of the same. Therefore, the research organization developing molecules can bargain with the manufacturing companies to the benefit of the former.

**Threat of substitute product:**

The pharmaceutical industry is primarily allopathic. The alternative approaches are as under:

- Ayurveda, an ancient Indian Science which uses herbal remedies
- Unani, having Chinese origin
- Homeopathy, founded by a German Physician

In comparison to the above Allopathy is the most modern medical science and little threat only is perceived from other methods of treatment.

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2.

|                                                                                                                                      | 2004   | 2003  | 2002  | 2001   | 2000  |
|--------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-------|--------|-------|
| EPS (Rs.) (PAT /No of shares)                                                                                                        | 24.50  | 36.72 | 28.64 | 53.88  | 38.30 |
| Dividend Per Share (Rs.) (Dividend paid /No of shares)                                                                               | 10.00  | 5.00  | 5.00  | 10.00  | 8.00  |
| Operating Profit Per Share (Rs.)                                                                                                     | 28.42  | 43.43 | 34.53 | 69.38  | 46.86 |
|                                                                                                                                      |        |       |       |        |       |
| Operating Margin (%) (Operating profit / Operating income)                                                                           | 33.32  | 29.16 | 28.77 | 24.29  | 21.64 |
| Return On Net Worth (%)                                                                                                              | 33.50  | 32.06 | 30.96 | 26.37  | 22.19 |
|                                                                                                                                      |        |       |       |        |       |
| Total Debt/Equity<br>(Secured + Unsecured loans + Current Liabilities)/Equity Capital +<br>Application money + Reserves and Surplus. | 26.26  | 22.14 | 28.04 | 36.91  | 51.35 |
| Interest Coverage Ratio (PBDIT / Interest)                                                                                           | 286.67 | 57.82 | 21.86 | 115.14 | 6.93  |
| Current Ratio (Current Assets / Current Liabilities)                                                                                 | 2.78   | 3.06  | 4.07  | 3.66   | 3.23  |

**Comments:**

- i. The earnings of the company increased initially, but due to share split in 2002 the EPS has declined.

- ii. The company follows as more or less constant dividend policy.
- iii. All the profitability ratios indicate that the profitability of the company has steadily increased over last five years.
- iv. Leverage ratio indicates that the company has gradually reduced the dependence on debt as a source of finance.

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3. The equation for SML can be derived by running a regression between the beta values given and the corresponding return:

$$\text{Value of A (R}_f\text{)} = 0.0836$$

$$\text{Value of B (R}_m - R_f\text{)} = 0.0438$$

The equation is  $0.0836 + 0.0438\beta$

Where  $\beta$  is the beta of the stock.

The beta of Sun Pharma can be determined based on the returns from the stock and the returns on the index.

|           | Closing Price of Sun Pharma (Rs.) | Return on Sun Pharma (%) | Closing Value of S&P CNX Nifty | Return on S & P CNX Nifty (%) |
|-----------|-----------------------------------|--------------------------|--------------------------------|-------------------------------|
| 1-Jan-01  | 524.90                            |                          | 1254.30                        |                               |
| 29-Jun-01 | 550.70                            | 4.92                     | 1107.90                        | -11.67                        |
| 1-Jan-02  | 573.20                            | 4.09                     | 1055.30                        | -4.75                         |
| 28-Jun-02 | 557.85                            | -2.68                    | 1057.80                        | 0.24                          |
| 1-Jan-03  | 601.00                            | 7.74                     | 1100.15                        | 4.00                          |
| 30-Jun-03 | 344.55                            | -42.67                   | 1134.15                        | 3.09                          |
| 1-Jan-04  | 595.65                            | 72.88                    | 1912.25                        | 68.61                         |
| 30-Jun-04 | 365.50                            | -38.64                   | 1505.60                        | -21.27                        |

On regressing the return on Sun Pharma and return on S&P CNX Nifty ,

$$A = -5.17$$

$$B = 1.093$$

$$\text{Beta of Sun Pharma} = 1.093$$

$$\text{Expected return from Sun Pharma} = 0.0836 + 1.093 \times 0.0438 = 0.1315 = 13.15\%.$$

According to DDM,

$$P_0 = \frac{D_1}{k - g} \quad \text{or} \quad 423.65 = \frac{10(1+g)}{0.1315 - g}$$

$$423.65 \times 0.1315 - 423.65g = 10 + 10g$$

$$55.71 - 10 = 423.65g + 10g$$

$$g = \frac{45.71}{433.65} = 0.1054 \text{ or } 10.54\%.$$

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4. Three growth phase would be experienced by Sun Pharma in the next 12 years

High growth phase

Growth rate = 10%

Beta during this period = 1.09

Payout rate = 40%

$$\text{Cost of equity} = 6 + 4.5 \times 1.09$$

$$= 6.00 + 4.91$$

$$= 10.91\%$$

EPS = 24.50

Growth rate will decline linearly from 10% to 4% in 6 year period i.e. each year growth rate will decline =

$$\frac{10-4}{6} = \frac{6}{6} = 1\%$$

Payout rate will increase linearly during this period from 40% to 58% i.e., each year it will increase by

$$\frac{58-40}{6} = 3\%$$

$$\frac{1.09-1}{6}$$

Every year beta will decline by  $\frac{1.09-1}{6} = 0.03$ .

As beta will change, cost of equity will also change every year cost of equity during 7<sup>th</sup> – 12<sup>th</sup> year

|                       |   |                          |
|-----------------------|---|--------------------------|
| 7 <sup>th</sup> year  | = | 6 + 1.06 × 4.50 = 10.77% |
| 8 <sup>th</sup> year  | = | 6 + 1.03 × 4.50 = 10.64% |
| 9 <sup>th</sup> year  | = | 6 + 1.00 × 4.50 = 10.50% |
| 10 <sup>th</sup> year | = | 6 + 0.97 × 4.50 = 10.37% |
| 11 <sup>th</sup> year | = | 6 + 0.94 × 4.50 = 10.23% |
| 12 <sup>th</sup> year | = | 6 + 0.91 × 4.50 = 10.09% |

EPS = 24.50

| Year | EPS (Rs.)            | Payout | DPS (Rs.) | Cost of Equity (%) |
|------|----------------------|--------|-----------|--------------------|
| 1    | 24.50 × 1.10 = 26.95 | 0.40   | 10.78     | 10.91              |
| 2    | 26.95 × 1.10 = 29.65 | 0.40   | 11.86     | 10.91              |
| 3    | 29.65 × 1.10 = 32.61 | 0.40   | 13.05     | 10.91              |
| 4    | 32.61 × 1.10 = 35.87 | 0.40   | 14.35     | 10.91              |
| 5    | 35.87 × 1.10 = 39.46 | 0.40   | 15.79     | 10.91              |
| 6    | 39.46 × 1.10 = 43.40 | 0.40   | 17.36     | 10.91              |
| 7    | 43.40 × 1.09 = 47.31 | 0.43   | 20.34     | 10.77              |
| 8    | 47.31 × 1.08 = 51.09 | 0.46   | 23.50     | 10.64              |
| 9    | 51.09 × 1.07 = 54.67 | 0.49   | 26.79     | 10.50              |
| 10   | 54.67 × 1.06 = 57.95 | 0.52   | 30.13     | 10.37              |
| 11   | 57.95 × 1.05 = 60.85 | 0.55   | 33.47     | 10.23              |
| 12   | 60.85 × 1.04 = 63.28 | 0.58   | 36.70     | 10.09              |

A. Present value of dividend

$$\begin{aligned} & \frac{10.78}{1.1091} + \frac{11.86}{1.1091^2} + \frac{13.05}{1.1091^3} + \frac{14.35}{1.1091^4} + \frac{15.79}{1.1091^5} + \frac{17.36}{1.1091^6} + \frac{20.34}{(1.1077)^7} + \\ & \frac{23.50}{(1.1064)^8} + \frac{26.79}{(1.1050)^9} + \frac{30.13}{(1.1037)^{10}} + \frac{33.47}{(1.1023)^{11}} + \frac{36.70}{(1.1009)^{12}} \\ & = 9.72 + 9.64 + 9.56 + 9.48 + 9.41 + 9.33 + 9.94 + 10.47 + 10.91 + 11.23 + 11.46 + 11.58 \\ & = 122.73 \end{aligned}$$

B. Present value of the stock price

$$\begin{aligned} & \frac{36.70 \times 1.04}{0.1009 - 0.04} \times \frac{1}{(1.1091)^6} \times \frac{1}{(1.1077)} \times \frac{1}{(1.1064)} \times \frac{1}{1.1050} \times \frac{1}{1.1037} \times \frac{1}{1.1023} \times \frac{1}{1.1009} \\ & = 185.64 \end{aligned}$$

The intrinsic value of Sun Pharma stock = A + B

$$= 122.73 + 185.64 = \text{Rs } 308.37$$

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5. A – Buy as the ROC has declined to its minimum and now it is expected to increase.  
 B – Sell as RSI has increased to the overbought position and is now expected to decline.  
 C- Hold – The MACD line is just at the reference line and we cannot draw any valid conclusion.  
 D – Buy as price line has already started moving up and the crossover of price line and moving average line suggests that in future moving average line will also move up.

## **Section E: Caselets**

### **Caselet 1**

6. The fundamental valuation tools discussed in the caselet may not reflect the changes in the prices as discussed below:
  - Dividend discount model: The relevant factors are the dividend payments, cost of equity capital and growth in dividends. The relevant income stream is the prospective dividend payments and the profits of the company are irrelevant. The problem with the dividend discount model is the uncertainty surrounding the future dividends payments and the discount rate. If there is any change in the investors' assessment of either the prospective dividend or the right discount rate there would be change in the share value i.e. if the investor expects lower dividends the share value would be lower and if the discount rate is increased due to the expected increase in the inflation the share value would decrease. Thus, any change in the values of the inputs changes the intrinsic value of the share.
  - Price to earnings multiple: It is obtained by dividing share price by earnings per share. It may also not give satisfactory results because profits can be manipulated, Profits are the result of certain accounting transactions and any change in the accounting transaction will change profits and accordingly the multiple will change. For example any change in the inventory valuation, any change in the method of depreciation will change the profit figures without any change in the true worth of the company.
  - Price to book ratio : This is also an accounting concept and also has the same drawbacks as above.
  - Risk premium approach: According to this method, the required rate of return by the equity investors is based on the premium over the return on the government bond on the assumption that the government bonds are risk-free. In reality this is not so and the calculation of risk premium of a security which is beta is dependant on the correctness of the market index.

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7. The caselet says that markets reflect crowd behaviour; for many investors, the best guide to what may happen next is what has just happened. A share is worth buying, even if it looks expensive, so long as there is reason to hope that somebody else will pay even more for it in future. This implies that the prices behave based on the demand and supply of the securities. As the market prices changes based on the market moods we can say that historical price patterns helps the investor in making investment decisions. The study of historical price patterns to make investment decisions is known as Technical Analysis. Technical analysis provides better result than the fundamental analysis because unlike fundamental analysis technical analysis depends on the demand and supply of the securities. However, investment decisions based on the price patterns or the so called technical analysis cannot be made for long term.
  - Technical analysis is based on the following assumptions:
  - The market prices are determined solely by interaction of demand and supply which are governed by both rational and irrational factors;
  - Stock prices tend to move in trends which persist for an appreciable length of time;
  - Changes in trends occur only by shifts in demand or supply which can be detected sooner or later in charts; and
  - Price patterns tend to repeat.

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### **Caselet 2**

8. FII investment depends on the returns being offered by the various markets. If they feel they can earn higher returns elsewhere, they will simply offload their holdings and exit. This may prove to be highly unstablizing. Recently, it was observed that huge amounts of funds were pumped into the market by hedge funds through participatory note (PN) route. Of the total FII inflow, about 23% was through PNs. About 25% of this, or 5.7% of the total inflow, came from entities unregulated by overseas financial regulators. Foreign institutional investors have exploited their status in India by carrying out stock market transactions for anonymous foreign clients- individuals and body corporates- who are otherwise not allowed to trade in

Indian scrips, according to the Securities and Exchange Board of India. Not only this, by routing transactions of foreign individuals and body corporates, the Mauritius-incorporated FIIs with sub-accounts in India have allowed foreign clients to claim undue tax benefits under the Mauritius Double Taxation Avoidance Treaty. While there are no exact figures available on the quantum of transactions FIIs carried out for foreign clients, it could be substantial given the fact that FIIs' gross purchase and sale transactions in the last 18 months were a whopping Rs 1,470 billion.

One thing that is to be remembered is that the surge in FII inflows represents a fortuitous, temporary phenomenon. For a steady growth of the stock market in the future, there is a need for strengthening the domestic investor-base, of which retail investors are an important and inseparable part.

However, FIIs do play an important role in the market.

They typically start a market rally. Subsequently flows come from all classes of investors. At this stage, the market behaves like a self-organised system. No single class of investors drives the market — asset prices go up, driven by the collective momentum of all investors. Finally, the market enters the state of self-organised criticality. This is when any negative information could have non-linear effect on the market. The FIIs play a major role during this phase too.

**Market data:** Statistics suggest that day trading plays an important role in driving up asset prices during the current market rally. The market capitalisation on the NSE in December 2003, for instance, was Rs 11,67,029 crore against Rs 6,12,030 crore in May 2003, an increase of 90 per cent. Yet, the delivery ratio increased just 10 per cent during this period. We know that institutional investors hold their positions for a longer period. The low delivery ratio juxtaposed with high market turnover suggests that non-institutional investors have been playing an important role in driving asset returns.

Another data set is the broker concentration ratio. Top 100 brokers constitute 60 per cent of the total turnover on the NSE. Importantly, this ratio has not changed during the current rally. A 90 per cent increase in market capitalisation suggests that the remaining 40 per cent of the brokers are also generating higher volumes. And these brokers primarily cater to non-institutional clients.

Finally, consider the rally in mid-cap stocks. The CNX Nifty Mid-cap Index has run up 85 per cent in the current rally against 65 per cent gain in S&P CNX Nifty. True, the FIIs and mutual funds have also taken exposure in mid-cap stocks. But the statistics on delivery ratio suggest that non-institutional investors may have contributed more to the rise in mid-caps than the FIIs and mutual funds. If non-institutional investors drive asset prices, would it matter if the FIIs pull out money from the market?

**Self-organised system:** Initially, FIIs drive asset prices. Next, more money enters the system, further driving up asset prices. Then, prices move away from equilibrium or the intrinsic value. This is when the market is said to be in a state of self-organised criticality. In such a state, even a small perturbation can have non-linear effect. That is, a small negative factor would have a magnified effect on asset prices.

The FIIs do matter because their entry starts off a market rally. Further, their exit or rumours of their exit at best temporarily halts the rally. At worst, their exit could halt the rally completely. But the FII factor is not very important when the market functions as a self-organised system.

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9. The demat system has not made much progress in terms of coverage of retail investors, majority of whom have stayed out of the demat system. The entry of new small long-term retail investors is virtually barred due to the present system of demat charges, which bear very heavily on small long-term investors. Not only they are not entering, they are gradually getting out even as shareholders by selling their existing shareholdings.

There is a drop in the number of equity shares owned by the public in major companies. This appears to suggest that retail investors may be quitting the stock market at the first available opportunity

In the primary market also, the retail participation is only marginal. During 1998-2003, an amount of approximately Rs 50,000 crores has been raised through public offers of capital. Of the total amount, a meager 5 percent or Rs 2500 crores was offered to small investors. The corresponding figure in the case of book building IPOs was only 3 percent. During 1998-2003 while only 10% of the total issues were through the book-building route, they accounted for 53% of the total resources mobilized through public issues. This is alarming because low public holding makes manipulation easier and also leads to reduced liquidity.

According to RBI statistics the household sector's investment in shares and debentures continues to be negligible at just 0.3% of GDP and 2.4% of the financial assets.

Some critics hold the opinion that small investors have not been marginalized but they have cut themselves off from the market because they lack resources and/or the capacity to take risk. However, this argument appears to be incorrect as an analysis of the four IPOs issued by banks during 2002 reveals that in three

cases small investor subscribed to more than 75% of the total issue despite the prevalence of bearish and nervous sentiments in the market.

Thus, the declining participation of small investors has more to do with investor unfriendly policies. It appears as if the policy framework has been designed to favor big/institutional investors.

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### Caselet 3

10. Yes the long term investment decisions cannot be made based only on the beta estimates. Beta helps in assessing the movement of the stock in relation to the market movements and can be successfully used for short term decisions and cannot be used for long term decisions because of the following reasons:

- It is true that beta only helps in ascertaining the risk of the stock by assessing the movement of the stock in relation to the market and can be used only in choosing a stock based on the risk taking ability of the investor but cannot be the main factor for making an investment decision. If the risk-ability of the investor is high, stocks with beta more than 1 can be chosen and if the risk-taking ability is low, beta with less than 1 can be chosen. It is also true that a portfolio cannot be formed only based on the beta estimates but based on the same a portfolio of defined risk can be formed i.e. based on the risk taking ability a very volatile stock can be clubbed with a low volatile stock to have a moderate risk.
- It is also true that the movements in the prices are mainly based on the market moods and the fundamental factors play a minor role in the movement of prices. Thus, beta changes very rapidly based on the market movements and a portfolio with a long term objective needs to alter the composition of the portfolio based on the beta estimates of the stock of the portfolio. Thus, beta is not helpful for the long term investment decisions.
- Historical betas cannot be used for long term decisions.

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11. Beta, which is helpful in assessing the movement of the stock in relation to the market, is found by regressing the returns on the stocks with the returns on the market. It is calculated as covariance of the stock returns with the market returns over a defined period divided by the variance of the stock returns. Thus, the success of the application of the model is based on the time interval, the index which can be considered as a market portfolio and time period. Therefore, the limitation of beta in giving the true direction of the stock arises from these factors. Limitations of beta can be detailed as follows:

- i. Index: An index can be defined as a portfolio, which can represent the market as a whole. If the index has stocks which have very high weightage, any movement in these stocks will make the index move in the same direction and gives the impression that most of the stocks are moving in that direction while the fact may be that the substantial number of stocks might be moving in the other direction. Thus, the stocks, which have substantial weight in the portfolio, may result in a lower beta implying that the risk is very low and the other stocks may result in a higher beta implying that the stocks are risky. Thus, the accuracy of the beta estimate is based on the right index chosen.
- ii. Time period: Before estimating the beta one needs to decide the time horizon over which the regression has to be made. If only few observations are made, then the estimate may not reflect the true beta.
- iii. Time interval: Accuracy of the beta also depends on the time interval over which the returns are computed. The interval should be chosen based on the trading cycle of the user i.e. if the trading cycle is daily it is better to have monthly returns for regression, otherwise results may not be truly reflecting the changes.

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