Financial Management for Managers
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Lecture 56
Capital Structure Part-3

Welcome all, so proceeding further with the process of learning about the MM theory of the capital structure. Now, I will discuss the second proposition of this theory proposed by the Modigliani and Miller second proposition in which they themselves have rejected the first proposition where they said that capital structure has no meaning and debt and equity had the same cost. But now, later on say realizing the importance of taxes, that debt being tax deductible source of income, which the equity is not.

They themselves have updated their first preposition and in the second theory in the second part of the theory, rather I would say they have improved their own outcome or the theory and they have agreed that yes capital structure makes a difference. And preposition 2 of the theory says that, debt capital being tax deductible or having the advantage of a tax deductible, it is cheaper than the say, the cost of equity.

And ultimately, means employing the debt capital in the firm brings more return to the equity shareholders because the cost of debt remaining fixed number one, and second thing that say that the cost of the debt is tax deductible. So, means the cost of the debt capital remaining under control or maybe remaining as minimum as possible increases the income of the equity shareholders.

So, if you the equity shareholders want to maximize the value of the firm or the value of say, of the firm for themselves. In that case that capital makes a difference. So said that is a second proposition of the Modigliani-Miller theory of the capital structure.

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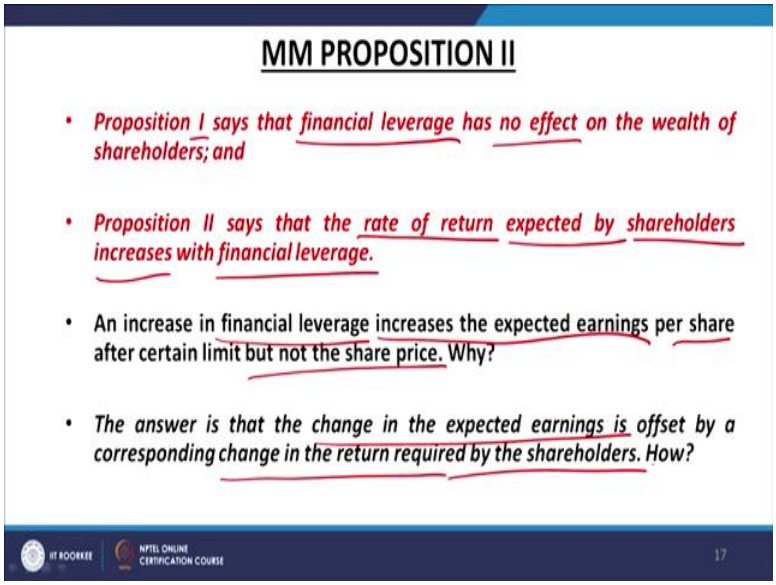

And, for example, if it is written here that preposition 1 says that financial leverage means the debt capital has no effect on the wealth of the shareholders that is a proposition 1, that financial leverage has no effect on the wealth of the shareholders. And the proposition 2 says that the rate of return expected by shareholders increases with the financial leverage.

So, it means you can understand that the first proposition supports a net operating income approach, where it is said that if the debt capital is cheaper than the equity capital becomes costlier and overall cost of capital remains the same. Whereas, the first approach if you recall, the say net income approach, which says that the debt capital being cheaper brings the overall cost of capital that is RA means down or makes it lower.

Because debt capital being remaining the cheaper source of the funds as I say and equity capital remains the same the cost of the equity capital remains the same. So, overall cost of the capital comes down and the value of the firm for the equity shareholder maximizes. So, this is the net income approach, which you call as the second preposition of the Modigliani-Miller theory and the first one is say the replica of the net operating income approach.

But the second one now, we are going to discuss in detail that how debt capital makes the say or reduces the overall cost of capital of the firm and maximizes the value of the firm for the equity shareholders. So, next point if you read here is an increase in the financial leverage

increases the expected earnings per share after a certain limit, but not the share price, means only the say income increases per share income earning per share increases.

But the share price remains the same, why? Why the share price does not increase? Because that increase in income is demanded by the equity shareholders, because of the increased risk of the firm, overall risk of the firm because of the induction of the debt capital. The moment the debt capital comes in the firm the overall risk profile of the firm as a whole increases and for the equity shareholders also the risk profile goes up, the risk complexion goes up.

So they want the extra premium for the compensation, as a compensation of increased risk. So the return on the equity shares or the earnings per share increases, but the share price does not change because that increase in the earnings per share does not mean that the share price will also say reflect increase, because it is clear in the market that whatever the increase earnings per share is being experienced by the firm or by the equity shareholder that is a compensation of the increase the risk, because the firm has employed the debt capital.

So share price remaining the same, only the risk is compensated by the increase in the earning per share to the equity shareholders. So, means, ultimately the purpose here is whether the income to equity shareholders can be increased anyway or not, that is a purpose of deciding about the capital structure. Ultimately the owners of the firm, the equity shareholders of the firm or the owners of the firm their objective remains that how to maximize the income for them, how to maximize the value of the firm for them or the value of their equity investment in the firm.

And that only happens when the overall say capitalization adopted in the firm lowers its cost of capital, so says that debt is a cheaper source of finance as compared to the equity. So, the movement that comes in the firm, overall cost of capital of the firm goes down and it increases the value of the firm for the equity shareholders in a way you can say that the return to equity shareholder a holders maximizes.

But at the same time, because the risk also increases because debt capital though it is cheaper in terms of the costs, but it is quite risky, because it creates a fixed obligation on the firm, whether you earn the profits you do not earn the profits, you have to service the debt, you have to pay the interest on the debt and on the due date, you have to repay that debt also back.

So, it means it we are going to create a fixed obligation, because in case of equity, the income is not fixed or the say the cost is not fixed, same way say the obligation also not fixed. So, it is say link to the income, if the firm is earning the income they can pay the cost of equity as a dividend as a return on the equity, but it is not the case in case of the debt. Whether you earn the profit, you incur a loss, you have to service the debt in terms of interest and you have to repay the principal on the due date.

So, that creates the risky situation for the firm and overall risk profile of the firm increases. So, ultimately, that risk profile risk of completion increases for the equity shareholders, so they want extra return. So, their cost of capital increases or in a way their required rate of return increases. So, because of that, the rate of return on the equity capital increases, so per share price remains the same, but the return increases and that return is the compensation of sharing or maybe bearing the extra risk.

So, the answer is that the change in the expected earnings is offset by a corresponding change in the return required by the shareholders. So, it means share price is not going to get affected because increase is demanded as a premium of bearing the extra risk and not because of any say special efforts made by the firm, that the overall return to the equity shareholders have gone up. So, certainly the share price should also change.

You have reduced the cost of capital by inducing debt in the firm. So, debt has come, cost of capital has gone down, but since the risk because of the debt capital has gone up. So, equity shareholders demand the premium for that and certainly say debt capital, it reduces the cost of capital increases the risk, but overall increases the return to the equity shareholders. This is the second proposition of the Modigliani-Miller say theory of the capital structure.

So, they themselves have accepted in the second preposition which is improvement over the first that yes debt capital having that tax deductible advantage is cheaper as compared to the equity cost and if debt capital is brought in the firm, then though the risk profile changes, it increases the risk of the firm, but the return to the equity shareholders increases, so capital structure now it has a meaning.

So, if you want to decide the capital structure of the firm looking at the operating income situation, looking at the risk profile of the firm, if we are able to employ some amount of the debt, certainly we can expect that yes, the return to equity shareholders will be maximized.

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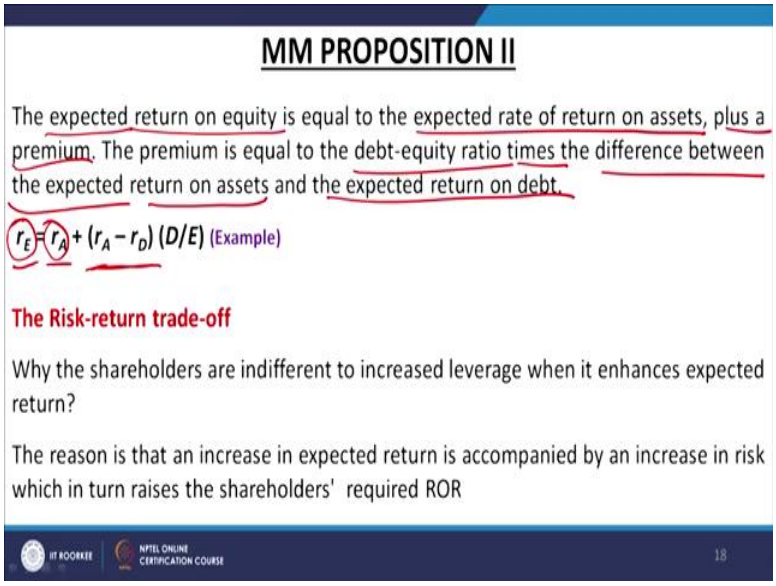

So, this proposition you can say now a nutshell you can decide, you can define this proposition, the expected return on equity is equal to the expected return on assets, is the total return of the firm plus a premium it means I just told you, they demand that normal returns should be equal to the return on the assets plus some premium and premium what for they ask for the premium?

Premium they asked for is the risk they are going to take because the firm has employed that debt capital. The premium is equal to the debt equity ratio times the difference between the expected return on assets and the expected return on the debt. Since the cost of say debt remains lesser than the cost of equity.

So, the total return on the firms say assets minus the cost paid to the debt or the suppliers of the debt or to the lenders, whatever the say residual income is that goes to the equity shareholders and since the cost of the debt is lesser than the equity, so the residual income to the equity shareholders remain much more as compared to that capital structure means totally financed by the equity capital.

So in this case, whatever that increased income we are giving to the equity shareholders, that is the return on assets plus some premium of bearing some extra risk because of employing the debt capital. So, this is now the new equation comes up as per say proposed model and this equation is RE. RE means the return on equity is equal to RA, RA is the return on assets or the total return of the firm plus RA minus RD total return on the assets minus the return or the cost of debt.

RD is the cost of debt and in the proportion of say debt equity ratio, whatever the cost of debt is paid, after that whatever the residual income is left that income goes to the equity shareholders. So, it means the equity shareholders get two components of income, first income is normally they are going to get that is the equal to the RA that is equal to the total return on the assets plus, because the returned to debt capital is lesser than the say a return to the equity shareholders.

So, that difference also goes as a premium which is defined by this bracket inside the bracket items and that difference as a premium also goes to the equity shareholders right. So, it means now the as per this preposition the cost of equity or return on the equity capital will be more because they are getting the normal return on the assets plus the premium for sharing that extra risk.

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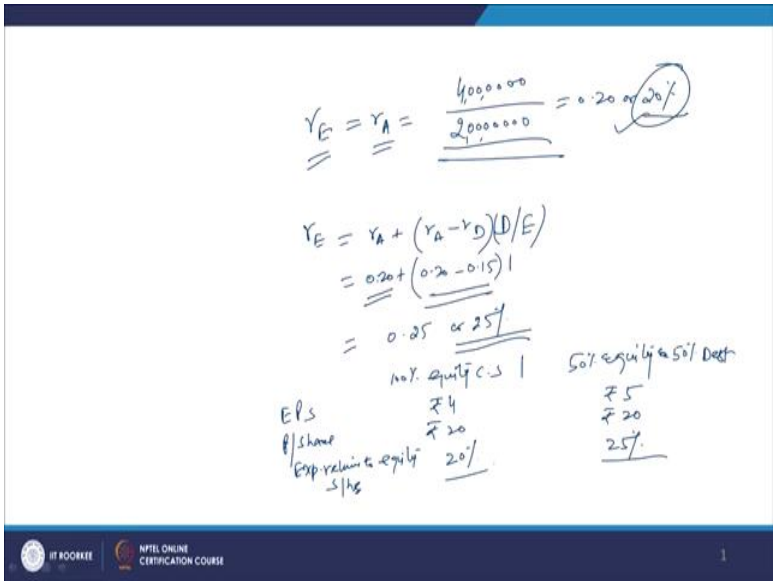

So, we can understand with the help of this for example, a few figures that say for example, you can calculate the cost of equity or the return on equity, which is the normal case is the return on assets, if the firm is financed only by the equity capital. For example, if the form is financed only by the equity capital is the capital structure you have the debt equity ratio has 0 is to 1, there is no debt only equity is there.

And we assume that say for example, your operating income is how much? Operating income is say 1, 2, 3, 4 operating income is 4 millions and the total value, market value of the shares total equity capital is say for example, 2 crores or the 20 millions, this is 2 crores. So, if you calculate the because in this case there is no debt capital employed and only equity capital is there and the market value of the equity is say 20 millions or the 2 crores.

And the operating income of the firm is for example, 4 millions or the 40 lakhs, so this is the 4 millions are the 40 lakhs. So, in this case you can find out what is the RA, that is a return on the total assets is how much? That is the same means whatever that return on the total lessons that is the return on that total equity also, because whatever this return is will go to the equity shareholders and this works out as point 0.20 or you call it as it is 20 percent.

It is 20 percent, right but the moment when you bring the debt in the firm, if you bring the debt in the firm and for example, the cost of debt is 15 percent right, the cost of debt is 15 percent. So, now we are going to find out the return to the equity shareholders which you can call it RE

that is a returned to the equity shareholders that will be as productive as per this model, as per this model you will calculate the cost and if we calculate the cost as per this model, this will be equal to RA plus RA minus RD and in the proportion of times debt to equity ratio, times debt to equity ratio if you do like this, so, you will get something like this, what is the, for example we assume that what is the return on the total assets is in case of the firm being financed only by the equity return on the total asset says, for example, 20 percent.

So, this is 0.20 plus this is 0.20 minus what I told you the cost of debt, the moment we bring in the debt in the form, the cost of debt is for example, say 15 percent right. And the debt equity ratio is the 1, equal amount of the debt is brought in. So, the debt equity ratio is 1 we have taken here that equity ratio. So, it means, in this case, we have to now find out the say cost of equity or return on equity and for finding out this return on equity you can use this model.

So, the moment you use this model, this will be having the this is a return on the assets plus which will be available to the equity shareholders, not in the normal course plus the extra premium they are going to get and that premium is the difference of the return on assets minus the debt capital and the debt capital, the cost of debt capital not debt capital, the cost of debt capital, so, this is 1.

So finally, this is going to be how much? This if you solve this, this is going to be point 0.25 or 25 percent, this is going to be 25 percent. So, it means, what is happening now, if it is a all equity capital structure, the cost of equity or return to the equity shareholders is 20 percent. But if it is a capital structure having partly debt or the debt equity ratio is of the 1 is to 1 then equity shareholders are getting 20 percent, the normal equal to the return on assets plus extra premium for bearing the extra risk.

Because now the debt has come in, 50 percent of the capital as come as the say source maybe as a as a debt. So, they are going to take extra risk. So, they are getting a premium of 5 percent. So, now the return on the equity capital will become as the 25 percent and not you call it as the not is that say 20 percent. So, in the entire process you can explain like this, that is 100 percent equity capital structure, 100 percent equity capital structure one and the capital structure which has 50 percent equity and 50 percent debt.

So, in this capital structure if you take the 50 percent of the equity and 50 percent of the debt, so and 50 percent is the debt, so debt equity ratio is the 1, so what will be there? Earning expected per share, so, EPS will be EPS for example, we are assuming here is that is rupees 4 and in this case it will become rupees 5 and the price per share is, price per share will not change.

Price per sale for example, if it is 20 it will also remain 20 it is not going to change and expected return to equity shareholders is now, earlier it was 20 percent as we have calculated here, this is 20 percent. But now in this capital structure, it will go up to 25 percent. So, what is said here, that it will not change the share price, it will change the movement the debt comes in the firm Modigliani-Miller is the second proposition says per share price will remain the same.

It is not because of any other factor, it is only because the risk profile, risk complexion of the firm as a whole has gone up. So, equity shareholders are going to take the extra risk. So, they want some extra return for that. So, the returned to the equity shareholders in this case will become 25 percent otherwise, it is 20 percent. So, in all equity, 100 percent equity capital structure, the return is 20 percent, which is the return on the total assets of the firm also.

But in case of the debt equity ratio, 1 is to 1 in that case, the return to the equity shareholders will be increasing by 5 percent. And this 5 percent is the premium of taking the extra risk, because the debt capital has come in the form. So, EPS is going to increase certainly it is going to increase by how much, again from 4 to 5 rupees by 1 rupee. And per share price is, price per share is 20, 20 same it is going not going to change, because overall performance of the firm has not changed, it has remained same only cost of capital has come down.

So, returned to equity shareholders has to increase because the risk profile of the equity shareholders has gone up and it has changed. So, this is the second proposition of the model and Miller model.

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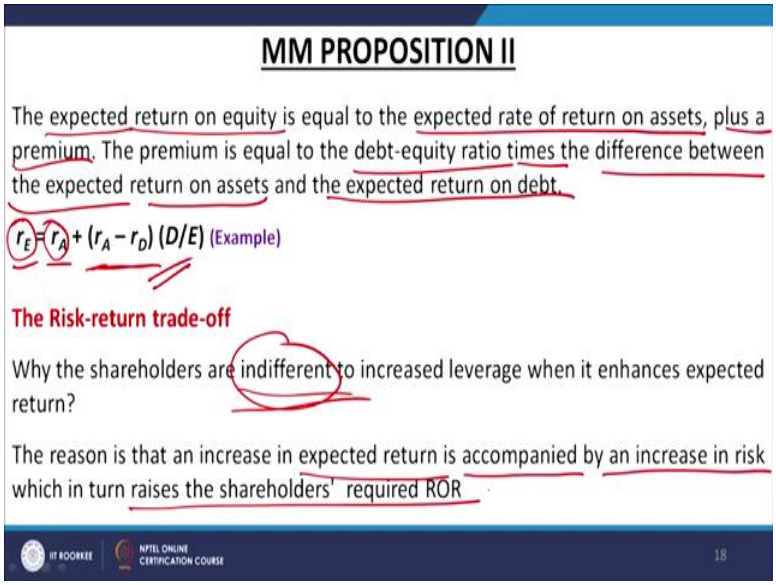

So, the risk return trade off, finally, this theory is called as second preposition of the Modigliani-Miller is also called as the means by the other name which is the risk return trade of theory also or you call it as a tradeoff theory also, where we have the risk and return trade off because you are going to take the extra risk because of induction of the debt capital in the capital structure of the firm.

So, naturally you will deserve the extra return. You can expect the extra return and that extra return is the same reward of bearing extra risk because of say bringing in the borrowed capital in the capital structure of the firm. So, why the shareholders are indifferent to increased leverage when it enhances the expected return? Why the shareholders are indifferent? They are indifferent because they are ready to take the risk and if they are taking the risk, their return is also increasing.

So they do not object to the say induction of the debt in the overall capital structure of the firm. Yes, they will object if their say a risk is increasing but the return to them is not increasing, then they will object then why should we take extra risk where is a premium for extra risk? So, their reason of their indifference is the reason is that an increase in the expected return is accompanied by an increase in the risk which in turn raises the shareholders a required rate of return.

So, they are totally indifferent because, yes, the say the capital is coming from a source, which is cheaper than the cost of equity. So certainly they are means going to pay the firm as a whole is going to pay the lesser cost of capital. But since it is a risky source of finance, so equity shareholders who are going to bear the extra risk, they are going to be compensated by the increased income, but the share price will remain the same.

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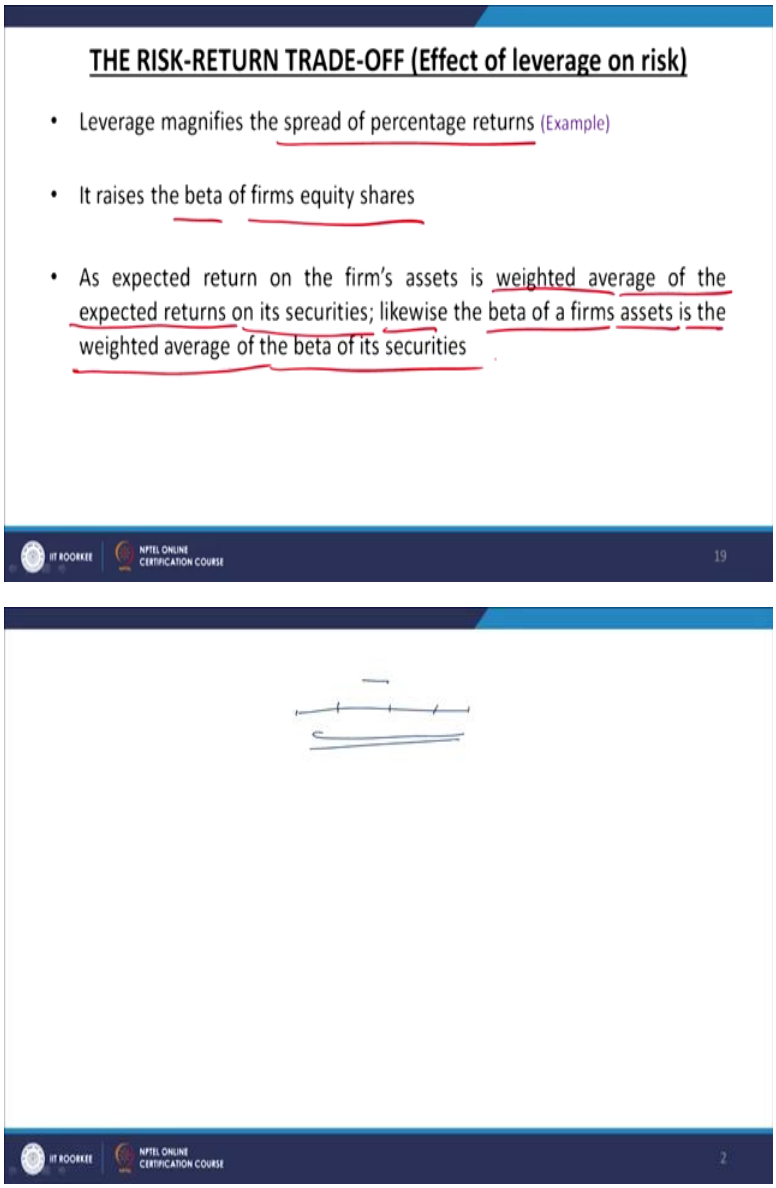

Now, we talk about the next part. And as I told you that the second name of the theory is the risk return trade off theory. So are we will learn it in a way that what is the effect of leverage on the risk? So here we can understand the effect of the leverage on the risk is there and since the

leverage is more risky or considered to be more risky and it increases overall risk profile of the firm. And that extra risk has to be borne by the equity shareholders. So that is why this theorys other name is a risk return trade off or the simply the tradeoff theory also.

So, the effect of leverage on the risk can be defined under these three points. First one is leverage magnifies the spread of percentage return and when the spread of percentage return it can be this also, it can be this also, it can be this also. So, when the spread is going to increase for example, now, the spread is for example, is this much they come is going to change this much or maybe we are talking about the percentage return.

So, it is this but when the spread is like this, so it means it can be this also, it can be this also, it can be this, this, this also. So, what is going to be there, the variance is going to increase standard deviation of the return, percentage return is going to increase and that increased in the deviation of say return or any kind of the profitability or return certainly that increases the risk.

So, how we can understand this that what is the pointed in here? Leverage magnifies the spread or percentage return that is the say bone of contention, which brings the risk here and for understanding this concept better let us understand with the help of an example here that again we have a say create a capital structure and when you have the different capital structure or we create the firms with the different capital structure.

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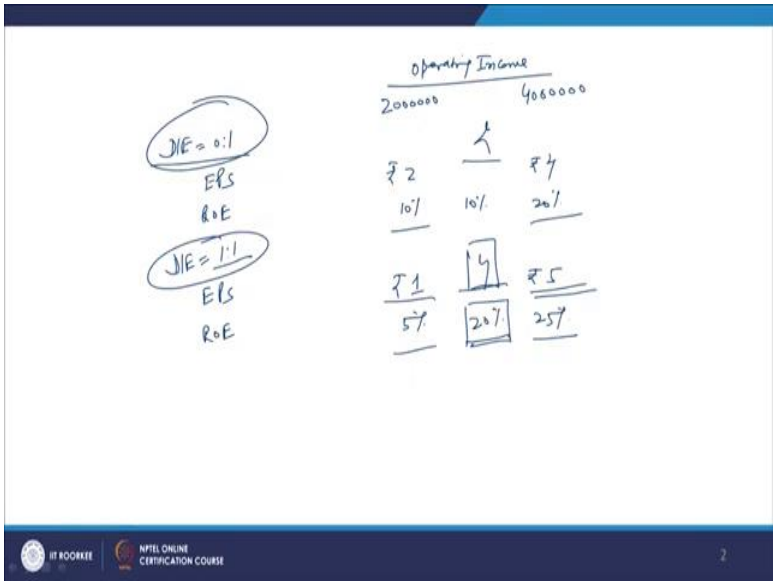

So, for example, we have the two operating incomes, here we are going to say that this is the operating income and it can be for example, 2 millions or it can be 4 millions, right. So, two operating incomes can be firm might have the income of the 20 lakhs or the firm might have the income of the 40 lakhs, right. So, first we assume when the debt equity ratio is equal to 0 is to 1, it means it is all equity capital structure is not a debt equity capital structure.

So, we assume that EPS is for example, is here 2 and here the EPS is 4 right, we talk about is that is the EPS here is 2 and here EPS is earning per share is the 4 and say return on equity for example, we assume that return on equity say for example 10 percent and here the return on equity is 20 percent right. And when we say we create a debt equity structure of debt equity structure is equal to 1 is to 1.

For example, if the debt to equity structure is 1 is to 1, then EPS may for example, if it becomes 1, this is rupees 1 and it may become rupees 5, this is also in the rupees right. This is also in the rupees right. And return on equity may become 5 percent or it may become 25 percent. So, this is the meaning of this point, what the point says here that leverage magnifies the spread of percentage returns, leverage magnifies the spread of returns.

For example not if it is a 100 percent equity finance firm where the debt equity ratio is 0 to 1. So, earning per share for example, we assume is, this is the operating income and earnings per

share is the say 2 and it is 4. So, what is the difference in the 2? That is only the difference of 2 rupees, right.

Whereas, if the equity is supplemented by the debt capital and the capital structure of the firm becomes like with the debt equity ratio of 1 is to 1, so earning per share of the same amount for example, will become if it is say 20 million sorry 2 millions is the income, operating income EPS will be 1 and if it 4 million it will be 5. So, now look at the spread here, here the spread is of the 2 rupees and here the spread is of 4 rupees.

Similarly, RE return on equity is 10 percent and 20 percent. So, what is the spread here? 10 percent, what is the spread here? The spread here is the 10 percent, this spread is 10 percent, but in this case the spread is of the 20 percent. So, when this spread increases in this terms also and this terms also, when this spread increases, naturally the spread the difference is 5 percent and 25 percent. The difference is 10 percent and 20 percent in case of all equity firm.

So, since this spread increases, this becomes more risky this because standard deviation of the operating income is very high. So, it means the return on equity that is the return on equity, the standard deviation of the return on equity is very high. So, because of that, the risk increases, the risk completion of the firm increases and because of that reason they means equity shareholders want to be compensated for the risk.

It raises the beta of the firm, firms equity shares it raises the beta of firms equity shares right, so because as we calculate the say cost of capital as the say weighted average cost of capital of the firm. Similarly, we also calculate the beta also, which you call it as the weighted average of the beta of all securities, right. So, what we say is, as expected return on the firms assets is the weighted average of the expected returns, weighted average of the expected returns on its securities, weighted average of the as expected return on the firm's assets is weighted average of the expected return on its securities.

Likewise, the beta of the firms assets is the weighted average of the beta of its securities right. So, it means when the return increases, risk also increases, right or first you can say the risk increases, then only the return increases or vice versa whatever the way you want to find it out. So, you have to find it say when you calculate the say cost of capital of the firm you calculate the weighted average cost of the capital or the in a way, cost of capital you treat it as the return

also. So, weighted average return or the expected return is the weighted average of the firm is the return on all the securities.

Similarly, the beta of the farm is also the weighted average of the beta of its all securities and all securities are either they are the non-fixed income securities or they are the fixed income securities. Non-fixed income securities are the shares and the fixed income securities are the debentures, bonds or the debt capital right. So, because risk is going to increase, because cost of capital is going to change. So say the cost of capital is going to change return is going to change.

Similarly, the beta is going to change or the risk is going to change, beta is representing the risk basically right, the risk of coming up because of the different kind of the securities and since now it is not all capital, all equity capital structure. So it has the debt also, debt becoming more riskier. So, the beta of the firm changes and the weighted average of the beta for the equity shareholders becomes different now.

Because debt increases the overall risk profile or the risk completion of the firm. So, how would you define this beta? You would define the beta like this.

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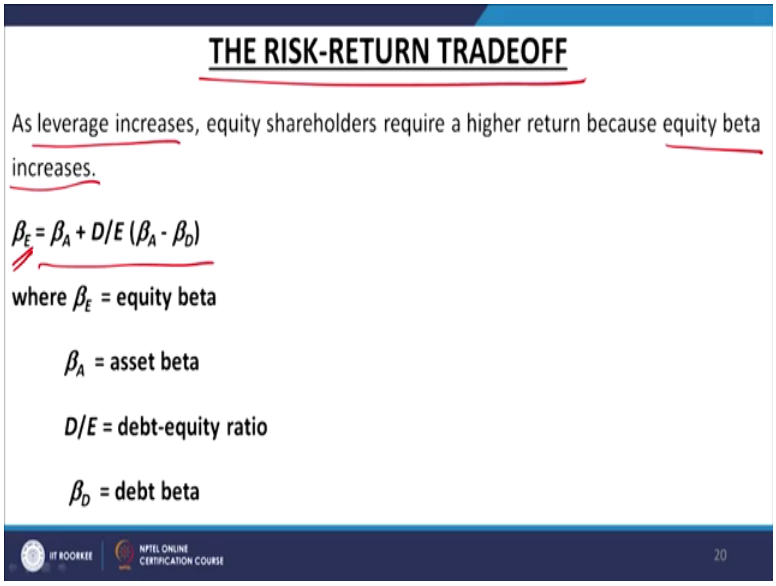

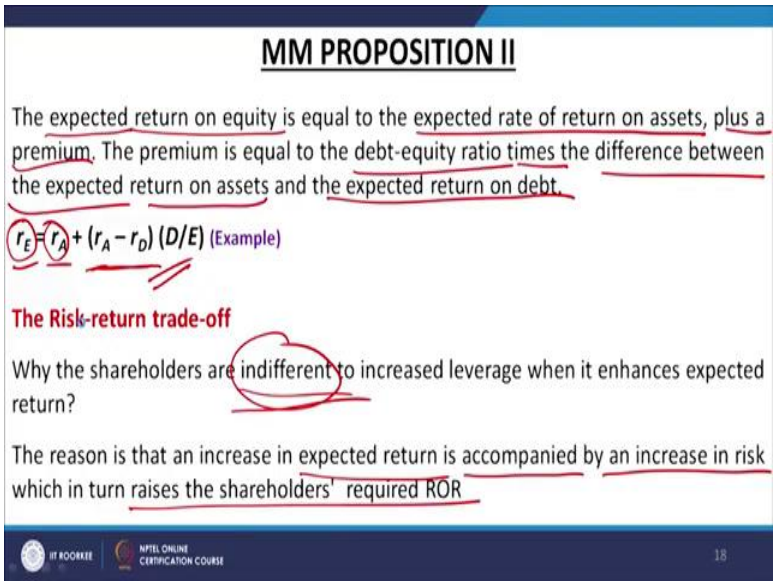

So as leverage increases, it is given here as a leverage increases equity shareholders require a higher return, because equity beta, equity beta means the risk for the equity shareholders increases and equity beta is defined here. Equity beta is equal to beta of the firm as a whole plus debt equity ratio or you can call it as the beta of the firm as a whole minus beta of the debt capital.

So, the overall say the beta of the equity capital is going to increase, the risk of the equity capital is going to increase. So, say they want the extra turn and this is the ultimate conclusion of the second proposition of the Modigliani-Miller model that because beta of the equity is going to change beta of the equity shareholders is going to change.

So, it is the model which is defining the beta of equity shareholders, where the beta E is the equity beta and beta A is the asset beta or the risk of the form as a whole and debt equity ratio is D by E D oblige E and the say beta debt is the debt beta. So, it means whatever the risk little amount the risk has to be bound by the lenders after that the entire risk of the firm is the risk of the equity shareholders.

So, same way, as you are calculating the weighted average return, for example, when you are talking about the return to be calculated on the equity shareholders. So, when we have calculated here we use this model, RE is equal to RA plus RA minus RD multiplied by the debt equity ratio, same way you are going to calculate the beta, beta of the equity is equal to beta of

the firm as a whole plus beta of the firm minus beta of the debt multiplied by the debt equity ratio.

So the first model is going to explain the return on equity and the next one is going to explain the risk on the equity capital or to the equity shareholders. So ultimately, we call it as the risk return trade off means if you are going to bring in more amount of the debt in the firm. Certainly, undoubtedly, this second proposition of the MM model says cost of capital is going to go down, but the risk of the firm as a whole is going to increase which will be passed on to the equity shareholders.

So equity shareholders will deserve the better return high return or at least the returns more than equity capital, which is 100 percent equity financed capital structure. If it is 1 is to 1 capital structure in that case because the risk is going to increase. So, equity shareholder deserve extra returns and this is the risk and return trade off theory you call it as a risk and return trade off theory also, that higher the amount of the risk to equity shareholders higher the return they deserve.

So, in the second proposition Modigliani and Miller themselves have rejected the first proposition where they have they said that capital structure has no meaning because of the arbitrage argument. But in the second proposition, they have proved it that yes debt capital is cheaper than the equity capital. So, the capital structure if having the more amount of the debt capital or some proportion of the debt capital, certainly the return to the equity shareholders is going to increase.

Because the debt capital remaining as a cheaper source of the funds. Overall cost of capital of the firms gets done and the return to the equity shareholders or other way around operating income remaining same, but the cost of capital getting down. So, the returned to the equity shareholders increases. So, this is a second proposition of the capital structure model given by the Modigliani and Miller very-very say you can call it historical contribution or the classical say theory of the capital structure.

But since means no theories free of any kind of the criticism, so, this theory is also full of the criticism So, quickly, I will take you through the points of say criticism here and the points of the criticism here are say some points of the criticism are given here.

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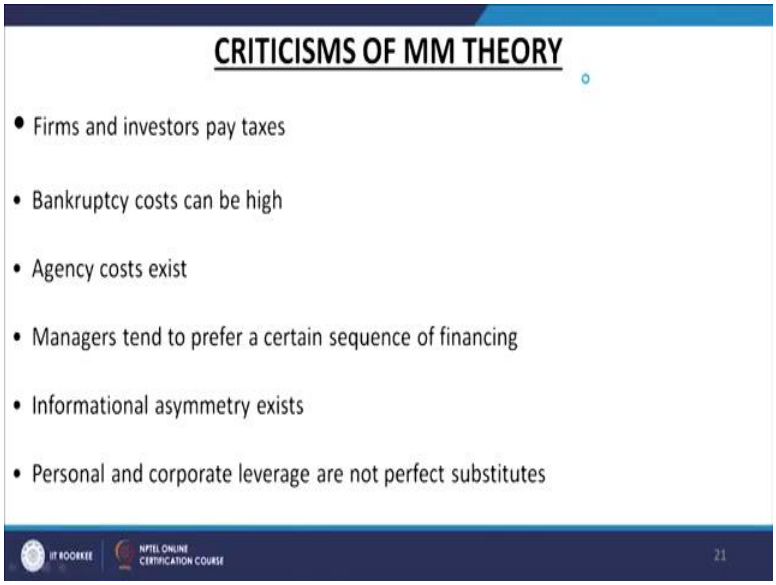

So, they are worth noting taking into account. So, first point is firms and investors pay taxes right. So, it means, when you talk about the say, Modigliani-Miller theory, so it means in the first proposition, they said that, there are no taxes, but in fact there are taxes and taxes are paid by the firms at the two levels. One is the taxes at the firm level and second the taxes are paid at the individual level.

When the equity shareholders get dividend or any other kind of equity income, they get taxed at the individual level also, right. First performance, pay the corporate tax and then the individuals pay the dividend tax right. And when they say interest income goes in the hands of lenders then lenders also are taxed. Means individually say though it is tax deductible expense at the firm level, but it is taxable when it reaches of the hands of the lenders.

So means this is the assumption that there are no taxes, taxes are there. Bankruptcy costs are can be high means when means there we have assumed that there is no means there is a complete information to the investors as well as to the say lenders or any other kind of the investors in the market and there is a say perfect market is completely perfect. But no, firms say fail also, firms become bankrupt also, firms become insolvent also.

And because of the existence of the debt capital largely because it is a fixed say obligation security, it is a fixed income security or a fixed obligation security for the borrower. So, sometimes in the lack of profitability state, it can lead the firm to the state of bankruptcy also,

because when the lenders are not getting their say, loans returned or maybe their loans properly serviced, they have filed a bankruptcy petitions.

So, certainly means debt brings the, this kind of the situation and causes for the liquidation of the firms also. So, it means the information is not complete and the market is not perfect, that assumption is also not true here. Agency costs like this, because we have the different type of the say a stakeholders who have the agency relationship with the firm, we have the two kind of agency relationships, we have the three stakeholders largely.

One is the equity shareholders then they are the creditors, then they are the managers. So, managers have the agency relationship for both the say and shareholders as well as the debt supplier for the lenders also. Whereas the shareholders and lenders also have the agency relationship right, so it means because of this agency relationship also, there is a cost and that cost creates a problem, agency cost I will discuss with you after this.

So, it means, means you can say that if no taxes are there, market is perfect, say expectations are homogeneous. So, all these assumptions are not going to held good. Managers tend to prefer a certain sequence of financing, right.

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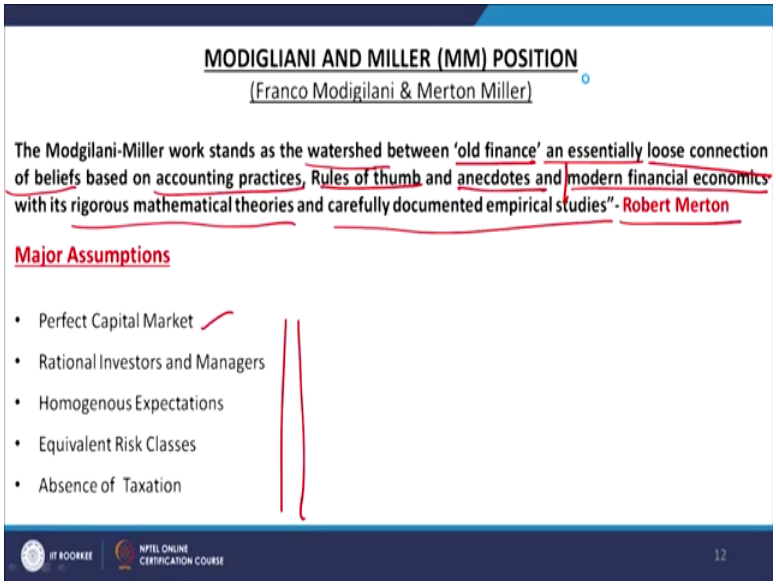

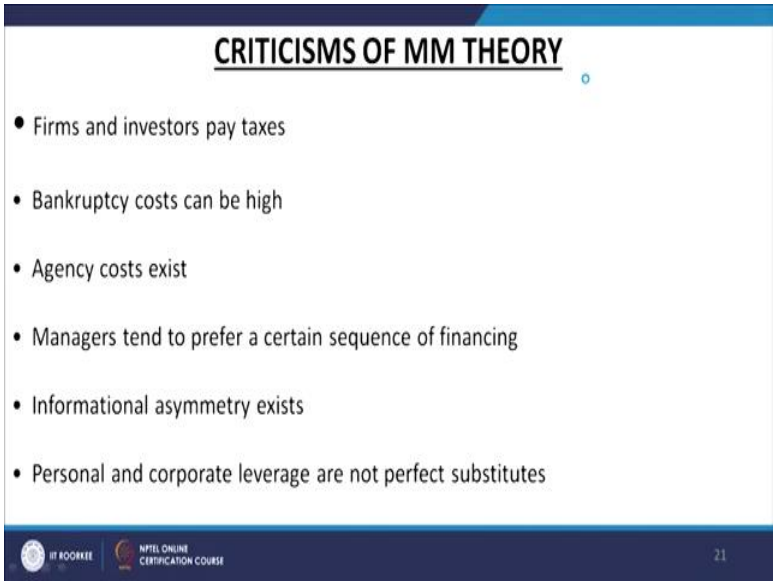

So, it means we have the some assumptions here. For example, if you talk about the assumption of the Modigliani-Miller the first proposition which we have seen here. So, this assumption was homogeneous of expectations equivalent risk classes and absence of the taxation, all these assumptions are not going to be held true. So, one more point of the say criticism is managers tend to prefer a certain sequence of financing.

So, though they have the complete information, but means, they sometimes do not tend to make use of that information, they follow certain sequence of financing and that is sequence is better

explained in the pecking order theory. Later on we will discuss, but it means managers take their own decisions.

Informational asymmetry also there you cannot say that the market is perfect and totally information is say communicable to all the stakeholders. There is the information asymmetry and because of this information asymmetry, wrong decisions with regard to the capital structures are taken and firms fail. And lastly, the personal and the corporate leverage are not perfect substitutes.

We have discussed at one point of time during the arbitrage argument, that the person can borrow 50000 and can replace the, say the corporate risk with the homemade risk, but sometimes that may not be held true, because the homemade risk is not the true substitute for the corporate risk. So, these are some of the points of criticism of the Modigliani-Miller theory of the capital structure.

But despite all these criticisms, despite all these factors affecting the say overall performance of the theory, you cannot say that this theory has no meaning. This theory has a very important meaning. This is a first classical and most scientific theory where they have say on the basis of say empirical research and say, citing the other researchers available at that time. They proved it that yes capital structure has a meaning.

It creates a difference if the say capital structure is created as a sum of the debt and equity or because of the internal and external sources of the funds, certainly the cost of capital can be kept under control and returned to the equity shareholders can be maximized. So, this is the first scientific theory, this is the first systematic theory, which is based upon the mathematical research.

And other theories you talk about though they are the not theories which can be rejected or which cannot be followed at all, but they were only you can call it as the say unsystematic findings of some observations or you can call it as unsystematic observations, whereas this theory is the are more scientific, where they have first accepted the net operating income approach, but later on they rejected it and they accepted that the net income approach where they proved it that the say debt capital is cheaper as compared to the equity capital.

So, now we talk about something about the corporate taxes. We talk about the corporate taxes which have the important point to say here. So we have two kinds of taxes, one is a corporate tax and another is the personal tax. So, if you talk about the corporate tax, naturally because of the corporate taxes, the debt capital becomes a cheaper source of finance. So, how it is becoming the cheaper source of finance and how say corporate taxes creates a difference in the total cost of financing as far as the different sources are concerned.

So, we will discuss and learn this concept in detail. So, this is the impact of the corporate taxes. First we will discuss the impact of corporate taxes. And then the next part we will discuss or learn about the impact of the, say your personal taxes or the corporate and the personal taxes together.

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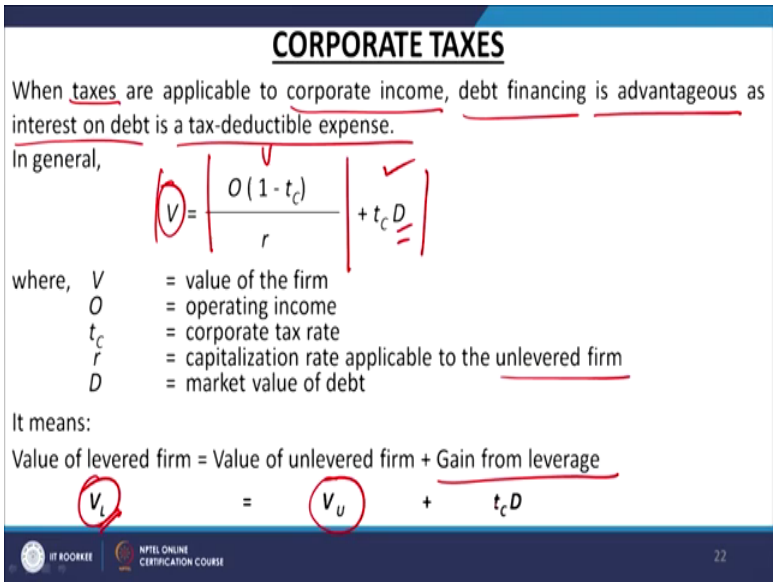

So, what is written here when taxes are applicable to the corporate income, when the taxes are applicable to the corporate income, debt financing is advantageous, as the interest on debt is a tax deductible expense, and how it is? With the help of this model you can understand that how the say debt financing makes a difference. So, what is given here V is equal to O into 1 minus t C bracket closed say divided by r plus t CD.

So it means where V is the value of the firm, means ultimately the value of the firm is influenced by operating income right and then the tax payable on the operating income which is known as a corporate tax and r is the capitalization rate applicable to the unlevered firm. So, we

have to divide it by this r and then D is the market value of the debt and the tax deductible advantage of this debt. So, this has to be added into this. So tax advantage of this say debt has to be added in this.

So it means how much amount of the tax you are going to save upon the debt capital that has to be added into the operating income after tax. So finally, in nutshell you can say value of the levered firm, this is the way you can define VL is the value of the levered firm is equal to where we are saying value of the unlevered firm. This is the up to this point, this is the value of unlevered firm right, this is a value of unlevered firm plus t C that is a gain from the leverage, this is the gain from the leverage.

So, value of the levered firm is more as compared to the value of the unlevered firm. So, why the value of the levered firm is more here it is that is the V L is equal to that is a value of levered firm is equal to value of the unlevered firm plus the say taxes the impact of taxes or the gain from the leverage as in the firm of the tax amount, which we have saved, which we have saved on account of the interest expense because that is debited in the profit and loss account.

So amount of the tax saved is to be added into the value of the unlevered firm. So, the total value of the levered firm is more than the value of the unlevered firm and that is because of the debt capital being part of the capital structure and this source of finance or financing being the tax deductible source of financing right. So, hope we can understand it we can understand it better with the help of this particular example.

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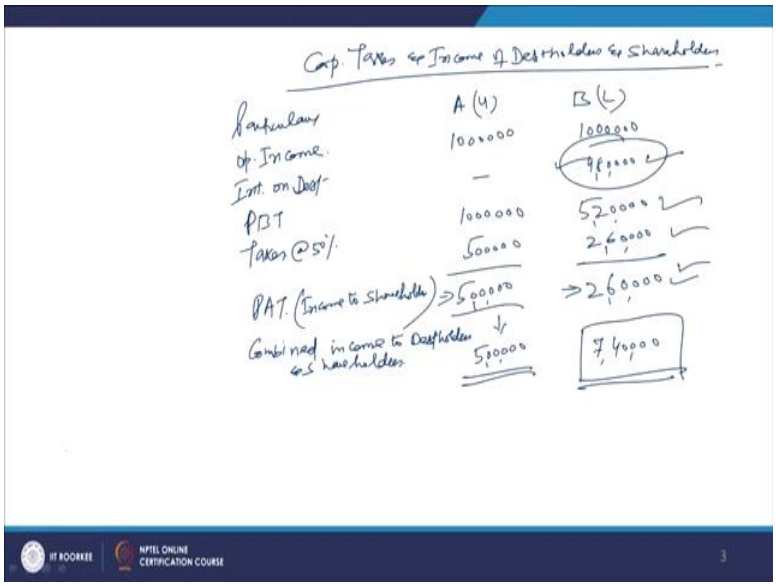

For example, we will say here corporate taxes and income of debt holders and shareholders right, corporate taxes and income of debt holders and shareholders. So, how can you take it for example, we have this particulars and we have the say the two firms here one is A, which is a unlevered firm and this is the B which is the levered firm right. So, in this case, we start with the operating income.

For example, this is the operating income and operating income of the firm is say we assume it as 1 million, this is 1 million. And again the same income, 1 million is the operating income of the both the firms operating income is the same. Interest on debt, first of all, we have to subtract the interest on debt. So, interest on debt we are taking the unlevered firm, no interest will be deducted, whereas, this form we assume, they have borrowed 4 million rupees and the rate of interest is 12 percent.

So, the total interest cost is 480000 rupees, 480000 rupees. So PBT, Profit Before Taxes, PBT profit before taxes is the same amount 1 million here and here it is the amount is how much? 520 millions sorry, 520000, 520000 it is the 10 lakhs and this is the 520000. Now we assume taxes and we are assumed here the tax rate of at the rate of for example 50 percent for corporate tax rate is a 50 percent. So, what is a tax here? Half a million is the tax going to be 5 lakhs and in this case the tax is going to be how much? 260000 rupees, 260000 rupees, right.

So, now, these are the say taxes amount, taxes at the rate of this So, profit before tax is 1 million and this is 5.20, 520000 I mean taxes at the rate of 50 percent that is you call it as the 500000 and the 26000 so it means PAT profit after taxes how much? In this case it is 500000, 500000 and in this case how much it is? In this case it is 260000, right this is a profit after tax and this profit after tax is the income to whom?

Income to shareholders, this is income to shareholders in both the cases, in this case also, in this case also and now we calculate the combined income, combined income we calculate the combined income. If you calculate the combined income here, so combined income to whom, if you calculate this combined income for the debt holders and this is a combined income to debt and debt holders and shareholders, how much it is?

In this case it is going to be how much? 500000 so, this is going to be the same combined income of the 500000 to the, because there is no debt suppliers. So, only the combined income is of the 500000 is to the equity shareholders. Whereas, in this case the combined income to the shareholders and debt holders the income of the debt holders is how much this much, 480000 and the shareholders is 260000, so what is the total income?

Total income is the 740000, so it means the combined income to the corporate taxes and combined income to the debt holders and shareholders is how much, that is the 500000 here and this in this case it is the (400000) 740000. So, it means, this is all the result as a result because if you look at this 480000 interest on debt it is tax deductible. Total amount of the say interest is subtracted from the say total revenues in the profit and loss account and we do not pay any tax on this because it is considered as a financial cost and we never pay any tax on the cost always taxes are paid on the profits.

And finally, the profit before tax is becoming this much and we are paying this much of the tax. So, it means PAT is becoming this. So, combined income is in this case, it is greater than this you call it as if you calculate the combined income. So, you can find it out that 740000 is more which is a income total income of the levered firm as compared to the total income of the unlevered firm. So, this is the say impact of the corporate taxes.

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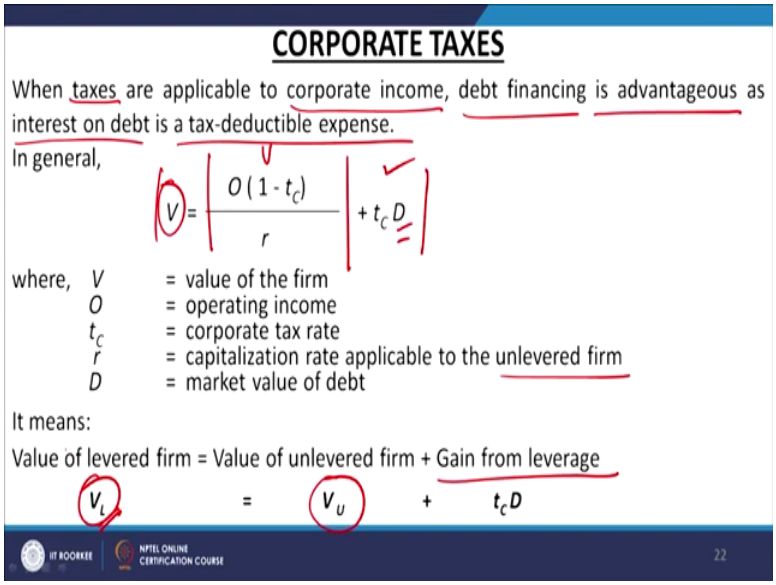

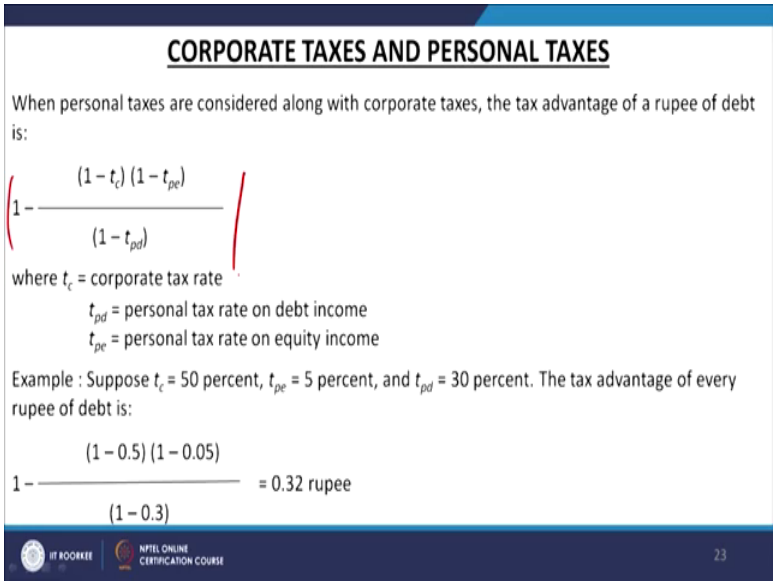

Now we move forward with the next part and that is to understand that impact of the personal taxes because personal taxes also make the difference. And if you look at the personal taxes here, when the personal taxes are considered along with the corporate taxes, the tax advantage of a rupee of debt is we can calculate here because we understand that along with the corporate tax, the personal taxes are also levered in any economy.

So the corporate income is basically taxed at two levels. One level of the say tax is the corporate tax, which the firm pays on its PBT profit before tax, then they pay the tax and then after that, what we saw in the just previous calculations, that the profit after tax is calculated.

And depending upon the capital structure of the firm that profit is the say income of the shareholders and before that the say interest on debt is the income of the say lenders, right.

Second level of the taxation comes at the personal level. And after paying the corporate tax people who get that income, profit after tax or maybe the interest on the debt, they are also say taxed at the personal level also. So, the shareholders who get the dividend from the profit, they are also taxed by the government at means when their dividend, that profit in the form of the dividend reaches in their hands, that is also taxed.

So, means the corporate taxes plus the personal taxes and in the second case that the debt supplier, the lenders who get the interest income, that interest income when reaches in their hands that is also taxed again by the government. So, second level of the taxation comes up in the picture, second level of the taxation means creates a problem or that comes up in the picture.

So, first level of the taxation we have seen here that how the corporate taxes impact the overall say income of the shareholders and the debenture holders or maybe the debt suppliers. And similarly, there is going to be the impact of the say personal taxes. So, it means when you talk about the impact of the personal taxes, you can understand that how the personal taxes are going to make a difference here. So what is this personal taxes?

When personal taxes are considered along with the corporate taxes, the tax advantage of a rupee of the debt is calculated here as right. And this is the say we are talking about first is the 1 minus t C is the corporate tax and multiplied by the taxation on the say equity capital and then factored by the say tax on the personal tax on the debt capital and the personal tax on the equity capital. So in this case in the numerator, the corporate taxes we are multiplying with the personal tax on the equity income and then we are dividing it by the personal tax on the debt income.

And finally, we are going to see the impact of the personal taxes and the corporate taxes. So it means you can conclude here that personal taxes make a difference, corporate taxes makes a difference and since these taxes are as especially the corporate taxes they are levered upon the debt capital or because of that debt say corporate taxes that debt capital becomes cheaper means no taxes paid on the say financial cost which will pay as interest on the borings.

So, because of that debt capital becomes cheaper and Modigliani and Miller have also a say accepted it, that yes because of the debt capital being tax deductible source of say, funding, it becomes cheaper and overall cost of capital goes down and return to the equity shareholders increases.

So, we have seen till now the impact of the corporate taxes, and then in the next part of discussion, we will learn about the combined impact of the corporate taxes and the personal taxes and how the debt capital makes entire means say overall, you can call it as a reduces a tax burden of the firm and becomes the cheapest source of finance because of both the taxes, corporate taxes and the personal taxes that I will discuss with you in the next class.

So, in the next class, we will learn about the combined effect of the corporate taxes and the personal taxes. Till now, we have learned about the impact of the corporate taxes on the say different sources of funding. And now, we will learn about the combined effect of the corporate taxes and the personal taxes and then we see how the debt capital is going to be the cheaper source of finance as compared to the equity and how it is contributing in the maximizing the value of the firm.

So this remaining discussion with regard to the taxes plus some more important concepts of the capital structure, I will discuss with you in the next class. Thank you very much.