Financial Mathematics
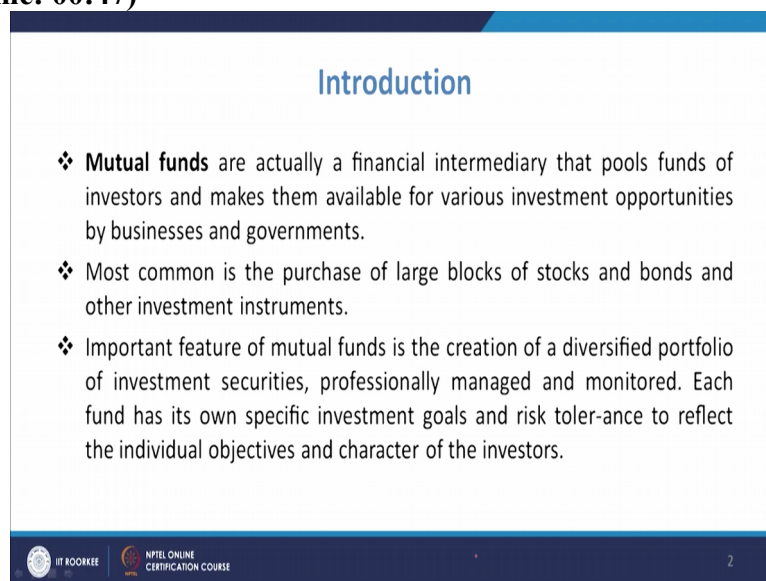**Prof. Pradeep K. Jha**
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Lecture – 46
Introduction to Mutual Funds

Welcome to the lecture on, Introduction to Mutual Funds. So Mutual funds basically they are not the specific securities such like stocks and bonds. Basically they are financial intermediary that pools funds of investors and makes them available for various investment opportunities by businesses and governments.

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So basically this is something which is in between and it will be pooling the fund of the investors and it will be making them available for the investment opportunities by the large business groups and the government undertakings. Most commonly it is purchase of large blocks of stocks and bonds and other investment instruments, so that may be the example of the mutual funds. One of the most striking features of the mutual fund is the creation of diversified portfolio of investment securities.

So basically in this we are creating the diversified portfolio which is supposed to give good return with minimum of risk and it is professionally managed and monitored. So you have a professional group of experts, subject matter experts in this area, and they have usually keep a very close eye on this and they try to see that how the returns are basically going to be expected, how that is factor ease or how the return will come, so that way they are being basically managed by the professionally, you know, groups who are monitoring, you know, having close eye on the, you know, on the behavior of the stocks and bonds or so.

Each fund has its own specific investment goals and risk tolerance to reflect the individual objectives and character of the investors. Ev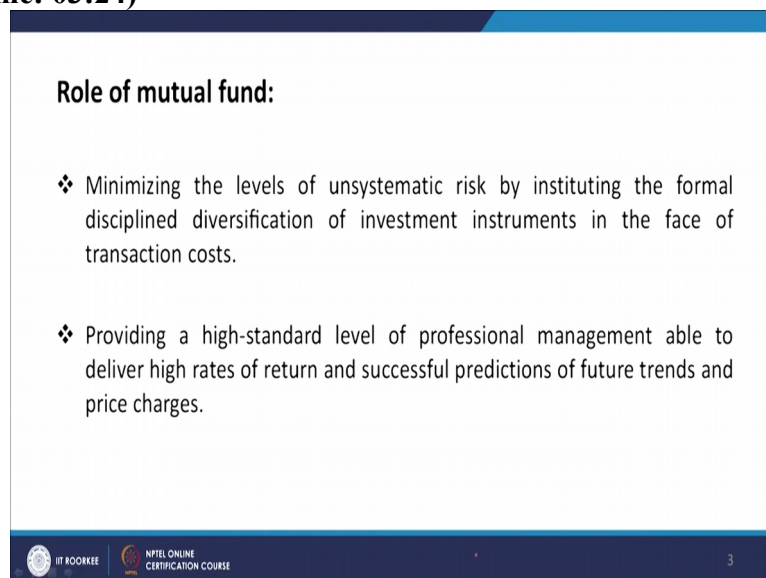ery you know fund will have its own specific investment goals and then certainly as, you know that when we talk about the investment, you know, in these securities, in those cases you have certainly risk associated with them and then it has certain objective which is to be, you know, fulfilled.

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So if you talk about, you know, the role of mutual fund, what it does is that, it will be providing very high quality services and that will be characterized, by the following points, like minimizing the levels of unsystematic risk by instituting the formal disciplined diversification of investment instruments in the face of transaction costs. So it will be trying to minimize that level of unsystematic risk. You have two types of risk, systemic risk and unsystematic risk.

So it will be minimizing that level of unsystematic risk, so that will be by the disciplined diversification of investment instruments. So you know disciplined diversement means, diversification means, the person must have the experts have the knowledge that where to, you know, how to diversify the fund, you know, in what kind of you know stocks or shares, you should have some part of the fund and some part whether so that, you know, ultimately you try to have better return and also lower amount of risk.

So because they are an inevitable part of you know this trade, so you will have, you know, you you have to face risk, that you may and once you are taking risk you are likely to get sometimes higher return, and and also you may lose also the, you know, the capital or the money. So, that way, you know, you have the disciplined diversification of these investment

instruments then providing a high standard level of professional management, able to deliver high rates of return and successful predictions of future trends and price charges.

So basically that price charge also comes into, because you have to, you know, put the transaction costs but then you have the high standard level of professionals who have a good you know grip on these you know issues, they have the you know experience in these in the you know fall or rise of the sales prices and about the market trends also.

So based on that they can ensure that if you are going to; so they will be suggesting and you can and that group basically will be, you know responsible for having the, you know look and they will be suggesting that where to invest, so that you have better and better you know higher rates of return and also at the same time it should be able to tell that when, what will be the trend of the market and you know with time, how your money will grow and when there will be risk, you can take the money out or so. So all these things are there in the case of, you know, mutual fund.

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Coming to the; you know categories of mutual fund because they are basically tailored to fit the need of, you know, the investors. So you will have the depending upon the need and their features and also, so you have their objectives and they are categorized into major four types of, you know, mutual fund. One is the fund for income, so this measure objective here is to provide you stable level of income and this is focused primarily on corporate and government bonds.

So these bonds which are from the corporate and high corporate and government, you know, sectors. So they will provide you this stable level of income. Then funds for growth, so this you know, company, this fund is it's basically, major purposes the capital appreciation. So

you know, once you your main objective is the appreciation of the capital, in that case, you know, they vary in their aggressiveness and risk levels. So certainly, in that case, your risk level will be quite high.

So there will be chances of loss also, so you know they are very aggressive and you know risk level is quite high, and they focus on the common stock of publicly held corporations. So they are basically under that category where your chances of fund growth is quite high, but still, but at the same time, there is high risk then the third, you know, category is the balanced funds. Now these balanced funds they are providing a balance of income and appreciation, and you know in the case of funds for income you have, you know, a less of a number of, less you know, risk.

You are given stable income but that rate of return will be smaller but you know the fund of growth, where you see that, there will be risk but your rate of return may be higher. Then you have the balanced funds, these balanced funds are providing a balance of income and appreciation, and they provide a fixed on income, as well as seeking capital growth opportunities. So they have the balance of both, they have they are giving you one fixed income and also they are you know you can have the capital growth opportunities.

They invest in both stocks and bonds and are popular with the large sector of investors with moderate level of risk tolerance so basically you know they are normally investing in stocks and bonds and with large sector of investors with moderate level of risk tolerance, because you have small risk in the funds for income, large risk in the case of funds for growth and you have moderate risk in the case of balanced funds.

Then the lastly it is the global funds. Now these are basically the, you know, balanced funds and there you have the; you know investment opportunity you have abroad, whenever you have that investment opportunities. So they are known as the global funds. So this way, there are, these are the, you know, four categories of the you know mutual fund they are tailored basically to fit the need of, I need, you know, so based on that, it has been categorized into these four types.

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Fund valuation

❖ Unlike stocks, a mutual fund's value is determined only at the end of each trading day. They are priced based on **net asset value** (NAV), which is settled after the market is closed.

❖ The net asset value is the mutual fund's equivalent of share price. It is upon the ability of the fund's management to deliver continuous and consistent profits.

❖ NAV is also a direct indicator of the market value, consisting of total value of the holdings of the fund after subtracting any obligations (O). Further net asset value per share can be found.

Now coming to the funding valuation, you know often evaluation basically. So, how to find the value of the fund so you know unlike stocks a mutual funds value is determined only at the end of each trading day. So, in these cases for every you know trading day you are finding its value, they are priced based on net asset value, which is settled after the market is closed. So every day when the market is closed that time the net asset value is basically calculated and based on that, the price is valued.

Net asset value is the mutual funds equivalent of share price. It is upon the ability of the funds management to deliver continuous and consistent profits. So that way, it will be any you know, a parameter to assess you know the ability of the; organize, give you the continuous and consistent profits. Then the net asset value, is the direct indicator of the market value and it will be consisting of the total value of the holdings of the fund, you know that includes also the you know, cash and from that you will be subtracting the obligations you know or the liabilities.

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So you have to subtract it and then you are going to divide it with the number of shares. So nest, net asset value per share, can be found. So we can define, you know when we evaluate these funding know or try to find the value of the fund valuation, in that case the, you know net you know, asset value which we calculate, so the net asset value its formula is coming as 1 by S * MV + C. So that is, you know, these two are added and then you are subtracting the who that is your, you know obligations or liabilities.

Now as we know that this NAV is the, net asset value in that asset value per share. Now MV is the market value of assets invested. So that will be talking about what is the market value that is then you have seen C is nothing but the cash on hand which it is, it has. So this is cash on hand and then O are the liabilities or the obligations or obligations. So once you have, so suddenly this is your market value of assets invested then you have the cash which it has in hand and from that you have to subtract the obligations or liabilities.

So that will be net asset value and net asset value per share. So that will be for that you are going to divide it with the number of shares. So you know this S will be the number of shares. So you know depending upon any, you know, organization like suppose any companies there are any mutual fund company, there ABC. Now it has you know, the shares following shares in majorities, you know 4 major securities.

So suppose security one, any company, any mutual fund company has these four major securities and they are a security one. Suppose it has you know 333200 shares and simply in the security two, it has 2,98,513 shares and in security 3 it has suppose 1,97,814 shares any security four suppose it has 88,500 shares. So nah suppose apart from that, if there are certain data like you have the company has in hand a cash of suppose 2,44,000, you know

dollars in hand cash. And you know it has liabilities so liabilities suppose it has you know 1,53,000. So that is your liabilities and also it has a total of 3,97,667 outstanding shares.

So these are, you know, so these are sales outstanding basically, now you know you have to find the you know the funds, net asset value on a day, on which the share price for each securities suppose the share price, you know, given and suppose the share price for security one is given as dollar twelve, for security two it is dollar sixteen, for security three it is dollar twenty and for security four it is dollar 22.

Now in such cases so this is for security 1, this is for security 2, this for security three and this is for security 4. So in such cases you can find the; you know net asset value for that as you know that for finding the net asset value you require the market value. Now the market value of the shares you have to first find. So for that, you will be multiplying these you know number of shares with the share value. So if you have to find the market value of the share so it will be suppose 3,33,200 multiplied by 12.

So this will be for the you know security one then for a security two it is 2,98,513 and this will be multiplied by you know 16 plus you know 1,97,814 multiplied by 20 and then it will be further added with you know 88,500 multiplied by 22. So this will be your market value of the you know shares and that will be coming out to be if you calculate it will be, you know, 14,678,008. So this money you know dollars this will be your market value then you have to have the cash in hand, cash in handy, 2,44,000 you know that is your cash in hand.

So your if you use the formula that is NAV that will be half of 1 by S, now S will be so it has outstanding shares of suppose 3,97,667, you know outstanding shares so it will be 1 by 395 667 and then, so this is basically sales outstanding. We can that will proper to call it so and then you are going to add this 14,678,008. So and then you are going to add to it the cash that is 2,44,000 and then with them we will be taking the liabilities off that is 153000. So this if you do then it comes out to be dollar 37.33.

So the net asset value per share can be computed out to be you know dollar 37.33. So this way the fund is evaluated, the mutual fund, you can have the evaluation of the mutual fund.
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Loads

- Loads are the commission or transaction fees imposed on the purchase and sale of mutual funds.
- A load fund is a fund that requires investors, buyers, and sellers of funds to pay these charges either per transaction, or as a percentage of return, or both.
- A front-end load is a charge imposed on the purchase transaction and a back-end load is a charge imposed on the sale transaction.
- Loads range in value between 1% and 10% on the investment amount.
- No-load funds do not require paying these transaction charges but may include other types of charges

Now, there are you know other things like we must know something about the Loads. So what is the load now loads they are basically the commission or transaction fees which are imposed on the purchase and sale of mutual funds. So you know basically whenever we are going for the purchasing of the, you know, mutual fund or we have to sell the mutual fund, then we need to you know, pay the commission charges and these are known as the Loads. So the commission or the transaction charges they are known as the load.

So a load fund is defined as a fund which requires investor's buyers and sellers or funds to pay these charges either per transaction or a percentage of return or both. So basically what happens that normally you have certain you know guidelines how to pay these load charges and these load charges can be paid you know for every transaction or you know depending upon the percentage of the return.

So, based on that, you are calculating these load charges. Now in that also, you have two types of load charges one is front-end load and one is back-end load. Now front-end load is a charge imposed on the purchase transaction so whenever you have the purchase transaction, that time, the load which is charged that is known as front-end load and the charge which is imposed on the sale transaction on selling that is known as the back-end load.

So normally these values are ranging between 1 to 10%, you know, that is for the investment account and there are certain names of these you know loads like the back-end load is also known as the default sales charge or the contingent commission. So that way you have different names to that. Now no load funds, you know, there are also no load funds so these funds do not require paying these transaction charges but may include other type of you know, charges.

So there are there are also like no load funds. So on these charges basically we can obtain the purchase price and the selling price so because they involve these load charges. So for calculating the purchase price or the selling price you have to have the adjustment of the front end load and the back end load while calculating. So how to calculate these you know purchase price or you know the selling price.

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So when we have to calculate the purchase price which is you know denoted by PP. So this is purchase price. Now purchase price so that will be basically the NAV. So this NAV will be adjusted you know that there has to be an adjustment into the NAV, you know, with regard to the front end load or the back end load. So the NAV basically, will be multiplied with one by one minus LF. So that will be your purchase price you know and then if you have to find the selling price so that will be SP. So selling price will be basically when you have NAV. So that will be basically multiplied with 1 - LB.

So the thing is that when so LA and LB LF and LB. LF is the front end load and the LB is the back end load so this is front end load and LB is the back end load. Now the thing is very, very clear from here, that when you are purchasing you know, anything you have to give the Commission, in that case, your purchase price becomes larger, because you have to pay that much extra amount. So that extra amount adds to basically increase in the purchase price with respect to the net asset value.

So basically that will be 1 - LF, so that is why this being a fraction, so it will be less than 1. So it will be more than 1 ultimately a whole factor that will be multiplied with NAV. Similarly whenever we are selling out of that basically we have to pay the commission

charges or the load charges. So this percentage will be subtracted from 1 and ultimately the selling price will be you know something which will be NAV multiplied with that factor which is less than 1. So it will be less, lessened by a certain amount. That is how you calculate.

So suppose, now you know if you have we try to understand with some example suppose the front-end load you know is defined as you know 6.5% you know in the earlier cases and you know and the back end load, back end load is, we suppose 5 1/4% so the net asset value which we have got in the earlier case, so in that case what will be the purchase price and the sale price, so find PP and SP for you know earlier problem.

So in the earlier problem we got, you know, answer that is so we have got the NAV as dollar of 37.33. So as we know that the front-end load is 6.5%, it means the purchase price will be 37.33, and this will be multiplied with one by one minus 0.065. So so it will be obviously it will be become because you have to give the load charges. So the 6%, 6.5%, something will be, you know, close to 2 or so.

So it will be more than two and that being added it will be 39.93. So 2.6 around 2.6 dollars of you know per share. So that purchase price will be 39.93 dollars that will be your purchase price. Similarly if you try to find the selling price so selling price for that you know NAV 37.33, this will be multiplied with the factor one minus 0.0525. So once you do that you know selling price will be lessened you know it will be less than 37.33 and it will become 35.37.

So now, this what you see that the purchase price and sale price they are influenced because of this front and the back end you know load charges. Purchase price becomes more than the NAV and the sale price becomes lesser than that NAV value. So that can be seen by what is the effect of these load charges in such cases. Next you know we also need to know that sometimes you know you have to we will in our next lectures, we will be discussing about the performance measures, in which we will see that, how these operating expenses you know how you know they are useful these some of the performance measured terms.

They are useful in you know basically comparing the cost of expenses you know cost of investing in you know, funds are in the company. So in the companies so in one or you know two or more funds so basically there are many such performance measures like you have expense ratio you have the; you know total investment expense. So this way, we with there

what we see is that normally depending upon you know the asset you have, and how much is the operating cost which is you know is reported.

So based on that you will have certain percentage which will come as it will show that this much percent of the asset value and that is being you know used you know for the on account of these you know giving the operating cost, so these load charges which are being used so all these are basically the charges which are basically depend because that will be deciding you know what is your final asset of what at what you have started in how you have finished you know.

So in the; or suppose in the years start how much it was, in the year end how much it was. So based on that average and then how much was the operating cost. So based on that, you know, that you know funds performance measures will be basically evaluated that how good that fund will be for the investor. So that he can think of investing into it, because you know he will be having more value and he has to put, pay less than, these operating expenses.

So certainly investor will prefer for that. So we will be discussing about the different types of performance measures you know for you know, for comparing the; you know, fund you know cost of investing between two or more funds. So, that we will discuss in our coming lectures, thank you very much.