Security Analysis and Portfolio Management
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Lecture 28
Equity Valuation - V

Welcome back. So, before the break, I was discussing the treatment of interest and depreciation, while calculating FCFF. So, this is the formula, these are the formula for calculating free cash flow to the firm from various sources from EBDIT from EBIT from PAT and from CFO.

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TREATMENT OF INTEREST

		By EBDIT	100
Depreciation	0		
Interest	10		
Tax	27		
PAT	63		
CASH FLOW	63		

EFFECT OF DEPRECIATION

		By EBDIT	100
Depreciation	10		
Interest	0		
Tax	27		
PAT	63		
CASH FLOW	73		

So, talking about the effect of depreciation, let us come back to that for a second. Let us recall, if you look at this, see Pat has a, the tax has changed from 30 to 27. If, if an amount of

10 is depreciation, debited to the profit and loss account, if a depreciation of 10 is debited to the profit and loss account, if the tax rate is 30 percent, then the tax amount is decreased from 30 to 27.

Otherwise this is, this represents a notional cash inflow you may call it, or at least in some sense, it adds to the cash flow or to the firm. And therefore, this DT factor is the why we add back this DT factor is because it is the saving on account of taxation. Taxation is a cash outflow. So, if there is a reduction in that in taxation, then naturally it adds to the cash resources of the company, and that is one part.

The second part is as far as the amount of D into 1 minus T is concerned, the post-tax effect of depreciation. Because that is not a cash flow at all, we need to add that back when we calculate the cash flow or the cash available for distribution to the various interest groups in the company. So, that is the reason that we add DT plus D into 1 minus T, that is D to the profit after tax when we calculate FCFF.

So, I have discussed this thing. Now there is another point here, why the change in dept is not deducted in calculating free cash flows to the firm? Why the change in dept is not considered while calculating free flow to the firm? Please note, when we calculate the free cash flow to equity, then we make adjustment for amount of dept, for the change in dept during that particular year.

If there is an increase in dept, it is added, when we calculate the free cash flow to equity and if there is a repayment or decrease in dept, we deduct it from the free cash flow to equity shareholders. Now, the important thing is the same thing does not operate, when we calculate the free cash flow to the firm. Why is that, let us try to understand it. Suppose during a particular year, the amount of debt increases the company borrows a certain amount.

Then what would it use that amount for? Either it would use that amount for financing some assets of the company in which case, the increase in the dept would be equal to the increase in either fixed assets or net working capital. And as a result of it the net impact on the free cash flow to the firm would be 0. The amount of increase in dept or the increase in FCFE, FCFF I am sorry, FCFF due to an increase in dept would be neutralized by the deployment of that increase in either the fixed assets or current assets of the company.

So, we end up with a 0 situation, where the increase in dept has no impact on the available free balance for the various stakeholders, that is the lenders, preferred shared and equity

shareholders. The other possibility is that the cash flow that you get or the cash flow that you generate by cash dept is used for repaying either the old debt or the preferred shareholders in which case also, the free cash flow to the firm will not change.

Because whatever is added on by way of increasing resources, would be deducted because the, the amount is being used to simply change or simply replace the existing resources of the company. Therefore, again, it would, there would be no change in the funds that are available for distribution to the, to the interest groups of lenders, equity and preference shareholders.

So, in either case, what we find is that the change in dept does not contribute to free cash flow to the firm, although it does contribute to free cash flow to equity. Because if there is further, if there is raising of dept. And then depth, that depth can is becomes available, at least in theory to the, to distribution to the equity shareholders. So, at least in theory, although there may be legal restrictions on this part, legal restrictions on borrowing and then paying to equity shareholders there would be legal restrictions.

But in principle, as far as the finance is concerned, this would operate to increase or to enhance the resources that are available for distribution to the equity shareholders. Therefore, we need to make an adjustment of for dept for any increase in borrowings, when we work out the FCFE, but we do not need to make any adjustment for the increase in borrowings, when we work out the FCFF.
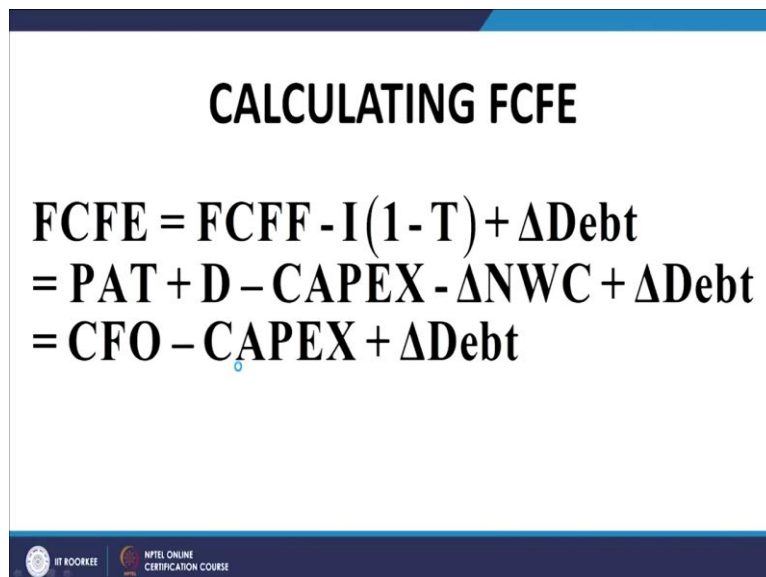
Reason? because whatever increase in borrowings is either going to be used for financing fixed or current assets. In which case, there is no change to the FCFF or it is going to replace existing debt, in that case also, it does not change the situation. Now, an important point here regarding projecting of capex. Again, I emphasize, I reiterate the point of compatibility, the point of consistency.

If you are considering an increase in capex, which is used to upgrade the operations of the company, upgrade the machinery of the company and thereby increase their production, then you also must necessarily consider, consider the impact of that upgradation, that improvement whatever that may be of the upscaling of the operations of the company or maybe introducing a new product line, whatever it is, you must also consider the cash flows, that are likely to be generated out of that upscaling, upgrading or refurbishing or the, the renovation, whatever the case may be.

The important thing is, I repeat to maintain consistency. If you consider a particular capital expenditure, you must also consider the benefits that are going to be derived from that capital expenditure in terms of increase in or incremental cash flows that are going to be or free cash flows that are going to be generated by the utilization of that capital expenditure. This is fundamental, this is again, I repeat, this is most important principle when we talk about any kind of valuation.

To repeat, if there is any increase in capital expenditure or even increase in working capital, if there is any increase in working capital, the impact there of in terms of increase in sales must also be considered, when we work out the free cash flow. So, now, we talk about calculating free cash flow to equity.

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The formula are absolutely similar, except that the delta dept term comes into play. And we deduct now please note here, please note two things here. Number one, we are assuming that the preference shareholding is 0 for the moment, we keep it simple. We assume that there is no preference shareholding. Number two, earlier when we worked out the free cash flow to the firm what we did? what were the stakeholders, the stakeholders were the long term lenders and the equity shareholders assuming preference shareholding to be 0.

The long term lenders and the equity shareholders, it was that basket or that bucket that comprise on the basis of which we have worked out the, the free cash flows. Now, the lend, long term lenders have been ousted from that bucket, have been removed from the bucket. Therefore, when we work out the free cash flows, we need to oust or we need to deduct the stakes of the long term lenders. And what is the stake of the long term lenders?

It is their interest, but when you debit interest, there is a tax shield that operates to your advantage. And therefore the effect of the tax shield needs to be considered and the net after tax cost of debt has to be deducted from the free cash flow to the firm to arrive at the surplus resources, which are available to the bucket comprising only of equity shareholders.

And of course, when delta dept has to be considered that is if there is an increase in dept, then that dept also becomes available to the bucket of equity shareholders and as a result of which it adds to the free cash flow to equity, as I explained just now. However, delta dept will not operate, will not come into play when we work out the free cash flow to the firm. So, this formula is then, this formula then becomes self explanatory.

We will start with the free cash flow to the firm. We did, we deduct there from, we deduct there from, the stakes of the lenders, that is I into 1 minus T. And we add any fresh borrowings if there are any and we deduct any repayments, if there are any on account of the dept, on the lenders. So, the net result is that the free cash flow to the equity becomes PAT plus depreciation, minus capex minus delta NWC.

What is delta NWC? It is the increase in working capital plus delta dept. Now, free cash flow with preferred stock. I kept the exposition simple just a few seconds back. When I said that let us assume that preferred stock is 0. What happens if there is preferred stock?

COMPUTATION OF FCFF

$$FCFF = EBDIT(1-T) + DT - CAPEX - \Delta NWC$$
$$= (EBIT + D)(1-T) + DT - CAPEX - \Delta NWC$$
$$= EBIT(1-T) + D - CAPEX - \Delta NWC$$
$$= (PBT + I)(1-T) + D - CAPEX - \Delta NWC$$
$$= PBT(1-T) + I(1-T) + D - CAPEX - \Delta NWC$$
$$= PAT + I(1-T) + D - CAPEX - \Delta NWC$$
$$= CFO + I(1-T) - CAPEX$$

If you use this PAT, then and preference dividend has not been deducted from here, then we need to deduct preference dividend from here. That is one, one adjustment that we need to make. If there is a preference dividend, and this figure is before preference dividend, then we need to deduct preference dividend from here, when we calculate the free cash flow to equity. The second thing is, when we work out the free cash flow to equity, we will also have to make adjustment for delta preference shares.
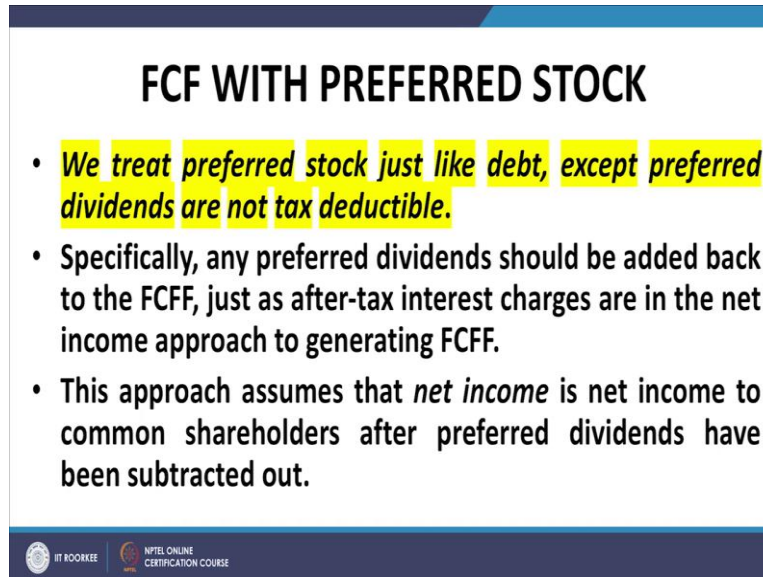
In other words, if there as a repayment of preference shares, that will need to be deducted. You see if the treatment is absolutely parallel to the treatment of dept except for the fact, that on the dept, you get an interest tax shield on the interest. However, you do not get an interest tax shield on the amount of preference dividend. And therefore, I repeat, if this PAT is before preference dividend, deduct preference dividend without any tax adjustment, deduct the absolute amount of preference dividend, PAT minus DP say.

And the second thing is, you have to add another term, that is delta preference share, preference share that represent the change in the preference capital due to any fresh issue of preference shares or a repayment of existing preference shares. So, this is important. Now, what happens to the free cash flow to the firm, let us look at it. What happens to the free cash flow to the firm? Now, if we start from PAT, let us assume that we start from PAT.

If the PAT, has preference dividend in it, it is fine. We do not have to make any adjustment. But if the PAT does not have preference dividend in it, we need to add back preference dividend just like interest has been added. We have added the term I into 1 minus T because preference interest was debited to the profit and loss account, in arriving at PAT. If

preference dividend is debited to the account and PAT is after preference dividend. We will have to add back preference dividend and if the PAT is before preference dividend, then we have to make no adjustment here. Please note this important point.

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So, we keep preference stock just like dept except that preference dividends are not tax deductible, that is the bottom line. We treat preference stock just as dept, except that preference dividends are not tax deductible. And therefore, we do not get a tax shield on preference dividends.
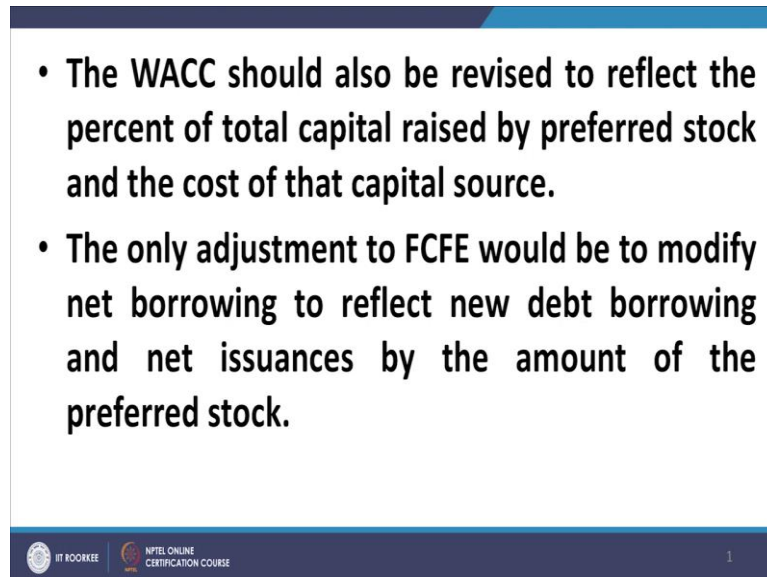
Any preferred dividends should be added back to the free cash flow to the firm. As I mentioned, if just as after tax interest charges are to the net income approaching generating FCFF. This is provided and this is provided, the preference dividend has been deducted from the PAT, if the preference dividends have not been deducted from the PAT, then obviously you do not need to add them back.

This approach assumes that net income is net income to common shareholders after preference dividends have been subtracted out. So, that is what I mentioned, that if the preference dividend has been deducted from PAT, then you have to add it back. If it has not been deducted, you have to do nothing while calculating free cash flow to the firm. And as far as free cash flow to the equity is concerned, you need to have PAT which is after preference dividend to start with.

And you need to make no adjustment for preference dividend. If the pat is before preference dividend, deduct preference dividend because that is not available to equity shareholders.

And if the PAT is before preference, after preference dividend, you do not have to make any adjustment. Of course, delta preference shares will come into play.
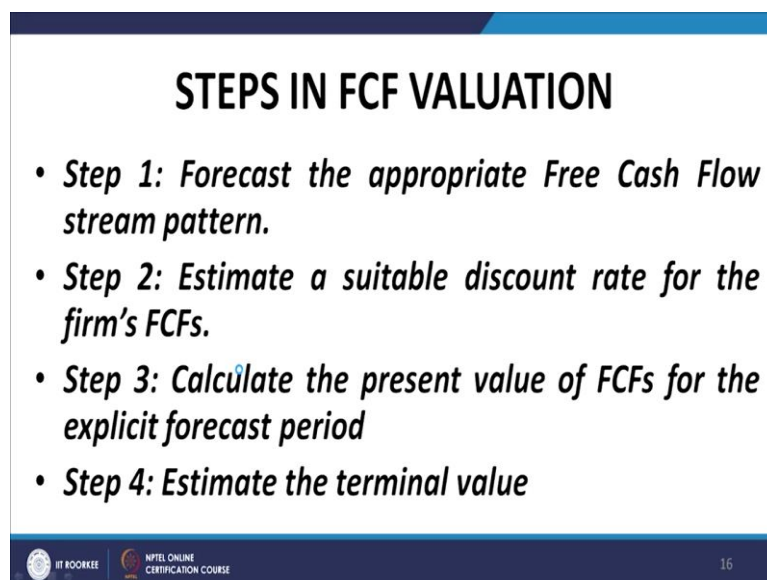
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- The WACC should also be revised to reflect the percent of total capital raised by preferred stock and the cost of that capital source.
- The only adjustment to FCFE would be to modify net borrowing to reflect new debt borrowing and net issuances by the amount of the preferred stock.

And secondly, the WACC has also to be revised to account for the preference, the shareholding or the preference dividend, when you work out the weighted average cost of capital naturally, the impact of the presence of preference shares will have to be incorporated while working the weighted average cost of capital. Steps in free cash flow valuation, let us quickly go through them.

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STEPS IN FCF VALUATION

- **Step 1:** Forecast the appropriate Free Cash Flow stream pattern.
- **Step 2:** Estimate a suitable discount rate for the firm's FCFs.
- **Step 3:** Calculate the present value of FCFs for the explicit forecast period
- **Step 4:** Estimate the terminal value

Number 1 forecast the appropriate free cash flow stream pattern. So, then nothing I will come back to it later. And in fact, estimate a suitable discount rate for the firm's free cash flow, this

should reflect the riskiness of the realization of the free cash flows. In fact, the numerator should be the expected free cash flows and the denominator discount rate should reflect the riskiness in the realization of those expected cash flows.

Calculate the present value of free cash flows for the explicit forecast period, assume a terminal value. Because we have an infinite stream of cash flow. So, we need to split it up into two parts, the explicit forecast period. And then at the end of that explicit forecast period, what else is the value of the remaining infinite stream. And that can be that can be worked out, as in the case of dividends, we will come back to it.

In step 5, at present value of terminal value to arrive at the firm's value, value significant non-operating assets separately, and the value of the firm is the present value of cash flows during the explicit forecast period plus terminal value plus value of non-operating assets. So, these steps are pretty logical, pretty simple and pretty straightforward at least on paper, they seem to be so. Then we deduct from them.

If we want to work out the equity, deduct from the value of the firm, we deduct the value of equity shares, I am sorry, if we deduct the market value of debt to arrive at the value of equity divided by the number of equity shares to get the intrinsic value per share, compare the intrinsic value with the prevailing market price and take appropriate decisions. When estimating terminal value, I mentioned that just a few minutes back.

As in the case of dividends, the two standard procedures are either you impute a regular pattern of growth of cash flows at the end of the explicit forecast period or you estimate a particular multiple and on the basis of that multiple you work out the value of the firm at the end of the explicit forecast period. I repeat number one, you use the Gordon model, that is you assume uniform growth rate of a free cash flows at the end of the explicit forecast period.

And then sum it as an finite geometric progression to arrive at the value at 30 equal to the explicit forecast period. And or you assume a particular multiple that the, like the PE ratio, you estimate a particular multiple like the PE ratio, forecast the earnings at the end of the forecast horizon, exquisite forecast horizon.

And then on that basis, using the earnings and the PE ratio, you work out the price or the value of the firm at the end of the explicit forecast period. These are the two commonly used approaches. Of course, instead of using the PE ratio, you can use P to book value as well.

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This slide gives you the working of the free cash flow to equity and free cash flow to the firm on a user's basis. So, far, we have been focusing on the, on the calculating of free cash flows to the firm and free cash flows to equity on the basis of sources. So, cash flow from operations and all other things deducting from capex and so.

Here, the we are working out it from the other side of the balance sheet that is from the user side. And this, this formula are pretty much self-explanatory. And they arise simply because the balance sheet must tally and on the equality of the assets and liabilities side we arrive at this formula by using the formula that we arrived at in the context of calculating free cash flow from sources side.

Now, we come to a new concept adjusted present value. Now discount, the what does the enterprise DCF do? Enterprise DCF discounts the free cash flow to the firm with, with the weighted average capital. Now this approach works reasonably well, when the company targets a constant dept to value ratio.
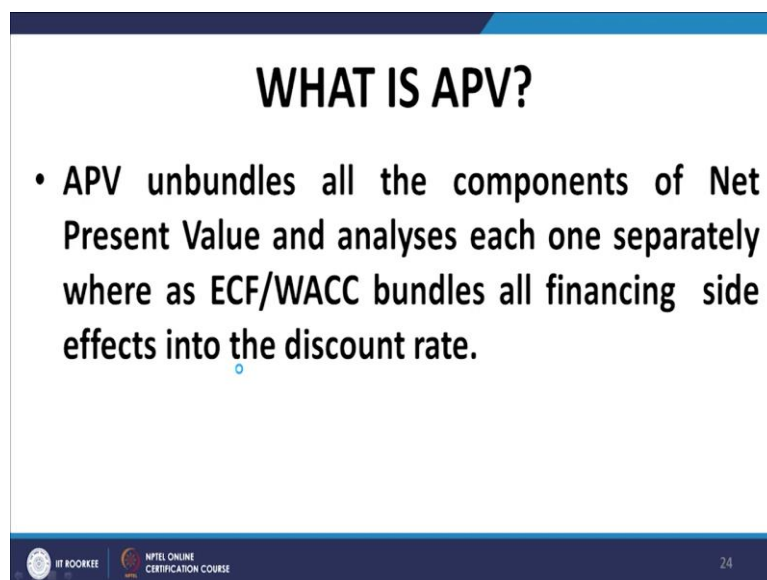
This is the fundamental premise on which the, you see because the important thing is that we are, we usually assume a constant, although it is not mandatory, but we usually do that, is to assume a constant working, some constant WACC weighted average cost of capital over the life of the firm. And on that basis, we do not change the WACC, from year to year that is the normal practice. Now that implies, that implies that we are having a constant dept to value ratio.

Because if the depth to value ratio changes from year to year, naturally the weighted average cost of capital would change, not only because the weights are going to change, because possibly the riskiness of the debt and equity, the relative riskiness of debt and equity would also change. And as a result, the weighted average cost of capital would change. So, the enterprise DCF method, which assumes a constant WACC works, is good enough, only when the company has a constant debt to equity structure.

And the enterprise DCF method is used, when the cash flows of the target in the case of acquisitions are perceived about as risky as that of the acquiring company. And therefore, the target company will maintain a similar capital structure as that of the acquiring company. So, that is why, we can use the target dept equity ratio which is usually the dept equity ratio of the acquiring company to value the acquired company.

That is what the enterprise DCF dictates. However, when this, this assumption breaks down, or in situations where the weighted average cost of capital could change over the valuation period, we are, we can use an alternative to the enterprise DCF, which is called the adjusted present value approach. The adjusted present value is a good alternative, when the company is target in absolute amount of debt.

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So, what is adjusted present value? The adjusted present value, unbundles all the components of the present value and analysis, e analyses each of them separately. Whereas, the enterprise discounted cash flow or WACC bundles all the financing side effects into the discount rate. So, that is the difference. In the adjusted present value, we segregate all components of the

valuation that is, as you shall see just now, that is the value of the free cash flows, value of the debt related costs, bankruptcy costs and so on.

And then we arrive at a composite algebraic sum of all these values to arrive at the value of the firm. So, this is important or this is useful, because each of these components that contribute to the value of the firm may have a separate riskiness level. And therefore, may require, may mandate the use of a different discount rate. Let me reiterate, in any in its generality, what the adjusted present value would do?

It would split up the various components of the valuation for example, the even the free cash flow to the firm component or the part relating to the free cash flow to the firm, we would split it up into the free cash flows to the firm as if it was totally equity financed. Then we would work out the benefits or costs or shifting or replacing equity by the desired amount of dept. And then we would also work out the implications of that dept in terms of bankruptcy costs.

And even we can also account for flotation costs, if the raising of dept entails the certain amount of flotation costs, we can consider that. So, all these separate components can be valued separately, using different discount rates. That is the underlying thing. That is the important thing. We may use different discount rates, depending on the riskiness of each of these components, we will go to the determination of the value of the firm, as a whole.

That is the advantage of adjusted present value. So, how does it work in practice? Let us see this, this was a general definition that I alluded to just now. But how does it work in practice, let us see. What we do is first of all, we value of the entity as if it was entirely equity finance. We ignore all costs and benefits arising from the introduction of dept into the capital structure, we simply use or we simply presume, that the firm is totally equity finance.

We work out the cash flow on the basis that it is totally equity finance, we use the unlevered discount rate, unlevered cost of equity rather. And on that basis, we work out what is called the base case value of the firm BCV, base case value. I repeat, what is base case value of the firm? The base case value of the firm is the value of the firm on the presumption on the hypothetical notional presumption, that it is entirely equity finance.

The numerator that is the cash flows, must be worked out on the basis that there are no debt funding costs here and the denominator should be the unlevered cost of equity. Unlevered, because we are working on the premise that the enterprise is totally equity financed. And

therefore we must use the unlevered cost of equity. And work out what is called the base case NPV. From the base case NPV, to the base case NPV rather, we make algebraic conditions, algebraic means with a sign.

If there is a value addition, we add it if there is a value subtraction of decrease in value is subtract it. When we introduce dept into the capital structure, what happens to the value of the firm? If it improves, if it increases on account of the interest tax shield and so on and such other things, we consider the present value of those benefits. Now, here lies the benefit of a adjusted present, present value method.

You can use an appropriate risk adjusted discount rate for the valuation of the debt related benefits, that is compatible with the riskiness or otherwise in the realization of, for example, the interest tax shield. How likely you are to be able to realize the interest tax shield, you must understand one thing, the tax shields are going to be realizable, they are going to be adding value only if the company has enough profits or taxable profits, to absorb those tax shields.

If the company is in losses, the company may not be able to derive the benefit of those tax shields. So, in order that the company has obviously benefits of the tax shields, it must be able to generate sufficient amount of taxable profits to absorb those tax shields. And thereby reduce your overall tax amount. If there are no profits, there are no taxes. So, there is no question of reduction in the taxes, unless of course, you can carry forward that loss to future years.

So, that is the important point here. In other words, when you are working out the, the impact of dept financing in terms of tax shields and so on, you need to use a discount rate, which is appropriate to the probability, the riskiness or otherwise of the realizability of those tax shields. And the APV method allows you to do precisely that.
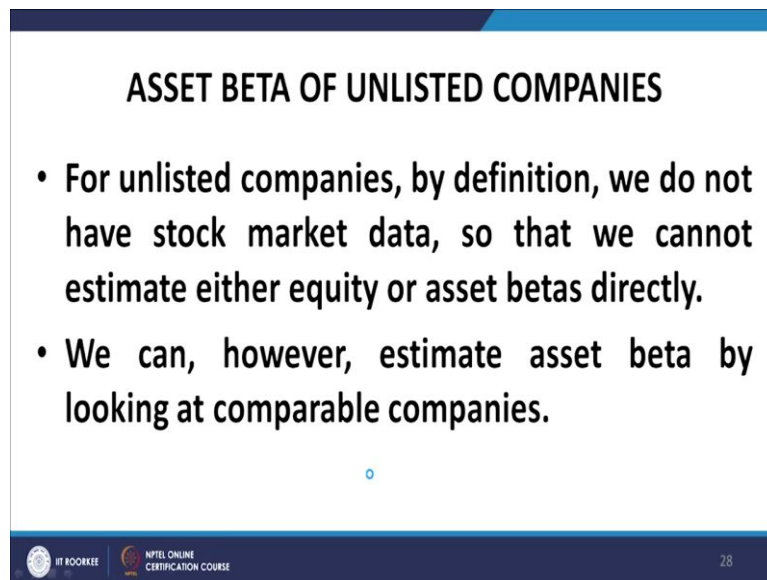
And of course, if there are, if you are having high amount of debt, there is a possibility of bankruptcy, which may entail incurring a bankruptcy costs, you can assess that, evaluate that on a subjective basis and take and take cognizance of this, while calculating the value of the firm. So, what are the steps in adjusted present value? Number one, calculate base case NPV, that is the present value of the free cash flows to the firm.

To equity assumed, assume that entirely their equity finance and then discount the cash flow so obtained at the unlevered cost of equity. How we work out the unlevered cost of equity?

we can use the CAPM method for that, KU, KU is the unlevered cost of equity is equal to RF plus beta A, what is the beta A? Beta A is the asset beta. In other words, it is the beta of the firm, we will talk about beta in a later section of this course, when we talk about portfolio management.

But for the moment, beta A is a measure of risk, measure of the sensitivity of the firm to the, to the market circumstances. In other words, it is an indication of how the firm reacts or the share stock of the firm reacts in response to market value changes or market price changes, and into the risk premium. So, this is the formula that is propounded by the CAPM of William Sharpe and we can use this for working out KU, that is the unlevered cost of equity flow.

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Now, how to work out the beta of an unlisted companies? See, as I mentioned just now, beta is the indication or is indicative of the responsiveness of the stock of the company to the market environment or the to the market stock. In other words, simply stated it is a measure of market risk, how the stock of your company or your holding or your portfolio responds to changes in the market, stock market or the market indices of well diversified market indices.

So, that is what is beta, that is roughly what is beta. Here, it is stating simply beta is a measure of the market risk. So, how to measure beta? because that is, that immediately implies that if you are going to measure the beta of a stock, the stock should be listed on the exchange. But, it is not necessary that that valuation access that is given to you may involve a listed company, it may well be an unlisted company.

And therefore, you need to work out the unlevered beta of that unlisted company in order to work out the discount rate appropriate for the valuation of that unlisted company. How do we go about it? What we do is, we identify a set of companies which are comparable to the company that we are going to value. Say, 10 50 or 100 companies, which are of similar dimensions in terms of the project, product range turnover, a capital structure and so on, which are analogous to which, which have a close similarity with the company that you are assigned the valuation exercise.

So, on that basis you calculate, because these companies have you take the set of these companies, which are listed companies, not unlisted companies. So, using this set of companies, which are listed companies, what you do is you use their stock prices on the basis of their stock prices, you are able to work out the beta of these 10, 50 or 100 companies in your comparable size, comparable set or comparable sample. You, using the leverage from the balance sheets of each of these companies, you unlever the beta of each of these companies. The process, the formula would be the same as that is given here.

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Formula 1, you use the debit equity ratio of the various companies from their respective balance sheets, the latest equity ratio, and on that basis, you work out the asset beta or the unlevered beta of these companies, of this sample of 10, 50 or 100 companies as the case may be whatever number of companies you find, and you choose as the comparable set. So, now you have the unlevered betas of all these comparable companies.

You take some kind of a good average of these companies, maybe a turnover weighted average, or a market capitalization weighted average or even a simple average. You take

some kind of an average of the beta unlevered betas of these companies, this would serve as the unlevered beta of the unlisted company, that you are given the exercise of valuation. So, to calculate the base case, NPV of this company of your company, that you are doing the valuation, what you do is, you work out the free cash flows on the basis that the company is entirely equity finance.

And then you discount this free cash flows using the unlevered beta, that you have arrived at by the process that I have just enumerated. Then you, then the next step is to calculate the tax shields. The tax shields, the calculation is not so difficult. You know, the amount of interest that is debited to the profit and loss account of any year. You multiply it by the average tax rate, you get the amount of tax shield. And what is the amount of interest, it is the amount dept into the interest rate.

So, the tax shield for any year will be equal to the interest rate into amount of dept into the tax rate, this gives you the tax shield for a particular year. Now, I strongly emphasized for the calculation of the value of this tax shield, we can assume that this tax shield would be perpetually available to us. And value, this tax shield as a perpetuity. But the important thing here is using what discount rate?

The discount rate, that you are going to use is as something which you have to be very sensitive about, very careful about. Because the nuisances, that are involved in the working out, out of the out of the discount rate at which to discount the tax shields, are quite significant. You need to have some basic knowledge of the tax structure as well as the provisions of the law govern taxation legislation.

And on that basis, and also taking into account, the business risk of the enterprise, as I emphasized a few minutes back, the realizability of the benefit of tax shields depends on the fact that there would be adequate taxable profits to absorb those tax use. If a company is in loss, and it is expected to be in loss for a substantial period of period of time, then the tax shields may not be benefit, beneficial or may not contribute to the value of the firm. They may lapse without being taken advantage of.

For example, in India we can carry for business losses up to eight years. So, if a company does not recover this, the benefit of these tax shields within the period of eight years then they get lost forever. So, the important thing I want to emphasize is that when you are working out the value of this tax shield, you must consider the riskiness in the realization of these tax shields.

There are two common approaches to the, two common approaches, the two ends of the spectrum you may say. Number one, you use the cost of dept for the purpose of discounting, that is one approach. And that, that is justified on the account that you will be able to realize taxes, there are adequate profits, but the, whenever you pay interest or to the company and if you are not in default in payment of interest, then the tax shields would be realized.

In other words, the realization of tax shields or the risk of realization of tax shield is equivalent to the risk in non-defaulting on the debt. If the riskiness of default on the debt or otherwise is mirrored by the riskiness of the, is mirrored by the riskiness in the realization of tax shield.

So, that is one approach. The other approach is that the realizability of tax shield mirrors the business risk of the company in which you would use the beta of the company or the discount rate that is the, that reflects the business risk of the company for calculating the for discounting the tax shield.

So, these are two extremes which you can consider. But this, the adjusted present value method gives you the flexibility to choose any appropriate discount rate which you believe is representative of the risk in the realizability of these tax shields. Bankruptcy costs are also another part, if there is a high amount of debt in the company and there are chances of the company going bankrupt, a company falling on the bad days and the possibility of bankruptcy is genuine, is significant.

Then you have to account for as you should take account for the bankruptcy cost, make a subjective estimate of bankruptcy costs and incorporate it into the adjusted present value computation. The next is the capital cash flows model, which I shall take up in the next lecture. Thank you.