

Question Paper

Portfolio Management and Mutual Funds – II (252) : January 03

Part D : Case Study (50 Points)

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

Case Study

Read the case carefully and answer the following questions:

1. Discuss the factors that any mutual fund manager or investor should consider in analyzing the overall performance of a mutual fund.

(10 points)
2. Do you agree with Mr. Gupta's opinion that the standard deviation is not an appropriate measure of risk? Discuss different measures of risk.

(10 points)
3. Based on quarterly returns in the last three years rank the performance of the four mutual funds using Sharpe ratio, Treynor ratio and Jensen alpha on yearly basis. Comment on the rankings.

(12 points)
4. Determine the variability of funds return considering only downside risk (i.e., downside semi- deviation).

(8 points)
5. Rank the mutual funds based on their excess return ($R_i - R_f$) to per unit of downside semi- deviation. Interpret your results.

(5 points)
6. Analyze the portfolios of all the schemes and comment on their asset allocation.

(5 points)

Mr. Pawan Gupta is an astute investor and intends to invest his savings in mutual funds, particularly in equity funds. He expects genuine return from the funds at moderate level of risk. He has selected four such mutual funds based on their past one year returns. He has contacted all the four fund managers and they have informed about risk and return aspects of their schemes. However, he is not convinced with their measure of risk i.e. standard deviation, which considers both positive and negative deviation of returns. He thinks that considering only negative deviation from mean return (downside semi-deviation) could be a more meaningful measure of risk. Even the performance measures such as, Sharpe ratio, Treynor ratio and Jensen's alpha used by fund managers should consider the negative deviation only, feels Mr. Gupta.

He has collected the following data related to the four schemes that performed well in the last one year.

J M Basic Fund

Background:

Launched in March 1997.

Converted into an open-ended scheme w.e.f. 27th November 2000.

An open-ended growth scheme with investments predominantly in equity and equity related instruments of petrochemical sector in India.

Minimum Investment Rs.1,00,000.

Entry load is 3.0% and exit Load is 0%.

Total assets : Rs 4.13 million

Investment Objective

To provide capital appreciation to its unit holders, through judicious deployment of the corpus of the Scheme in the petrochemical sector

Benchmark Comparisons (%)

	1 month	3 month	1 year	3 year
Fund	9.08	6.21	89.14	26.58
Sensex	8.7	1.07	-3.4	-12.05
Nifty	7.74	3.31	-1.95	-8.61

Best and Worst Performances (%)

	Best	Worst
Month	52.33 (13/03/2000 - 12/04/2000)	-43.01 (11/02/2000 - 13/03/2000)
Quarter	92.59 (03/01/2002 - 04/04/2002)	-35.25(19/05/1998 - 19/08/1998)
Year	178.08 (26/04/1999 - 26/04/2000)	-36.15(15/04/1998 - 15/04/1999)

Quarterly Returns (%)

Year	Q1	Q2	Q3	Q4	Annual
2002	86.89	-6.38	-7.62	2.12	89.15
2001	-6.54	-2.51	-7.73	-1.40	-17.11
2000	30.92	8.87	0.36	9.21	56.24

Asset Allocation

Assets	%of total corpus
Equity	82.27
Debt	0.00
Others	17.73

Top Holdings

Company	% of total Corpus
Reliance Industries Limited	63.15
Hindustan Petroleum Corporation Limited Indian	8.03
Oil Corporation Limited	5.36
Other equities	5.73

Reliance Vision Fund (Growth)**Background:**

Launched in October 1997.

An open-ended growth scheme with investments predominantly in equity and equity related instruments

Minimum Investment Rs.5000.

Entry load is 2.0% and exit Load is 0%.

Total assets : Rs 150 million

Investment Objective

Seeks to provide long term capital appreciation, primarily investing in growth oriented stocks.

Benchmark Comparisons (%)

	1 month	3 month	1 year	3 year
Fund	5.59	2.99	64.42	7.80
Sensex	8.7	1.07	-3.4	-12.05
Nifty	7.74	3.31	-1.95	-8.61

Best and Worst Performances (%)

	Best	Worst
Month	64.62 (20/09/1999 - 20/10/1999)	-33.43 (20/10/1999 - 19/11/1999)
Quarter	85.48 (21/07/1999 - 20/10/1999)	-39.59 (22/02/2000 - 23/05/2000)
Year	212.39 (20/10/1998 - 20/10/1999)	-47.82 (11/04/2000 - 12/04/2001)

Quarterly Returns (%)

Year	Q1	Q2	Q3	Q4	Annual
2002	25.49	35.08	-8.09	-2.52	64.42
2001	-24.28	3.31	-12.60	22.45	-16.28
2000	5.22	-15.58	-7.74	-2.49	-20.10

Asset Allocation

Assets	% of total corpus
Equity	61.76
Debt	0.52
Others	37.37

Top Holdings

Company	% of total Corpus	Company	% of total Corpus
Bharat Forge Ltd	5.36	J B Chemicals & Pharmaceuticals Ltd	1.41
Ingersoll-Rand (India) Ltd	3.67	Jindal Iron & Steel Company Ltd	1.39
Reliance Industries Ltd	3.31	Thermax Limited	1.37
ITC Ltd	3.05	Jindal Steel and Power Ltd.	1.34
Vysya Bank Ltd	2.59	Garden Silk Mills Ltd	1.33
Geodesic Software	2.05	Ranbaxy Laboratories Ltd	1.29
Atlas Copco (India) Ltd	1.82	E Merck (India) Ltd	1.22
Raymond Ltd	1.77	Shasun Chemicals & Drugs Ltd	1.22
Hinduja TMT Ltd.	1.74	Burroughs Wellcome (India) Ltd	1.2
Aban Loyd Chiles Offshore Ltd	1.64	Shree Cement Ltd	1.2
Tata Elxsi (India) Ltd	1.62	Salora International Ltd	1.17
Siemens Ltd	1.62	Ballarpur Industries Ltd	1.17
I-Flex Solutions Limited	1.52	Zee Telefilms Ltd	1.14
E-Serve International Ltd.	1.48	Goodlass Nerolac Paints Ltd	1.14
Zicom Electronic Security Systems Ltd	1.46	Karur Vysya Bank Ltd	1.09

UTI (Petro)

Background:

Launched in June 1999.

An open-ended growth scheme with investments predominantly in equity of Petro Chemical companies and other equities

Minimum Investment is Rs.5000.

Entry load is 0% and exit Load is 2%.

Total assets : Rs 516 million

Investment Objective

To provide capital appreciation to its unit holders, through judicious deployment in the petrochemical stocks to exploit increasing demand for petrochemical products.

Benchmark Comparisons (%)

	1 month	3month	1 year	3 year
Fund	3.75	-6.45	60.12	26.57
Sensex	8.7	1.07	-3.4	-12.05
Nifty	7.74	3.31	-1.95	-8.61

Quarterly Returns(%)

Year	Q1	Q2	Q3	Q4	Annual
2002	59.51	5.25	-13.48	-5.25	62.16
2001	13.63	-10.86	-16.48	12.01	-5.24
2000	14.44	7.73	-5.82	15.32	33.9

Best and Worst Performances (%)

	Best	Worst
Month	38.57 (16/01/2002 - 15/02/2002)	-23.26 (12/02/2001 - 14/03/2001)
Quarter	69.38 (31/12/2001 - 01/04/2002)	-37.79 (18/06/2001 - 17/09/2001)
Year	99.36 (17/09/2001 - 17/09/2002)	-21.82 (15/09/2000 - 17/09/2001)

Asset Allocation

Assets	%of total corpus
Equity	86.06
Debt	0.25
Others	13.94

Top Holdings

Company	% of total Corpus
Reliance Industries Ltd	15.22
Oil & Natural Gas Corpn Ltd	14.10
Hindustan Petroleum Corporation Ltd	13.99
Bharat Petroleum Corporation Ltd	12.02
Indian Oil Corporation Ltd	9.64
Gas Authority Of India Ltd	5.48
Indian Petrochemicals Corporation Ltd	4.37
IBP Ltd	3.63
Chennai Petroleum Corporation Ltd	1.87
Kochi Refineries Ltd.	1.83
Balmer Lawrie & Company Ltd	1.64
Gujarat Gas Company Ltd	1.49
Mangalore Refinery And Petrochemicals Ltd	0.50
Neyveli Lignite Corporation Ltd	0.28

Reliance Growth

Background:

Launched in October 1995

An open-ended growth scheme with investments predominantly in equity of IT companies

Minimum Investment is Rs.5000.

Entry load is 2% and exit Load is 0%.

Total assets : Rs 140 million

Investment Objective

The primary investment objective of the scheme is to achieve long term growth of capital through a research based investment approach.

Benchmark Comparisons (%)

	1 month	3 month	1 year	3 year
Fund	4.80	-0.14	40.58	-1.66
Sensex	8.70	1.07	-3.4	-12.05
Nifty	7.74	3.31	-1.95	-8.61

Quarterly Returns(%)

Year	Q1	Q2	Q3	Q4	Annual
2002	22.08	25.92	-9.75	8.25	40.58
2001	-19.67	1.65	-13.97	16.18	-18.39
2000	-1.08	-27.35	-13.81	-1.87	-39.21

Best and Worst Performances (%)

	Best	Worst
Month	50.82 (03/12/1999 - 04/01/2000)	-28.31 (31/03/2000 - 02/05/2000)
Quarter	86.37 (05/10/1999 - 04/01/2000)	-44.99 (22/02/2000 - 23/05/2000)
Year	229.36 (04/01/1999 - 04/01/2000)	-56.37(13/03/2000 - 13/03/2001)

Asset Allocation

Assets	%of total corpus
Equity	78.66
Debt	0.26
Others	21.08

Top Holdings

Company	% of total Corpus	Company	% of total Corpus
Jindal Steel and Power Ltd.	7.44	ETC Network Ltd.	2.73
Grasim Industries Ltd	5.67	Other Equities	2.70
Glaxo Smithkline Pharmaceuticals Ltd	4.95	ABB Ltd	2.45
Ashok Leyland Ltd	4.77	Atlas Copco (India) Ltd	2.31
Punjab National Bank	4.73	Hindustan Petroleum Corporation Ltd	2.17
IPCA Laboratories Ltd	4.35	Vesuvius India Ltd	2.10
Mahindra & Mahindra Ltd	4.24	Associated Cement Companies Ltd	1.69
Reliance Industries Ltd	4.02	Shaw Wallace & Company Ltd	1.66
Asian Paints (India) Ltd	3.82	Bajaj Auto Ltd	1.60
Polaris Software Lab Ltd.	3.73	ICICI Banking Corporation Ltd.	1.39
Siemens Ltd	3.33	Apollo Hospitals Enterprise Ltd	1.26
Polyplex Corporation Ltd	3.3	Tata Telecom Ltd	1.23

The quarterly returns of Sensex is given below:

Quarterly Returns (%)

Year	Q1	Q2	Q3	Q4	Annual
2002	4.56	-2.8	0.124	8.75	-3.13
2001	-16.7	-1.77	-15.55	9.13	-24.60
2000	-3.92%	1.96	4.43	7.04	23.69

The average annualized yield on 182 T-bills for last three years is 5%.

END OF PART D

Part E : Caselets (50 Points)

- This part consists of questions with serial number 6 - 13.
- Answer **all** questions.
- Points are indicated against each question.
- Do not spend more than 80 - 90 minutes on Part E.

Caselet 1

Read the following caselet carefully and answer the following questions:

- The caselet states that PEG ratios are considered less useful in assessing cyclical stocks and those in industries such as banking, oil or real estate. Do you agree? Justify.
(7 points)
- According to the caselets if the PEG ratio is less than one, it is a sign of possibly under valued stocks. Do you agree? Discuss.
(9 points)

The PEG ratio is developed by Peter Lynch and popularized by the Motley Fool, who also named it the "Fool Ratio." Peter Lynch, the former star manager of Fidelity's Magellan Fund puts it aptly in his book '*One up on Wall Street*' that "In a fully and fairly valued situation, a growth stock's price-to-earnings ratio should equal the

percentage of the growth rate of its company's earnings per share". Therefore the PE ratio of a company will be equal to its profit growth rate. And the PEG ratio of a stock should be equal to one, as PEs come into line with the growth rate in net profits.

If the PEG ratio is greater than one, it indicates that the stock is possibly overvalued or that the market expects future EPS growth to be greater than what is currently prevailing. Growth stocks typically have a PEG ratio greater than one because investors are willing to pay more for a stock that is expected to grow rapidly (also known as "growth at any price"). It can also be interpreted that the earnings forecasts have been lowered while the stock price remains relatively stable for other reasons. Traditional wisdom held that a stock should sell for a P/E equal to its growth rate (i.e., a PEG of 1.0). However that thinking has changed when technology companies started selling for higher PEGs than the industrials.

If the PEG ratio is less than one, it is a sign of a possibly undervalued stock or that the market does not expect the company to achieve the earnings growth that is reflected in the market estimates. Value stocks usually have a PEG ratio less than one because the stock's earnings expectations have risen and the market has not yet recognized the growth potential. On the other hand, it could also indicate that earnings expectations have fallen faster than the new forecasts. Overpriced stocks have higher PE's than their respective growth rates. PEG is considered particularly helpful in valuing small and mid-cap growth stocks, which typically pay no dividend. For valuing larger stocks, the company's dividend yield should be added to its projected five-year earnings growth rate because larger and more established firms are valued by investors for their current payout as well as for their future prospects of price appreciation. PEG ratios are considered less useful in assessing cyclical stocks and those in industries such as banking, oil or real estate.

During the tech boom, the PE and PEG ratio were used to justify the high valuations. Though, the expectations were belied, this ratio can still add glitter to one's portfolio if used judiciously.

Caselet 2

Read the following caselet carefully and answer the following questions:

9. The caselet says that Modern Portfolio Theory is not a risk-elimination tool but it is a risk management tool. Do you agree? Justify your view.

(6 points)

10. "There does not seem to be any fundamental change in the correlations between the world markets". Discuss.

(8 points)

International investing has two key benefits for American investors: Higher returns and a strong diversification effect. International markets have a very low correlation with our domestic markets. This diversification effect will lower the risk at the portfolio level, which is one of the chief advantages offered by Modern Portfolio Theory. (This is a very simple two-asset-class illustration. Our investor should also consider the impact of small cap stocks, emerging markets, value investing, real estate, hard assets and other asset classes on his program.)

Modern Portfolio Theory is certainly a great leap forward in our ability to construct rational investment plans. But like any good tool, it must be used with judgment. And, like any good idea, there will always be someone who will take it to an illogical extreme.

First, we must understand that MPT is not a risk elimination process; it is a risk management tool. It allows us to build more rational investment plans, control risk, and get "the most bang for the buck" of risk. It is not a substitute for judgment, and in fact requires great judgment for its proper application. There are severe limitations which, if not properly understood, can lead to very strange and counterproductive results. When dealing with investment tools we must always remember that none of them work every day, every quarter, or every year. So an optimized portfolio is not a substitute for CDs. Patience and discipline are still required if the process is to bear fruit.

MPT is based on an examination of past results. We can say that some things happen more often than not, but there is no guarantee that tomorrow will always be just like today. Short-term returns will always remain random and variable.

We can take a great deal of comfort in the fact that none of the three variables appear to be changing in any fundamental way. In particular, there doesn't seem to be any fundamental change in the correlations between the world's markets. While we may be moving toward a global economy, individual economies and markets still respond to local conditions and politics.

There are a number of "optimization" programs readily available to financial planners and portfolio managers that will quickly and easily solve the math problems associated with MPT. However, like any computer program, if we put garbage in we will get garbage out. Many of us put far too much value on the output of a computer

program without considering the input and programming problems. If it's from a computer, we believe, it must be right! Beware of the black-box approach to solving life's little problems.

The MPT process and math is particularly vulnerable to data input distortions. For each asset or asset class, we must enter the expected rate of return, risk, and correlation to every other asset class. This leads to two problems. First, the data changes every day. Next, a tiny change in an input of any of the three factors will have a giant impact on the suggested allocation. Even if we assume that all the data going in is totally accurate, we still have problems.

Caselet 3

Read the following caselet carefully and answer the following questions:

11. The caselet states that market has been moving within a very narrow range and this has led to mutual funds moving towards a different kind of offering for their investors. What kind of flexible schemes suit different types of investor if markets are moving in a narrow range.

(7 points)

12. Dynamic funds can switch over from stocks and bonds and allocate 100% of their fund in either of these two assets based on market condition. According to you what would be the riskiness level of dynamic funds compared to other types of mutual funds.

(8 points)

13. The caselet states that investor should look around because with increasing innovations and offerings available from funds there is a greater chance of their needs being met without too much of a trouble. Discuss.

(5 points)

INVESTORS, who have suffered erosion in their portfolio values due to poor performance of several equity-oriented mutual fund schemes, have focused on a few other options.

While a majority of the investors have preferred to go in for a debt-oriented scheme, the other choice has often been passively managed funds where there is not much decision making left to the discretion of the fund manager.

The market has been moving within a very narrow range and this has led to mutual funds moving towards a different kind of offering for their investors. Thus, another category or range of schemes, which are witnessing an entry into the Indian mutual fund industry are flexible schemes.

These schemes have the ability to change the composition of their investment regularly by shifting from one class of assets to the other depending upon the situation prevalent in the markets.

The very basis for such types of schemes is flexibility in the investment process. Once again investors need to be cautioned that while such schemes would have different names depending upon the mutual funds which have launched them, there would also be variation in their features, which need to be considered.

According to the broad nature of these plans the scheme can invest in a particular class of assets, say, equities. This gives it the ability to have the potential to record good returns in case of a rise in the market. However, unlike other equity schemes there is no compulsion for the fund to remain invested in equities at all times.

This means that in case of a rise in the market the fund can switch over to debt or cash so that in case of a downturn in the market the investor does not suffer on account of the fall.

While all this may sound to be good in theory, the key for the investor is the way in which the changes will be done. The question to be asked is whether the estimation of the overvaluation or undervaluation and the selection of particular stocks is left to the discretion of the fund manager or would the changes be based on prefixed norms. These points will help in aligning the specific features of a scheme with the exact requirements of the investor.

We shall take the example of a couple of recent examples to illustrate the point. First, consider the UTI Variable Investment Scheme, which has launched an index-linked plan. This scheme seeks to increase allocation to equities when the markets are depressed and vice versa. The important point here being that the stocks, to be selected in the scheme, would be the sensex scrips based on the same proportion as in the index as this is an index linked plan. This point introduces an element of passivity because an element of decision-making in the issue of selection of scrips is taken away from the fund manager.

On the other hand, consider the Prudential ICICI Dynamic fund. The fund manager here has the discretion to take aggressive asset calls and thus one could find that at some point around 100% of the portfolio is in equities or at other times even a majority of the portfolio lying in debt and debt-related instruments.

The important point here being the changes being made at the discretion of the fund manager. In all these cases, investors need to be aware of the danger that large churning of the portfolio in the pursuit of the stated objectives could also lead to losses.

For investors, here is also a view about how other schemes that are present in the market behave. In case of normal diversified or sectoral equity schemes, the fund manager has the potential and the ability to ensure that the investment of the fund is sold and the corpus is held in the form of cash and related securities when the situation so desires. This is usually seen when fund managers stack up in cash and related instruments in the expectation of a fall in the market so that stocks can be bought at lower levels.

Now, balanced schemes. These schemes invest in a mixture of equity and debt so as to allow the investors the benefits of both the worlds. Usually, however, the percentage of both these are fixed over a period of time, with the equity part being more than half of the total corpus of the scheme.

On the whole, investors have to answer the question of what they are looking for while investing in such schemes. The first choice to make is whether one would like to go in for a passively managed scheme or an actively managed scheme. In addition as described earlier some schemes will consider certain pre-fixed levels based on which they will necessitate a change in the composition of the holdings of the fund.

As against this, in the case of an actively managed fund there will be an element of discretion that is available to the fund manager wherein he will be able to dictate when and the way in which the investments of the scheme shape up. But investors should always look around because with an increasing number of innovations and offerings available from funds there is a greater chance of their needs being met without too much of a trouble.

END OF PART E

END OF QUESTION PAPER

Suggested Answers

Portfolio Management and Mutual Funds – II (252) : January 03

Part D : Case Study

1. Mutual funds are available with different investment objectives and policies. An investor or fund manager has to consider the following qualitative and quantitative factors for analyzing the performance of mutual funds.

Fund Objectives: There are various funds available in the market such growth, income, balanced and money market mutual fund. A classification of mutual fund based on their investment objective is required to avoid comparing apples with oranges. A mutual fund should be always compared with a fund of same category having same type of investment objective and philosophy.

Asset Allocation: The asset allocation of a particular mutual fund is to be considered to know whether the fund is fulfilling the investment objectives as outlined in the prospectus. For example, if an income fund invest more in equities than fixed income securities then it is deviating from its investment objectives.

Dividend Policy: Analyzing the dividend history of the fund helps in understanding the performance of that fund.

Diversification: This aspect is very important when analyzing a mutual fund. A diversified fund can withstand the worst times. Diversification of a mutual fund helps in giving a smooth return to investors.

Market timing: One important question arises while evaluating mutual fund is market timing. A successful mutual fund manager will be successfully utilizing the market timing to gain better returns.

Excess return per unit of risk: An other basis for performance evaluation is the excess return per unit of risk given by a mutual fund. The risk could be denoted as total risk or systematic risk.

Superior stock selection: Superior stock selection ability of a fund manager enhances the chances that a mutual fund will perform better than other funds in the same category.

Load: The amount of entry or exist load also decides the amount of return available to the investors. It also matters whether the load is front-ended or back-ended.

2. Mr. Gupta is right in defining risk as negative volatility or downside semi-variance. Infact, this is a burning issue before the experts to consider downside volatility as a true measure of risk. Risk of a fund, stock or security can be measured in various ways. However, the most popular measure is standard deviation or variance of return. Other measures could be range, coefficient of variation and skewness.

Standard deviation of returns merely measures the extent of deviation of returns from the average value of return. Precisely put, standard deviation of returns is the square root of the average of squares of deviations of the observed returns from the expected return. The square of standard deviations is called variance of returns. Thus, variance of security returns is the average value of the squares of deviation of the observed returns from the expected value of return.

The range of the security return is simply the difference between the maximum and minimum return observed during a particular period. Some times, to evaluate the magnitude of dispersion it is useful to calculate the ratio of standard deviation to the expected return. This measure of risk is called coefficient of variation. Till now we have only described the measures of dispersion as indicating the size of the average surprise whether good or bad. But, the standard deviation is not exactly equal to the average surprise because squaring deviations and then taking the square root of the average square, deviations gives higher weight on large deviations. Simply putting, standard deviation is a measure that tells us how large a deviation from expectation can be expected. Once we calculate the standard deviation the next question arises is that whether larger deviations (surprise) are more likely to be positive. Any risk averse investor is more concerned about bad surprises but the standard deviation doesn't distinguish between good and bad surprises. In other words, most investors will be interested in likely small good surprises and less probable large bad surprises. Skewness is a measure of risk which distinguishes between the large good vs. bad surprises. It is also known as third moment because it cubes each value of deviation and magnifies larger deviation more than the smaller ones. This can be written as

$$M3 = E(d^3) = [E(r_i - E(r))^3]$$

By cubing each of the deviation magnifies large deviations more than smaller ones. Third moment gives more weightage to large deviation than smaller deviation. Skewness is called as third moment because it cubes the deviations while standard deviation is called second moment it requires squaring the deviations.

3. J.M.Basic

Year	Quarter	Returns	$(x_1 - \bar{x}_1)$	$(x_1 - \bar{x}_1)^2$	$(m - \bar{m})$	$(x_1 - \bar{x}_1)(m - \bar{m})$
2000	1	30.92	22.08	487.85	-3.52	-77.75
	2	8.87	0.03	0.00	2.35	0.08
	3	0.36	-8.47	71.78	4.82	-40.91
	4	9.21	0.37	0.14	7.43	2.80
2001	1	-6.54	-15.37	236.31	-16.30	250.57
	2	-2.51	-11.34	128.65	-1.37	15.54
	3	-7.73	-16.56	274.31	-15.15	250.93
	4	-1.4	-10.23	104.70	9.52	-97.51
2002	1	86.69	77.85	6061.79	4.95	386.13
	2	-6.38	-15.21	231.42	-2.40	36.51
	3	-7.62	-16.45	270.68	0.52	-8.61
	4	2.12	-6.71	45.05	9.14	61.41
		105.99		7912.72		656.38

$$\bar{x}_1 = 8.8325$$

$$\sigma_{x_1} = \sqrt{7912.724111} = 26.82\%$$

Reliance Vision

Year	Quarter	Return	$(x_2 - \bar{x}_2)$	$(x_2 - \bar{x}_2)^2$	$(m - \bar{m})$	$(x_2 - \bar{x}_2)(m - \bar{m})$
2000	1	5.22	3.72	13.86	-3.52	-13.11
	2	-15.88	-17.37	301.91	2.35	-40.99
	3	-7.74	-9.23	85.30	4.82	-44.60
	4	-2.49	-3.98	15.88	7.43	-29.65
2001	1	-24.28	-25.77	664.39	-16.30	420.15
	2	3.31	1.81	3.29	-1.37	-2.48
	3	-12.6	-14.09	198.69	-15.15	213.55
	4	22.45	20.95	439.07	9.52	199.68
2002	1	25.49	33.58	575.72	4.95	118.99
	2	35.08	-9.58	1127.89	-2.40	-80.61
	3	-8.09	-4.01	91.88	0.52	-5.01
	4	-2.5		16.12	9.14	-36.74
		17.5		3534.06		699.16

$$X_2 = 1.4958$$

$$\sigma_{x_2} = \sqrt{\frac{3534.062}{11}} = 17.92\%$$

UTI Petro

Year	Quarter	Return	$(x_3 - \bar{x}_3)$	$(x_3 - \bar{x}_3)^2$	$(m - \bar{m})$	$(x_3 - \bar{x}_3)(m - \bar{m})$
2000	1	14.44	8.10	65.71	-3.52	-28.53
	2	7.73	1.39	1.95	2.35	3.29
	3	-5.82	-12.15	147.70	4.82	-58.69
	4	15.32	8.98	80.76	7.43	66.85
2001	1	13.63	7.29	53.24	-16.30	-118.93
	2	-10.86	-17.19	295.61	-1.37	23.56
	3	-16.48	-22.81	520.44	-15.15	345.63
	4	12.01	5.67	32.22	9.52	54.09
2002	1	59.51	53.17	2827.75	4.95	263.72
	2	5.25	-1.08	1.17	-2.40	2.60
	3	-13.48	-19.81	392.56	0.52	-10.37
	4	-5.25	-11.58	134.17	9.14	-105.98
		76		4553.33		437.24

$$X_3 = 6.3333$$

$$\sigma_{x_3} = \sqrt{\frac{4553.3304}{11}} = 20.35\%$$

Reliance Growth

Year	Quarter	Return	$(x_4 - \bar{x}_4)$	$(x_4 - \bar{x}_4)^2$	$(m - \bar{m})$	$(x_4 - \bar{x}_4)(m - \bar{m})$
2000	1	-1.08	0.03	0.00	-3.52	-0.13
	2	-27.35	-26.23	688.10	2.35	-61.89
	3	-13.81	-12.69	161.07	4.82	-61.29
	4	-1.87	-0.75	0.56	7.43	-5.59
2001	1	-19.67	-18.55	344.16	-16.30	302.40
	2	1.65	2.76	7.66	-1.37	-3.79
	3	-13.97	-12.85	165.16	-15.15	194.70
	4	16.18	17.29	299.23	9.52	164.84
2002	1	22.08	23.19	538.16	4.95	115.05
	2	25.92	27.03	731.07	-2.40	-64.90
	3	-9.75	-8.63	74.50	0.52	-4.51
	4	8.25	9.36	87.76	9.14	85.71
		-13.42		3097.47		660.58

$$X_4 = -1.11833$$

$$\sigma_{X_4} = \sqrt{\frac{3097.476}{11}} = 16.78\%$$

Sensex	Quarter	Return	$(m - \bar{m})$	$(m - \bar{m})^2$
2000	1	-3.92	-3.52	12.39
	2	1.96	2.35	5.56
	3	4.43	4.82	23.32
	4	7.04	7.43	55.34
2001	1	-16.7	-16.30	265.53
	2	-1.77	-1.37	1.87
	3	-15.55	-15.15	229.53
	4	9.13	9.52	90.81
2002	1	4.56	4.95	24.59
	2	-2.8	-2.40	5.76
	3	0.124	0.52	0.27
	4	8.75	9.14	83.71
		-4.746		798.91

$$\bar{m} = -0.3955$$

$$\text{S.D. of Sensex return} = \sqrt{\frac{\sum (m - \bar{m})^2}{11}} = \sqrt{\frac{798.91}{11}} = 8.52\%$$

Beta of the stocks

$$\beta_1 = \frac{\text{Cov } x_1 m}{\sigma_m^2} = \frac{656.38}{798.91} = 0.8216$$

$$\beta_2 = \frac{\text{Cov } x_2 m}{\sigma_m^2} = \frac{699.16}{798.91} = 0.8750$$

$$\beta_3 = \frac{\text{Cov } x_3 m}{\sigma_m^2} = \frac{437.798.91}{798.91} = 0.5473$$

$$\beta_4 = \frac{\text{Cov } x_4 m}{\sigma_m^2} = \frac{660.58}{798.91} = 0.8270$$

We will take annualized average return based on quarterly average returns and also annual S.D.

$$\text{J.M. Basic } (1.088325)^4 - 1 = 40.29\%$$

$$\text{Reliance vision } (1.014958)^4 - 1 = 6.118\%$$

$$\text{VTI (Petro)} (1.0633)^4 - 1 = 27.83\%$$

$$\text{Reliance Growth} = (0.98817)^4 - 1 = -4.65\%$$

$$\text{Market } (0.99604)^4 - 1 = -1.57\%$$

Yearly standard deviation

$$(Q.r. S.D.) \times \sqrt{4}$$

$$(26.82) \times 2 = 53.64\%$$

$$(17.92) \times 2 = 35.84\%$$

$$(20.35) \times 2 = 40.7\%$$

$$(16.78) \times 2 = 33.56\%$$

Ranking based on Sharpe ratio

Fund	$\frac{R_i - R_f}{\sigma_i}$	Rank
J.M Basic	$\frac{40.29 - 5}{53.64} = 0.67$	I
Reliance vision	$\frac{6.118 - 5}{35.84} = 0.0312$	III
UTI (Petro)	$\frac{27.83 - 5}{40.7} = 0.5609$	II
Reliance(Growth)	$\frac{-4.65 - 5}{33.56} = -0.2875$	IV

Treynor ratio

Fund	$\frac{R_i - R_f}{\beta_i}$	Rank
J. M. Basic	$\frac{40.29 - 5}{0.8216} = 42.95$	I
Reliance vision	$\frac{6.118 - 5}{0.875} = 1.277$	III
UTI (Petro)	$\frac{27.83 - 5}{0.5473} = 41.713$	I
Reliance uroor	$\frac{-4.65 - 5}{0.827} = -11.682$	IV

$$\text{Jensen's } \alpha = R_i - [R_f + b(R_M - R_f)]$$

For calculation of alpha, we will use annual risk-free and annual market return.

Funds	Jensen's alpha	Rank
J.M. Basic	$40.29 - [5 + 0.8216(-1.57 - 5)] = 39.89$	I
Reliance vision	$6.118 - [5 + 0.875(-1.57 - 5)] = 6.86$	III
UTI (Petro)	$27.83 - [5 + 0.5473(-1.57 - 5)] = 26.42$	II
Reliance growth	$-4.65 - [5 + 0.827(-1.57 - 5)] = -4.2166$	IV

Rankings as per Jensen's alpha Sharpe and Treynor ratio is similar.

4.

Year	Quarter	Returns	$(x - \bar{x})$	$(x - \bar{x})^2$
2000	1	30.92	—	0
	2	8.87	—	0
	3	0.36	-8.47	71.78
	4	9.21	-	0
2001	1	-6.54	-15.37	236.31
	2	-2.51	-11.34	128.65
	3	-7.73	-16.56	274.31
	4	-1.4	-10.23	104.70
2002	1	86.69	-	0
	2	-6.38	-15.21	231.42
	3	-7.62	-16.45	270.68
	4	2.12	-6.77	45.05
		105.99		1362.93

$$X=8.8325 \quad \text{semi-deviation} = \sqrt{\frac{(x_1 - \bar{x}_1)^2}{11}} = 11.13\%$$

Reliance Vision

Year	Quarter	Return	$(x_2 - \bar{x}_2)$	$(x_2 - \bar{x}_2)^2$
2000	1	5.22	—	0
	2	-15.88	-17.37	301.91
	3	-7.74	-9.23	85.30
	4	-2.49	-3.98	15.88
2001	1	-24.28	-25.77	664.39
	2	3.31	—	0
	3	-12.6	-14.09	198.69
	4	22.45	—	0
2002	1	25.49	—	0
	2	35.08	—	0
	3	-8.09	-9.58	91.88
	4	-2.52	-4.01	16.12
		17.95		1374.20

$$X_2=1.495833 \quad \text{semi-deviation} = \sqrt{\frac{(x_2 - \bar{x}_2)^2}{11}} = 11.177\%$$

UTI

Year	Quarter	Return	$(x_3 - \bar{x}_3)$	$(x_3 - \bar{x}_3)^2$
2000	1	14.44		0
	2	7.73		0
	3	-5.82	-12.15	147.70
	4	15.32		0
2001	1	13.63		0
	2	-10.86	-17.19	295.61
	3	-16.48	-22.81	520.44
	4	12.01		0
2002	1	59.51		0
	2	5.25	-1.08	1.17
	3	-13.48	-19.81	392.56
	4	-5.25	-11.58	134.17
		76		1491.67

$$X_3=6.333333 \quad \text{semi-deviation} = \sqrt{\frac{(x_3 - \bar{x}_3)^2}{11}} = 11.64\%$$

Reliance Growth

Year	Quarter	Return	$(x_4 - \bar{x}_4)$	$(x_4 - \bar{x}_4)^2$
2000	1	-1.08	0.03	0.00
	2	-27.35	-26.23	688.10
	3	-13.81	-12.69	161.07
	4	-1.87	0.75	0.56
2001	1	-19.67	-18.55	344.16
	2	1.65	—	0
	3	-13.97	-12.85	165.16
	4	16.18	—	0
2002	1	22.08	—	0
	2	25.92	—	0
	3	-9.75	-8.63	74.50
	4	8.25	—	0
		-13.42		1433.58

$$X_4 = -1.11833$$

$$\text{semi-deviation} = \sqrt{\frac{(x_4 - \bar{x}_4)^2}{11}} 1433.58 = 11.416\%$$

5.

Fund	Return(R_i)	S.D(down side volatility)	$(R_i - R_f) / D.V$	Rank
J.M Basic	8.8325%	11.13%	0.6812	1
Reliance Vision	1.4958%	11.177%	0.2199	3
UTI (Petro)	6.3333%	11.64%	0.4367	2
Reliance Growth	1.1833%	11.416%	-0.2131	4

As we can see that the rankings of the funds almost resemble the rankings based on Sharpe ratio. The important thing to note is that the risk suffered by fund due to downside volatility is almost same but as their returns are different they have got different rankings.

6. JM basic fund has allocated a predominant portion of its fund towards petrochemical stocks and therefore the performance of the fund is very much related to the performance of the petrochemical industry. Again, no fund have been put into debt. Therefore, source of regular income is also not available. Reliance Vision fund has also devoted a fund towards diverse types of stocks and other stocks like Bharat Forge Ltd. and Ingersoll-Rand (India) Ltd. Again, UTI Petro has also devoted lot of fund towards Petrochemical Industry stocks and has also diversified with stocks like Reliance Industries and Tata Telecom. Although allocation is largely in petro chemical stocks the fund has also devoted some amount towards diversified stocks giving the return a healthier base. Reliance growth is a truly diversified equity fund which has invested in wide range of stocks from diverse industries and its return is more likely to be stable in difficult times and not dependent on a particular industry like other three funds.

Part E: Caselets

Caselet 1

7. The most important presumption of PEG ratio is that the PE ratio of a company will be equal to its profit growth rate. PEG ratio is generally construed to capture the growth component of valuation. But, PEG ratio may not be useful for assessing the cyclical stocks as the growth of these stocks will not be very smooth and will be shown during a particular period. In the case banking oil and real estate industry the most important thing is assets and their valuation depends not on PEG ratio but their asset base. Therefore, PEG ratio cannot be used for valuing the cyclical stocks and other stocks from banking, Oil and Real estate.
8. Lot of financial experts have challenge the rule of thumb that the stocks, which are having PEG of less than 1 are good picks. We should see whether the financial theories support PEG ratio. Strictly speaking theories do not support this ratio. For example, If we consider Aventis pharma and Cipla and if an investor perceives that the Cipla stock is less risky than Aventis and satisfied with lower return from Cipla. This indicates that the investor would be willing to pay more for every Re.1 of Cipla EPS. In other words, lower the risk of the stocks, higher its PE ratio. However the flip side of this rule is that higher the risk, lower the PE ratio. Since Aventis is expected to be more risky by the investor, its PE ratio will be lower than that of Cipla. Suppose the P/E ratio of Cipla is 10 and that of Aventis is 5 and the expected growth rate for Cipla and Aventis is 20% and 15% respectively, the PEG ratio for Cipla is just 0.33. Therefore an investor may choose Aventis based on the PEG ratio even though his perception for Cipla is better. Hence basing stock picks just on the PEG ratio may be wrong, as the ratio is biased towards stocks that have low PE ratio. Thus, we can say that PEG ratio is not perfect.

PEG ratio is a logical extension of PE ratio that compares prices with the current stock prices. As lower PE ratio indicates that stock is undervalued and a higher PE ratio indicates that stock is overvalued or overpriced. Same logic is applicable to PEG ratio if PEG ratio is less than one than it indicates that the stock is possibly undervalued and market expects future growth of EPS will be low and earnings of the company will not be at the same level as prevailing in the given conditions.

Caselet 2

9. Risk management system simplifies the complexities of fixed income, equity and other investing. Portfolio management seeks to manage the risk and do not believe in eliminating the risk as it is almost an impossible task to eliminate the risk completely. Modern Portfolio Theory believes in diversifying the portfolio so that without compromising the return risk can be eliminated. Diversification process seeks to achieve this objective by investing in different kinds of assets. While managing a portfolio of bonds we generally try to match our inflows with the outflows of future. In matching the inflows and outflows the emphasis is on minimizing the interest rate risk. In fact we can say that risk management is an integral part of portfolio management process.
10. Today, economic and political factors that affect one country affect all countries. This is true for financial markets in general, unless there is unusual situation and the trade and other conditions prevailing between two countries do not change. Globalization has also attached each country with other and therefore the correlation prevailing between two markets is getting established. Consolidation and globalization have changed the nature of all types of investing. Consolidation has resulted in the creation of global investment management firms that find themselves managing increasingly complex portfolios. Formation of global portfolio has picked up because of lower risk attached to it. Correlation between two countries can change if extraordinary things like war occur and business and economic scenario changes completely.

Caselet 3

11. Indian Mutual fund industry has witnessed several new products introduced by mutual funds during the last few years. Most of these products have been related to new kinds of schemes launched by the funds or some additional services provided to investors.

One of the recent trend has been investment in overseas securities. Some of the ways in which this is being implemented by different funds include investment in foreign debt instruments across the world and investments in American Depository Receipts (ADRs) and Global Depository Receipts (GDRs) of Indian companies abroad. The attractive feature is that such an investment can provide an additional element of

diversification for the investor's portfolio. The first and the most common mode of diversification for the investor are to choose between equity and debt and spread their risk between these areas, depending upon their risk bearing ability. Apart from this benefit there can be a further attempt at diversification even within the equity or debt portfolio so that the entire class of assets is not subject to the same kind of risk. Since last one year the market is moving in narrow range that is very much evident from the values of indices one year before and their values prevailing now. ICICI has launched dynamic fund, which can invest in equity, and debt instruments depending on the prevailing market conditions this type of schemes suits the investors who are interested in the steady returns. Again UTI has introduced UTI variable investment scheme which is an index linked plan and plans to increase allocation to equities when market is depressed. Therefore it suits those type of investors who are interested in more returns.

12. Although dynamic fund can switch over between the equity and stocks the riskness level of the dynamic fund is moderate and definitely lesser than a normal growth fund. Roughly speaking riskness level of the dynamic fund will be lesser than risk of a balanced fund but greater than money market fund. This is because dynamic fund invest in fixed income or equity markets based on the prevailing market conditions and therefore mutual fund manager will always try to avoid those market which are not attractive and greater risk attached with them
13. The caselet indicates that now Indian mutual funds are offering different types of schemes to its investors and the schemes offered by them suits every kind of the investors depending on their risk and return requirement. Investors who do not wish to maintain a portfolio can invest in a truly diversified fund and the investors who are looking for regular income can invest in the income plans. For short term investment investor can invest in money market funds. A moderately risk averse investor can look for balanced schemes. Investors with variable liability can invest schemes who invest primarily in floating rate instruments.