Financial Management for Managers
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Lecture 54
Capital Structure - Part I

Welcome all, so in the process of learning about the capital structure of the firms, which we say started talking about in the previous class. Now I will take you further with say remaining important conception approaches of the capital structure and a while talking about the capital structure of the firms this say you can call it as say, the process of arguments always goes on that whether say capital structure plays any role in the value maximization of the firm or not.

Means that if we bring more funds from the equity or more funds from the debt, does it make any difference in that say reduction in the say average cost of capital and then say value maximization for the equity shareholders. So, this process is a means years old ages old, a decades old and now, it has started stabilizing because now many scientific theories are available, many say research based theories are available that capital structure yes makes a difference.

And if you say have more amount of the debt, if you employ more amount of the debt in the firm in the total financial resources or in the total capital structure of the firm, then the overall cost of capital can be brought down, the weighted average cost of capital can be brought down and the value maximization of the firm for the equity shareholders can be attained, this objective of the value maximization for the equity shareholders can be attained.

So, it is a now say empirically proved also but we should have the complete knowledge, because sometime you confront you may confront with the question from any person any form any side that how does the capital structure makes a difference? And what are the different say theories, different approaches concerning that? So, you should be clear about all the theories all the approaches and the background.

And the say now the final decision that we have arrived at after the say systematic research that capital structure makes a difference. So, now before that what was the situation and where we started learning about this capital structured process systematically and now what is the current state of affairs you should be very clear, being a student of finance, you should be very clear about that.

So, now I will take you back a little bit and then we will start with the different approaches and we will divide the learning of the theories of the capital structure into two broad say ways. One is those theories which are you can call it as not as such as a systematic approaches or any kind of the theories based upon the research rather they are simply based upon the general understanding or maybe the rules of thumb or maybe the answer dots.

And no you can call it as systematic theory has been developed on the basis of the research, but those theories are equally important even today you cannot ignore them. And they are basically the basis of the systematic research and say finding it out by the different researchers that yes, capital structure makes a difference.

And the moment you increase the amount of leverage in the firm, you employ more amount of the leverage in the firm, leverage means the debt capital, the borrowed capital, because of the tax deductible advantage of the borrowed capital, it say, reduces the overall cost of capital of the firm weighted average cost of capital of the firm and otherwise also the cost of the debt being a fixed costs.

It does not increase with the profitability or does not come down with the reduction in the profitability. So, the firms if they are sure about earning the profitability or they are going to be the highly profit making firms for them for say those firms for deciding their capital structure, yes, they must bring a more amount of the debt in the firm.

So, means this say, a process of learning about the composition of debt and equity in the firm and the process of deciding the capital structure of the firms is a very-very important component of the say discipline of financial management and being a student of financial management, you should be clear about all these theories and the systematic processes and how this genesis of the capital structure has moved forward.

And now, where we stand and what is the latest thought right. So, different approaches are there I will discuss with you the 4 important approaches, one means, one approach is a systematic approach, whereas, the other 3 are the unsystematic approaches. So, when the systematic approach was not available which was given in 1958 for the first time by say Novel laureates, two Novel laureates in economics, financial economics, Modigliani, Franco Modigliani and the say Merton Miller.

So, these two economists they have given the approach which is called as a systematic approach of the capital structure that came in 1958 for the first time and even 1958 the report

they gave or the theory they propounded that they themselves rejected over all later on over a period of 3 to 4 years in, I think 62 when they gave the second say version of the theory or second proposition of the theory.

So, they have changed their view which they gave it the first theory 1958 but these theory is called as the systematic theory of the capital structure and before that, we had 3 theories, which are called as the or 3 approaches which are called as a net income approach, net operating income approach and the traditional approach.

So, first we will learn about the unsystematic approaches, unsystematic theories which are based upon the general understanding, accounting rules, rules of thumb or accounting process or the incidents and then means when this say systematic research in the capital structure was not available. So these theories were forming the basis.

And at that time people were not clear, businesses were not clear, whether the capital structure makes any difference or not, because we are going to discuss now the three say approaches before the Modigliani approach and these three approaches put forward the three different views. So, which view to accept that was not clear at that time with the people and businesses were just using the trial and error methods to decide the capital structures.

So, we will systematically learn about all these approaches of the capital structure one by one and finally, we will move to the systematic approaches that is the Modigliani Miller approach and then we will conclude that how does the capital structure of the firm means say, affects the overall profitability or the cost of capital because if the cost of the capital is under control, then the say value of the firm will be maximized, value of the form for the equity shareholders will be maximized.

So let us learn about these approaches one by one. First the unsystematic approaches or the you can call it as the, say, the approaches which had their own view, which is not based upon any research or any kind of the scientific findings, but they are not ignorable at all we have to learn about these three. And then after that, we will move to the one the theory of the capital structure most important theory of the capital structure given to us by the Modigliani and Miller.

So first we will start with these three approaches. And the first approach is the net income approach. I will tell you that the abstract of this or in abstract I will tell you about this approach, that as per this approach or as per this particular theory of the capital structure, this

approach says that debt amount of the debt means, the moment you increase the amount of leverage or amount of the debt in the firm, the overall cost of capital comes down and the value of firm stands maximized, value of the firm stands maximized.

So, it means that as per the net income approach, we have the two sources of the funds, one is the debt and then is a equity. So, in that total capital structure, you should have the high proportion of the debt, the moment you increase the amount of the debt in the firm or the financial leverage in the firm, the overall capitalization rate or the cost of capital means the cost of capital not capitalization rate, I would say cost of capital would come down.

Overall cost of capital would come down and if the overall say cost of capital comes down weighted average cost of capital comes down, it means ultimately after servicing the fixed amount of the say of the of the funds. That is the debt component the remaining amount will go to the equity shareholders because operating income remaining the same.

And if the average cost of capital is going to reduce by employing the more amount of debt in that situation, your overall value of the firm for the equity shareholders is going to be the maximum right. So, this approach says that yes debt and equity are the two sources, but debt is cheaper source of finance as compared to the equity and the moment you increase the debt or the component of leverage in the total capital structure of the firm, it reduces a overall cost of capital.

Weighted average cost of capital and it helps in the value maximization of the firm. So, let us see what is written here.

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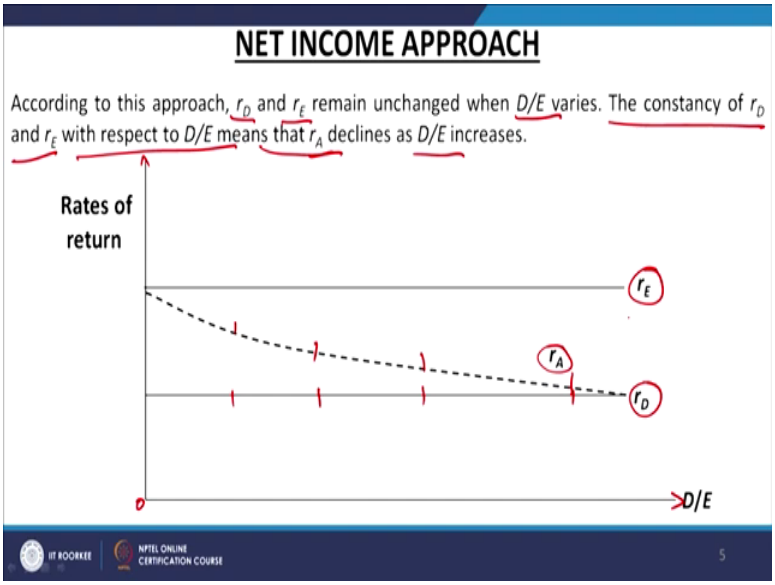

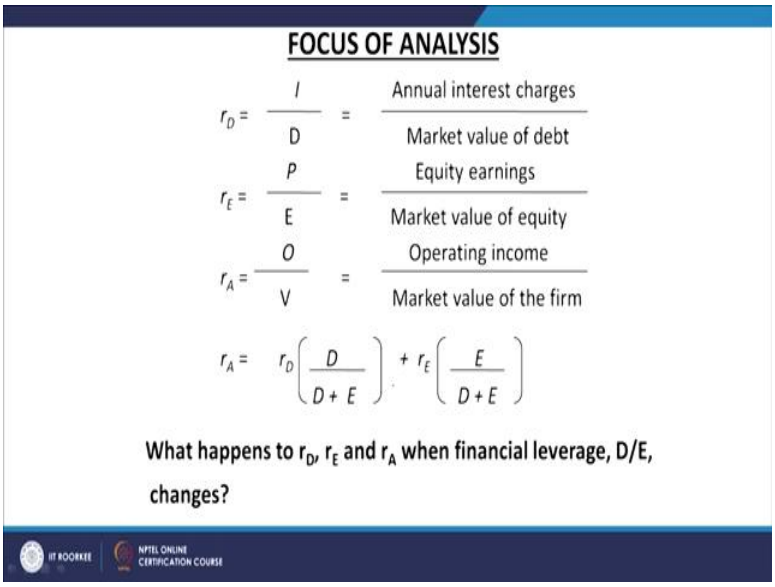

It is clearly given here that according to this approach, according to this approach, RD and RE, RD is basically the cost of debt, we have seen in the previous class in the first lecture. That is, we have decided how we signify that cost of debt, how we signify the cost of equity and how we signifies the overall capitalization rate that is RA and that is the weighted average cost of capital RA is basically the weighted average cost of capital.

So, we are going to talk about all these three here are given. So, what is written here? What is the crux of this approach? It says, according to this approach, RD and RE remain unchanged when DE varies, RD and RE remain unchanged when the DE varies means a debt and equity ratio varies. There is no change in the costs of debt or in the cost of equity means these cost

of debt and equity they remain same whatever the amount of the funds you are bringing up in the overall capital structure of the firm.

So, because we this is a say well understood fact that cost of debt is much less as compared to the cost of equity because of it is a tax deductible nature. So, it means when the approach says that the say the RD and RE, the cost of debt and the cost of equity does not change, when you change the debt equity ratio or the capital structure of the firm.

So, it means if the debt is cheaper than the equity and you employ more amount of the debt, so, what is going to happen? Since the cost of the individual sources not going to increase means beyond a particular point. So, in that case, if you employ the more amount of the debt in the total capital structure of the firm, then the overall cost of capital that is RA is going to go down. So, it means, it is written here, this constancy of RD and RE with respect to the debt equity ratio means that are RA.

RA is the overall capitalization rate or the weighted average cost of capital with the help of we have seen in the previous class it is given here. For example, RA is basically the weighted average cost of capital the total capitalization So, RA declines as DE increases. As a debt to equity ratio increases, RA declines overall cost of capital declines, weighted average cost of capital declines because debt being the cheaper source of finance.

When its weightage in the capital structure is increased, then certainly it is the beneficial position for the equity shareholder and the objective of the value maximization can be achieved right. Now, for example say graphically it is shown here that on this, this say X axis you are given the debt equity ratio, and here you are given the rate of return and here you are given the three important costs, right.

So, first line is talking about the say this is depicting the cost of debt, then this third line is talking about the cost of equity and in between this dotted line is this is talking about the RA that is overall cost of capital weighted average cost of capital right. So, here you are at the zero level, right. So, here is a rate of return going from this to this upwards, you can say that this is like this, and this is like this, and this is the debt equity ratio.

So, it means in this debt equity ratio when you move from this side to this side, what you are going to do here is that if you employ the more amount of the debt in the firm. If you employ if we're having the amount of the debt in the firm up to this level, the overall cost of capital is

at this level. If it increases up to this level, cost of debt goes like this, because when the debt amount increases in the firm, cost of the debt will also increase.

But the overall capitalization is going to go down and if it is reaching here, then it is reaching here and for example, if it is the say debt component is further going up in the debt, this is a debt equity ratio, then the overall capitalization rate is going to be the minimum. So, what is happening? Cost of equity is stable, that is not going to change, means if you are increasing the say the debt equity ratio, cost of equity remaining change, even the cost of debt is also unchanged.

Cost of equity is unchanged it is given in the approach itself that the costs of debt and equity remain unchanged. Only the overall cost of capital goes down, when you increase the component of debt in the say overall capital structure of the firm and that is happening here we are showing it here cost of debt is same cost of equity is same and when the moment in the debt equity ratio, you are increasing the component of the debt here going from this side to this side.

Overall, your cost of capital that is RA is declining this with the say increase of the debt in the overall capital structure of the firm, right. Because it this approach says this approach advocates that debt being the tax deductible number 1, it is fixed in terms of the cost. If there is increased profitability in the firm, then the cost of debt does not change, does not increase and since it is the tax deductible, so the moment you increase the amount of the debt, so, means in the larger.

For example, in the total capital of the firm, 80 percent is coming from the debt and 20 percent is coming from the equity as it means so overall, say out of the total cost of capital, 80 percent is the controlled cost or the lower level of the cost as compared to the equity costs. Only 20 percent is a equity costs which is the higher cost. So, it means higher the amount of debt, it means the average cost of capital is going to go down.

Only negative advantage or the sorry, only negative feature of the debt is that your risk level goes up because it is a fixed cost on the or against the revenues of the firm. It is a fixed charge, it is a fixed cost, you have to service the debt in any case, whether you have the revenue, you do not have the revenue, whether you are a profit making firm, you are a loss making firm. In any case, you have to service the debt you have to pay the cost of the debt, which is not the case with the equity.

But if the firm is able to cross that threshold level and the minimum income is going to be ensured by the firm, then certainly as per this approach, larger the amount of the debt, lower is going to be the overall cost of capital and the firm is going to means say increase the value of the firm this overall value of the firm is going to increase because of this capital structure when the financial leverage is high.

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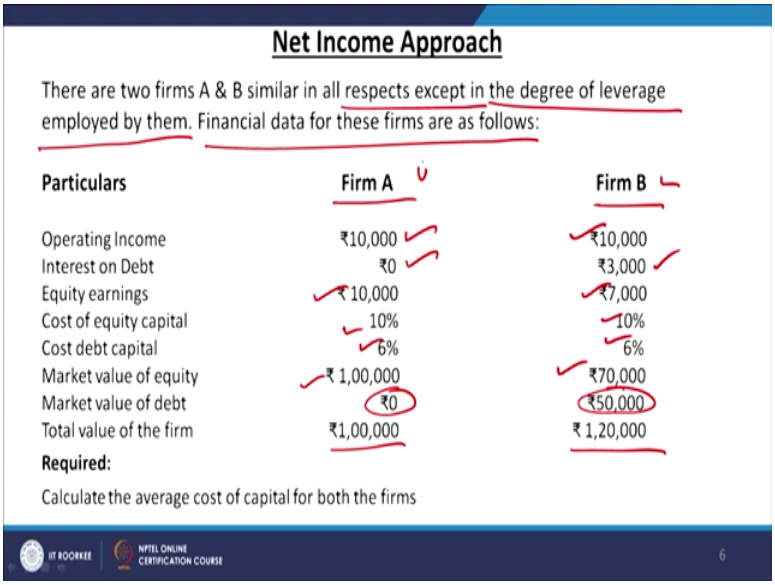

So, we have to say learn with the help of this particular example here if you look at this particular example, you can say net income approach and this example will help us to understand how the overall cost of capital goes down the movement, the amount of debt in any form increases.

Here we are given the 2 firms, firm A and firm B and we have written here there are two firms A and B. Similar in all respects, similar in all respects except in the degree of leverage in the degree of leverage employed by them. In one firm, the degree of debt is higher as compared to the other firm or maybe in the one firm the level of debt is zero, in the second from the level of debt is high.

And the financial data which is given to here which is given to us here is that will help us to understand the overall capital structure of the firm. If you look at this firm, so, you can call it as market value of the debt given here and it is zero, whereas the market value of the debt given here is the 50,000 say rupees, right. Other incomes are other say a particulars are same here operating income is 10000, 10000 and interest on debt because the debt component of debt is zero.

So, our interest on debt is zero whereas, here we have the interest on the debt. Equity earnings are 10000 because whatever the operating income is, that 100 percent will go to the equity shareholders because no cost of the debt has to be paid because the level of debt is zero, whereas here the equity earnings have come down means the total earning total income minus the cost of the debt, so remaining is going to be the say equity earnings.

Cost of equity capital is 10 percent, same 10 percent, cost of debt capital 6 percent, 6 percent and value, market value of the equity is 100000 and here it is 70000 and say if you talk about the total value of the firm, it is 1 lakh, it is 120000 rupees. So, the firm which is employing the debt component the overall say the total value of the firm of total value of the firm is more and here this firm is employing total amount of in their capital structure, total amount employed is 120000.

Whereas, in this case the total amount employed is 100000 rupees. So what the amount of debt is here 50000 and amount of the debt in this form is 0. So you can say this firm is the levered firm, this firm is unlevered firm. This firm is the levered firm this firm is the unlevered firm. So, I am saying or not I am saying but this approach says the moment you increase the amount of debt in the firm or any firm having the say a higher amount of the debt in its capital structure, overall cost of the capital of the firm goes down.

So let us solve this and try to calculate, from this say total information. Let us calculate the say weighted average cost of capital or the average cost of capital. And then we will be able to understand whether it was certainly goes down when the firm employs the amount of debt or it remains a stable or it is otherwise, right.

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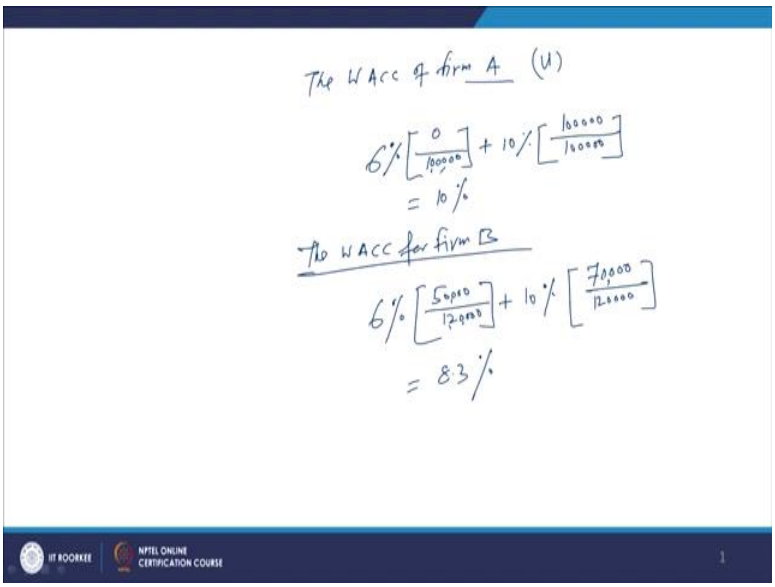

So, you can see it that is the weighted average cost of capital for the firm A or of the weighted average cost of capital of firm A, of the firm A. So here what is the formula if you look at? It is given here and you can take it as the cost of debt, what is the cost of debt? 6 percent and with this we have to multiply the proportion of the debt and the proportion of debt given here is how much?

The proportion of debt given and this is, that is 100000 rupees is a total capitalization, portion of debt is 0 here and then it is the equity costs of equity is a 10 percent. And here the total amount is coming from the total say capital is coming in the capital structure only from the equity capital. So, if you calculate the weighted average cost of capital for this firm, we have the proportion of the weights.

So, weight of the debt is 0 and the weight of equity is 100 percent and the cost of debt is 6 percent, cost of equity is 10 percent. If you calculate the cost of say average cost of capital here, so you will find out this comes out as say 10 percent, this works out as 10 percent and this firm is the say unlevered firm. This firm is the unlevered firm there is no leverage, no debt is employed here, right.

Now, we talk about the weighted average cost of capital for the firm B for Firm B. So if you calculate the weighted average cost of capital for this firm, so, we can again take the same thing cost of debt is how much? 6 percent and what is the, if you look at this, what is the total capitalization? Total capitalization is 120000 and the component of the debt is 50000, right.

So, it means, we have employed the debt in this firm which is 50000 and the total capitalization is 120000. So, this is the one component plus the second component is the equity and in this equity this amount is the say how much is the amount remaining? Remaining is the weightage of the equity 70000, weightage of the debt is 50000 and total is 120000. So, if you calculate this cost, this works out as say 8.3 percent.

So, you can understand that the firm which is employing a certain amount of debt or more amount of debt in their capital structure, they their cost of capital is lesser as compared to the firm having the no debt at all in the capital structure or the lesser amount of the say debt in the capital structure. So, as per this approach, though, the cost of these sources of the funds internal and external sources of the funds, debt and equity remains unchanged.

Means, even you vary the say, do any kind of the variations in the capital structure, so debt because it is a well-known fact debt has the tax deductible advantage. So, because of that particular feature which is not associated to the equity capital, so because of that tax advantage feature of the or the feature associated to the debt, it makes the debt as the cheaper source of the fund or the cost of the debt is much less as compared to the cost of equity.

And because of that the moment you vary the say capital structure or the debt equity ratio and the you increase the component of the debt in the overall capital structure, so the overall cost of capital or the weighted average cost of the capital of the firm goes down, because cost of equity remains unchanged, cost of debt remains unchanged, but cost of debt goes down because of its tax deductible nature. So, overall cost of the debt is lesser normally as compared to the cost of equity.

And that say create the situation where the higher amount of the debt or higher amount of leverage in the capital structure of the firm reduces the overall cost of capital for the firm. And if the cost of capital goes down, certainly the reverse will happen that the value firm value of the firm will be maximized or the say value maximization objective of the firm will be achieved. So, this is the net income approach.

Now, we will move to the next approach, which is the net operating income approach. So, this approach is totally different from the net income approach this income, this approach says net operating income approach says that both the cost of debt and equity is the same in the beginning, so the cost of debt and equity like the say net income approach, the cost of debt and equity remains the same.

But the moment you say varies the debt equity ratio, the moment you vary the debt equity ratio and increase the proportion of debt in the total capital structure of the firm, the cost of equity capital goes up, it does not remain stable. This is the crux of this say approach net operating income approach. The moment yes, the cost of these two is same, we understand, but the moment you increase the component of debt in the capital structure of the firm, cost of equity increases.

Because equity shareholders increase their required rate of return because of the increased element of risk, because of the increased amount of the debt in the firm. Equity shareholders assume that the more amount of the debt you are employing in the firm, it means the overall risk of the firm is going to or overall risk of the firm is going to increase. So, they have to be or more amount of the risk because of the increased amount of the debt employed by the firm.

So their cost of capital will also be going up, because the required rate of return goes up because they want more compensation to be compensated means those people want the equity shareholders want to be compensated for the higher amount of the risk they are going to take because of the higher amount of the debt employed by the firm.

So the moment you increase the component of debt or the proportion of the debt in the overall capital structure, cost of equity does not remain the same. Rather it goes upwards. Because equity shareholders believe, by employing the more amount of debt you have brought in more amount of risk in the firm. And in that case, their required rate of return cannot remain same, rather they are going to jack it up.

They are going to increase it and because of that means if the say cost of debt is lower, but if the cost of equity goes up, so ultimately, it does not make any difference. It does not make any difference in the overall cost of capital of the firm. Because we understand this approach also accepts debt is a cheaper source of the funds as compared to the equity right, but it is to that extent, when the debt and equity are in equal proportion right.

The movement to increase the debt with the objective of reducing the overall cost of capital of the firm, the cost of equity goes up because equity shareholders increase their required rate of return because they assume that higher amount of the debt employed by the firm brings more amount of the risk in the firm. And since the equity shareholders are going to take more amount of the risk, so their required rate of return goes up.

It does not remain stable and ultimately the cost of capital or cost of the equity capital goes up. So, as per this approach, both the things RE and RD, they are not going to remain same, they are only same if they are means debt is employed to a certain extent, but if you increase the debt, then the cost of equity is also going to increase. So, you are going to increase the debt with the objective of reducing the cost of capital because debt is a cheaper source of finance.

But cost of equity is going to increase so net result is going to remain the same. So, as per this approach, the net operating income approach concludes debt capital structure has no meaning. Whether you bring the funds in the firm from the debt or the equity, overall cost of capital is going to remain the same. It is not going to change. You cannot say that the debt as having the tax deductible advantage so it is a cheaper source of funds. That thing is not going to happen mind it.

So this approach and this approach is literally followed by the Modigliani and Miller, the first preposition, the first hypothesis of the Modigliani and Miller which they propounded or they proved in 1958 under their first theory of the capital structure, they themselves agreed with this say approach net operate means it says the first proposition.

The first part of the Modigliani-Miller theory is the replica of the net operating income approach in that approach, they have empirically proved it after the systematic research they have proved it that debt and equity has no say difference to make in the overall capital structure or the capital structure has no meaning the debt and cost of debt and equity is same. But the moment you increase that debt in the firm with the objective of reducing the cost, cost of equity goes up. So, it has no meaning, overall cost of the capital is going to remain the same.

So, if you are employing them in the equal proportion, then there is a different cost of capital, but if we want to reduce the cost of capital and increase the component of debt in the firm, because the debt has the tax deductible advantage, in that case cost of equity is going to increase. So, net result is going to remain the same, it is empirically proved by the Modigliani-Miller in the first part of their theory.

However, they have rejected their own theory in the second version, and then they have proved it that yes, the say employing the more amount of the debt in the firm reduces the overall cost of capital, so, the capital structure has a meaning. It means the first approach was

then accepted by them, that is a net income approach. First, they accepted the net operating income approach, this approach which says that it has no meaning, capital structure has no meaning.

Whereas, the second proposition of the Modigliani-Miller says that capital structure has the meaning and cost of equity and debt remain unchanged, but debt having the tax deductible advantage reduces overall cost of capital of the firm and maximizes the value of the firm.

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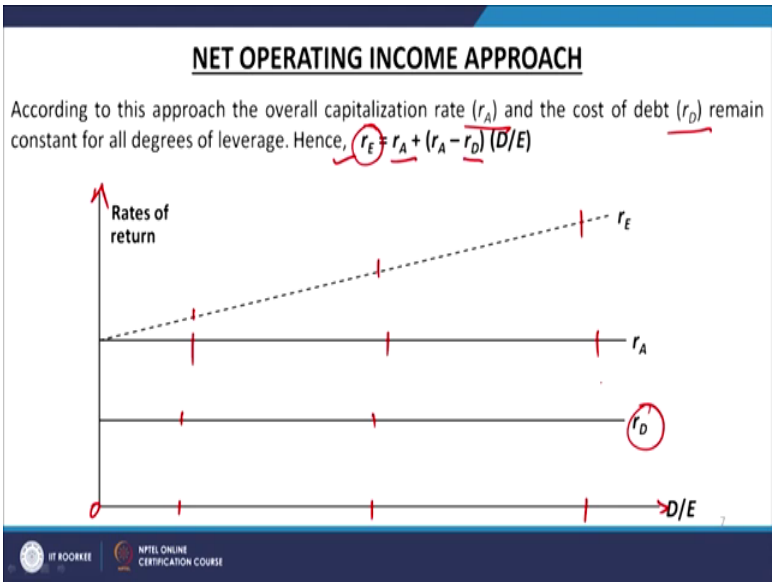

So, now let us understand this approach systematically, the net operating income approach. So, first see what is given here, according to this approach the overall capitalization rate RA and the cost of debt remain constant for all degree of leverages. This is not going to change RA is not going to change, RD is also not going to change right.

The cost of overall cost of capital and the overall capitalization rate and the cost of debt remain unchanged constant for all degree of leverages. So, finally, if this is, these two are constant, so you can easily calculate the cost of equity with the help of this equation that RE will be equal to overall capitalization rate RA plus RA minus RD.

So, from the total capitalization rate when you subtract the part or the cost of the debt, say in in the proportion of the debt equity ratio, so you will be means left with something which is called as the say cost of equity, right. So, they have, what this approach says this approach was basically given to us by the David Durant, right. So, he was advocate of that, I understand that the cost of debt is lesser as compared to the cost of equity, but what happens?

See here, now, he has said he has proven with the help of this structure, that here we have the rate of return, this is a debt equity ratio on the x axis we have the debt equity ratio on the y axis we have the rates of the return. And these are the cost. This is the cost of debt, like in the previous approach, costs of the debt is unchanged in this case.

In the previous approach, this RA was say showing a declining trend and RE was stable. But in this case, RA is now showing the stable trend. And RE is showing the rising trend. So what is the meaning what I discussed with you just a moment back that the moment that component of debt increases in the firm when you move in the debt equity ratio from the zero to this side. So, if you are having the amount of debt in the firm, so cost of debt is this much, but the cost of equity is this much.

And if you increase the amount of debt in the firm, so, the cost of debt will be this much but the cost of equity will be this much and if you (break) make the amount of debt in the total capital structure on the debt equity ratio up to this level, then the cost of equity is this level. So, what is happening? You are increasing the amount of the debt in the firm with the objective that this is a cheaper source of the firm because of the tax deductible advantage.

So, you are increasing this component and you want to reduce the overall cost of capital but what is happening? The moment you are increasing the amount of debt in the firm the equity shareholders are increasing their cost. So, this reduction in the cost of capital because of the cheaper source of the firm is offset by the increased cost of the capital coming from the equity capital.

So, ultimately RA is same here, RA is same here and RA is same here. So, in all the 3 levels, the overall cost of the capital or overall capitalization rate for the firm is same, because equity shareholders assume that increased amount of the debt employed in the firm brings more amount of the risk in the firm and that is not means good for the equity shareholders. So, they should be compensated for bearing the increased amount of the risk because of the increase the amount of the debt. So, our cost of the capital has to go up.

So, one source you are reducing the cost of capital, other source is increasing the cost of capital as a result the net result remaining the same that ultimately your overall say capitalization rate or the say weighted average cost of capital that is RA is going to remain same, it is not going to change. So, what we conclude? You can say that this capital structure

has no meaning, it does not affect the say the cost of the capital largely the cost of capital remains the same, whether the funds come from debt or the funds come from the equity.

So, if you feel that we are employing more amount of the leverage or debt, the overall cost of capital can be brought down. So, this is a myth, it is as per this approach it the overall cost of capital or the overall capitalization rate which is depicted here by RA is going to remain same, it is going to remain unchanged. So as per this approach capital structure is not important.

So, firm should not spend time on deciding about from where the funds will come, it will depend upon the easy availability of the funds, whether the funds are available from the equity or from the debt wherever from whatever the source the funds are available, they should be employed and the capital structure of the firm should be formed, but not with this objective that they have more amount of debt, then the overall cost of capital will go down.

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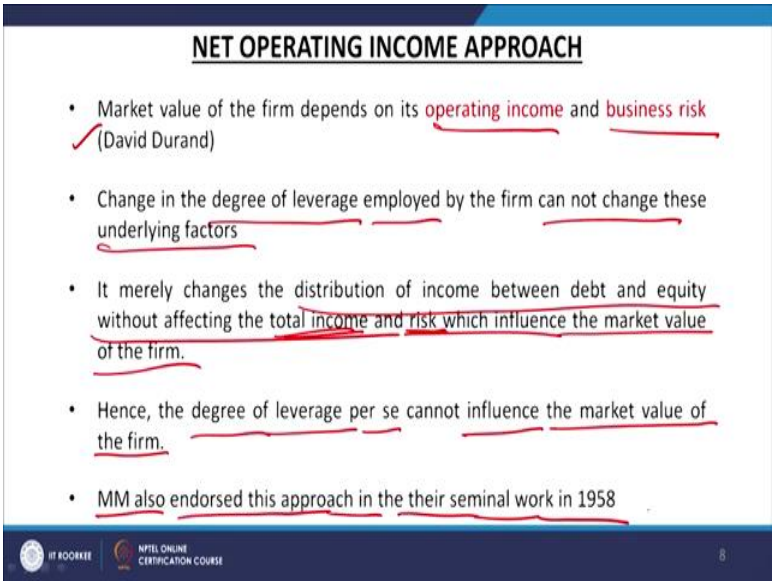

So, let us understand this with the help of this say one example, some say conceptual discussion is given here. So, what this net operating income approach says? This approach says, let us read these points quickly. Market value of the firm depends on operating income and the business risk.

This is the person who has propounded this theory, David Durant, he has said that basically the market value depends upon the two things, the operating income and the business risk. Second thing he says, change in the degree of leverage. Change in the degree of leverage employed by the firm cannot change these two underlying factors.

Change in the degree of leverage employed by the firm cannot change these underlying factors which means the operating income is going to remain the same because cost of capital is going to remain the same and business risk is also going to remain the same. So no change is going to be there. It merely changes the distribution of income between debt and equity.

It merely changes the distribution of income between debt and equity without affecting the total income and risk, which influences the market value of the firm without affecting the total income, this is most important and the risk which influenced the market value of the firm. And the last, second last point is hence the degree of leverage per se cannot influence the market value of the firm.

So, what is the purpose of spending the time trying to know about how much debt has to be there, how much equity has to be there? So, it is written here, MM also endorsed the this approach in their seminal work, which was say presented and published in 1958. So, first theory, propounded by the Modigliani and Miller in 1958 also accepted this approach.

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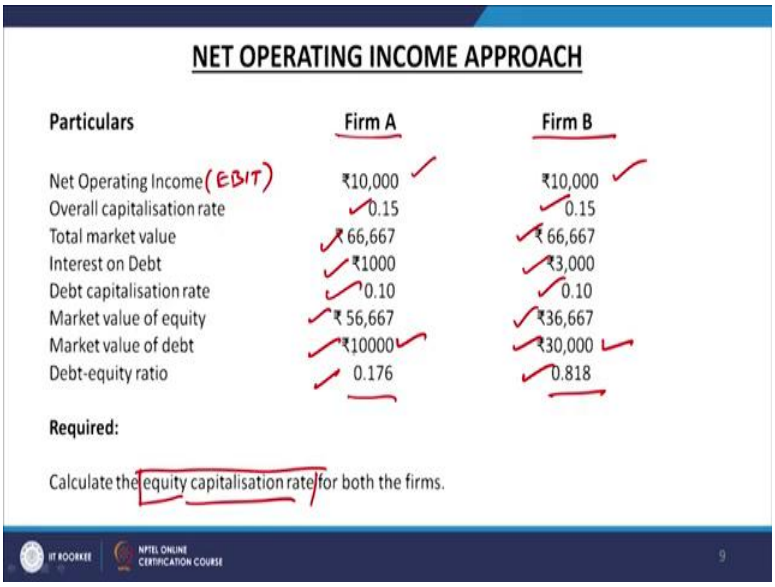

Now, let us understand this approach in the practical sense. And if you try to understand this approach in the practical sense, here is the one example and this example will help us to understand to calculate the overall capitalization rate. So, in this case, net operating income approach and we are given here the information like the net income approach, we are given the say information about the two firms.

So, one firm here it is, this is the firm A and this is a firm B right and we are given the particulars. So, you can understand that what the information is given to us, net operating

income this is basically the EBIT earnings before interest and tax. This is the say EBIT you can write it here as EBIT earnings before interest and tax net operating income. So, which is same in both the cases firm A and firm B, again 10000 rupees.

Overall capitalization rate is again same, overall cost of capital is same, that is 15 percent right, total market value is of the this form is also same 66667 right. And interest on the debt is 1000 here, interest on the debt is 3000 here, interest on debt is this much here and interest on the debt is this much here and here we talk about that capitalization rate, capitalization rate is again 10 percent, it is again 10 percent.

Market value of the equity is 56667 and here it is 36667. So, market value of the debt is this much, market value of the debt is this much and debt equity ratio is this much debt equity ratio is this much in this firm, debt equity ratio is just 17.6 percent and in this firm the debt equity ratio, debt to equity ratio is at 81.8 percent. So, we should means be able to find out, what we have to find out here? Calculate the equity capitalization rate for both the firms.

Calculate the equity capitalization rate for both the forms so if you talk about the equity capital capitalization rate for both the firms so you can call it as that means equity capitalization means the cost of equity for both the firms. So, in this case, we have to prove it missing with the help of this example, we are going to prove it, the moment you increase the amount of the debt in the firm, the cost of equity increases and this is the equity capitalization rate we are going to calculate here.

So, it means, in this firm A, the amount of debt is much less that is just 10000 as compared to this firm, firm B. So, it means the equity capitalization rate for the firm B must be higher as compared to the firm A and that is what we are going to calculate or we are going to find out. So let us calculate the equity capitalization rate for both the firms and then try to find out whether the equity capitalization rate increases with the increase in the amount of financial leverage or debt or not.

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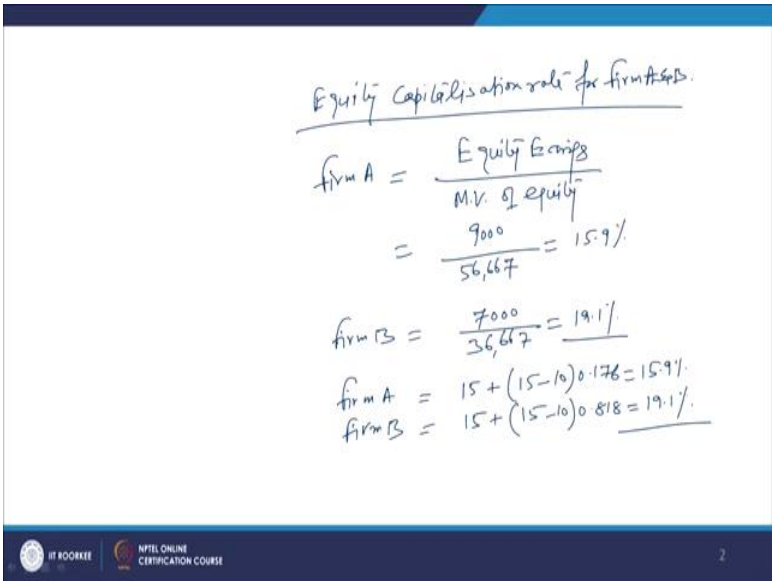

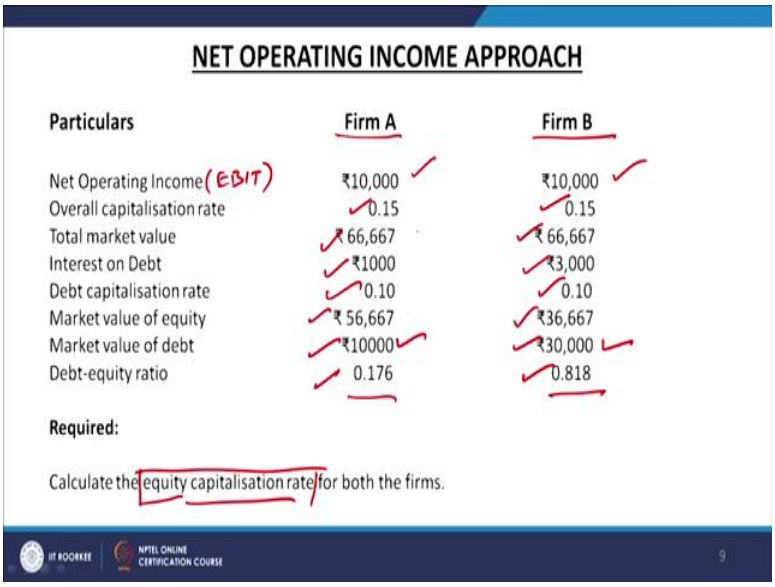

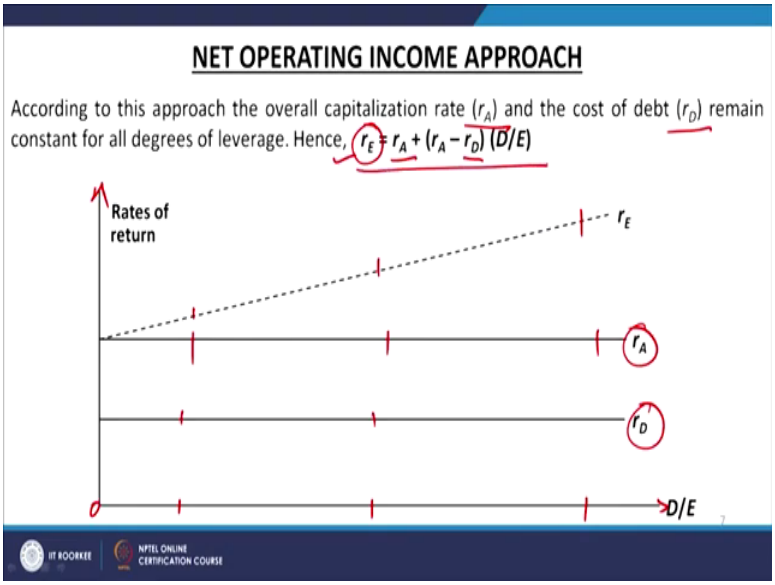

So, equity capitalization rate for, and equity capitalization rate or equity cost, equity capitalization rate for the firm A. Let us calculate this, so if you calculate the equity capitalization rate for the firm, firm A. So, how you can calculate is? Equity earnings divided by the market value of equity, equity earnings divided by the market value of equity. So, let us see what is the equity capitalization rate here?

So what is the equity earnings here? We are given equity earnings if you look at the problem, equity earnings given to us are here, that is total operating income is how much? Net operating income is 10000. So, what is the cost of debt here? 1000, so equity happening is 9000, in this case equity earning is 7000 because cost of the debt is 3000. So it is going to be how much? 9000 and what is the market value of equity?

56667 in the total market capitalization of the firm 10000 is coming from the debt and 56667 is coming from the equity. So this will work out as 15.9 percent right. This is this will work up as 15.9 percent and now will calculate the equity capitalization rate for the firm B. So, you can write here for the firm A and B not for only the one firm, so firm B, the equity capitalization rate for the firm B is how much? Equity earnings are how much?

Equity earnings we have seen, because total earnings are 10000, cost of the debt is 3000. So, equity earnings are going to be 7000 and here the composition market value of equity is because 30000 is coming from the debt. So, only 36667 is coming from the equity. So, the market says this capitalization rate of equity goes up that is 19.1 percent. So, we were say trying to find out here that with the help of this equation also with the help of this equation also you can calculate that say equal equity capitalization rate.

So, let us you calculate it for the firm A you can calculate with the help of this equation also, this is going to be how much? 15 plus the 15 minus 10 into what is this 0.176 debt equity ratio, so what the equation requires? The cost of equity is equal to the overall cost of capital of the firm into overall cost of capital minus cost of debt multiplied by the debt equity ratio.

So, overall cost of capital of the firm is over a capitalization rate is how much? Overall capitalization rate is 15 percent here overall capitalization rate is given here 15 percent. So, we are going to make use of it. So, 15 percent is the overall capitalization rate plus 15 minus 10 into this, so, this will come out as straightway it is the same amount 15.9 percent. This will come up as 15.9 percent and if for the firm B with the help of this equation, you can calculate this amount is going to be 15 plus 15 minus 10, 15 plus 15 minus 10. Again, this is the cost of the debt is going to be a 10.

So, we are going to take here as the, what is the cost of the debt capitalization rate is 10 percent. So, this is the say cost of the debt is 10 percent overall cost of capital is 15 percent, but the debt equity ratio is changing and now the debt equity ratio is 0.818. This is 81.8 percent. So, the same amount you can calculate as calculated above and this is going to be the equity capitalization rate.

So, equity capitalization rate goes up, the moment the amount of financial leverage or the debt increases, and this is what we have tried to prove here in the two firms, one is employing the lesser amount of debt another is employing the higher amount of debt in the one there is a 10000. in the other there is the 30000. So, we have seen here empirically with the help of this example, the moment the amount of debt in the total capital structure on the debt equity ratio increases, equity shareholders increase their capitalization rate and ultimately the overall cost of capital that is RA depicted by RA remains same.

So capital structure has no meaning, whether you bring the funds from debt and equity that is not going to affect because ultimately, the value of the firm depends upon the operating income and the business risk. So this is what this approach says. And this approach I am again say repeating that it is also supported by the Modigliani and Miller in their first part of their say very so you can call it as a renowned and classical theory on the capital structure.

So, before we close the discussion for this class, let us talk quickly about the next approach also. And that approach, the third approach is the traditional approach. The third approach is the traditional approach and in this approach means finally you can say something is drawn

from the first something is drawn from the second approach, something is from the net income approach, something from the net operating income approach.

And finally, this approach says that means ultimately it also concludes that capital structure has lesser meaning. It does not totally reject that the capital structure has no meaning. It guides it to some extent, but ultimately not in the way that a normal standard theory on the capital structure should be guiding the firms to form their capital structure.

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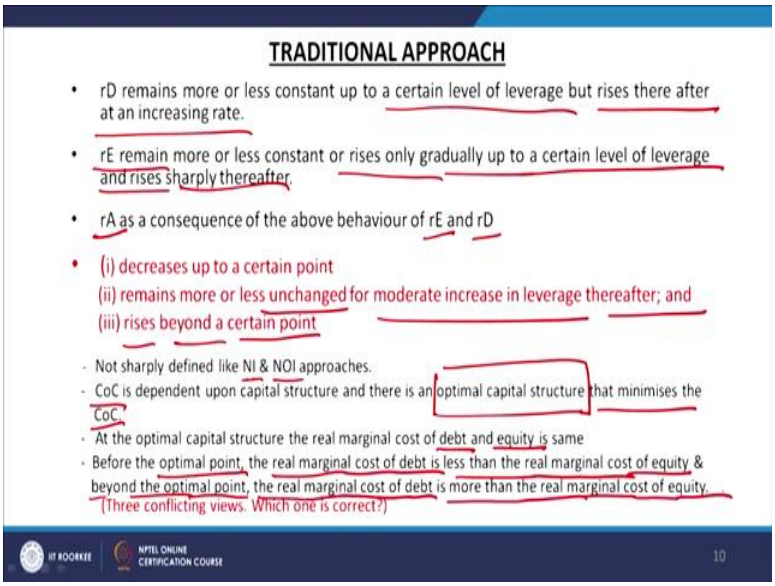

So, what this traditional approaches says? RD, the cost of debt remains more or less constant up to a certain level of leverage. But rises thereafter at an increasing rate, cost of debt remains constant, cost of debt remains in the other two approaches, we assumed or we found that the cost of debt remains unchanged. Here this approach says, cost of debt remains constant up to a certain level, but rises thereafter, at the increasing rate.

And cost of equity as per this approach remains more or less constant, or only rises gradually up to a certain level of leverage. This is supporting the second approach and rising sharply thereafter, right. So this is a say partly it is supporting the net operating income approach that the movement the amount of leverage increases in the firm, cost of equity rises at a very faster rate or at the sharper rate.

And overall cost of capital RA, as a consequence of the above behavior of RE and RD does what? Number 1 decreases up to a certain point because amount of the debt is higher and the

cost of debt is low and the amount of amount of equity is low and amount of cost of equity is higher. So, as a result of that, the RA decreases up to a certain point.

Number 2, remains more or less unchanged for a moderate increase in the leverage thereafter, and rises beyond a certain point and that too at a very sharper say pace or at very faster pace. So it means the cost of debt is stable to a certain point. Cost of equity is also stable up to a certain point, but the moment you increase the debt, cost of debt also increases or starts going up and cost of equity also goes up because a component of the debt is increasing.

So, your overall cost of capital also behaves like that, it remains say it decreases to certain extent, because the amount of debt is say there in the firm, but the moment you increase the amount of debt. So, overall cost of debt also goes up equity costs also goes up and the overall cost of capital say increases overall capitalization rate of the firm increases, because that debt has increased.

So, cost of debt is also increasing. So, debt has increased, so cost of equity also has increased and overall capitalization rate has also increased. So, this is more you can call it as a practical theory or maybe what is happening in the market or has been happening in the market. At that point of time, this theory has been pounded out of the practical as empirical situation in the market.

So, a next thing is not sharply defined like say this approach, not sharply defined like net income and the net operating income approaches. This means we are talking about the traditional approach. So, as per this approach the cost of debt, cost of equity and overall, cost of capital has been defined first, after that it is say observed here that this approach is not sharply defined like net income approach or net operating income approach.

And its approach says, cost of capital is dependent upon the capital structure and there is an optimal capital structure that is, that minimizes the cost of capital. Means this approach talks about the optimal capital structure that minimizes the cost of capital, optimal capital structure and this approach further also says that, at the optimal this capital structure, cost of debt and equity is same. So, that is, that capital structure is called as the optimal capital structure.

But the moment you say change the proportion of debt and when the say in this case what it is written here? At the optimal capital structure the real marginal cost of the debt and equity is same, that is why we call it as the optimal marginal, this capital structure. Because marginal cost of debt and equity is same at this level.

And next thing is before the optimal point, the real marginal cost of debt is less, the real marginal cost of debt is less than the marginal cost of equity and beyond the optimal point, the real marginal cost of debt is more than the real marginal cost of equity. So, overall cost of capital goes up. So, it means, we need to develop a capital structure which can be called as the optimal capital structure which way can be called is the balance the capital structure, where the proportion of debt and equity should be in the say more or less you can say in the equal proportions so that two costs are equal.

So, that is called is the optimal capital structure, but the moment you change the proportion of debt or equity, so the level of optimization is going to get disturbed and the moment the level of optimization gets disturbed. So, if you increase the amount of debt in the firm, initially the cost of debt will be low, but beyond that beyond a certain point, it will increase at a very faster pace, increasing the overall cost of capital.

Similarly, because of the increased amount of the debt beyond the optimal point, the cost of equity will also increase because of the increased amount of the risk because of the higher amount of the debt in the firm. So, overall cost of capital will increase because cost of debt has also gone up, cost of equity has also gone up so overall capitalization rate has gone up.

So, this seems to be some practical say basis of defining this approach, which is the traditional approach observed maybe say about 50, 70 or 70 years back in the market. And whatever was happening at that time, it was found it was observed at that time. So, the traditional approach was developed. So till now we discuss the three approaches. One is the net income approach, net operating income approach and traditional approach.

And now a million dollar question is that which approach is the most appropriate for defining or deciding the capital structure of the firm? Which approach is the most appropriate, it is very difficult to decide which approach to accept, which approach is say going to give us the final result of these out of these three. It is a very-very conflicting issue, because these are all three say approaches are going to give us the conflicting results.

So, it is totally not means it will be totally incorrect to accept either of the three or maybe not to accept any of the approach or finally we have to means get an answer that one approach say something, other approach say something, third approach say something. So, which one is correct, which one is to be accepted?

And for that, we have to move to the next level and that next level is the say, systematic research based scientific theory of the capital structure given for the first time in 1958 by Franco Modigliani and Merton Miller, and in the next class, I will discuss with you in detail, the Modigliani-Miller theory of the capital structure.

We will first learn that what was the original theory, first proposition of the theory given by these two novel laureates, financial economists who were who became novel laureates later on what was the first version first proposition of the capital structure theory given by these two people, these two novel laureates and how they change their own findings of the first propositions in the second proposition.

So that all means we will be talking about, we will be learning about the say systematic approach of the capital structure, Modigliani-Miller theory of the capital structure, but in the next class till then, thank you very much I will stop here for this class and we will resume next class or we will start talking about say the capital structure, we will resume the discussion on the capital structure in the next class, where we will talk about the MM theory, Modigliani-Miller theory of the capital structure. Thank you very much.