Security Analysis and Portfolio Management
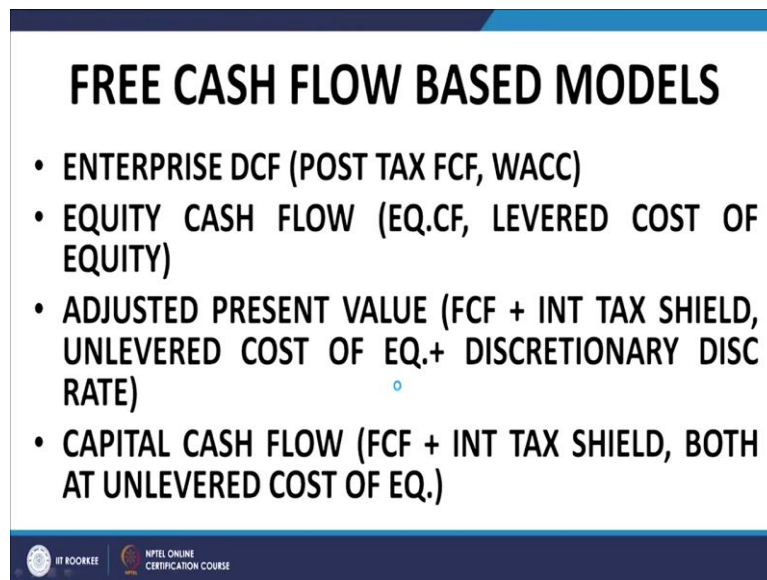**Professor J P Singh**
Department of Management Studies
Indian Institute of Technology Roorkee
Lecture 27
Equity Valuation - IV

Welcome back. So, let us continue from where we left off after a quick recap. In the last lecture, I was talking about the variance of free cash flow and started discussing the concept of free cash flow. And its use for the valuation of a company and the equity shares of the company. And I discussed, I introduced the following variants of free cash flow.
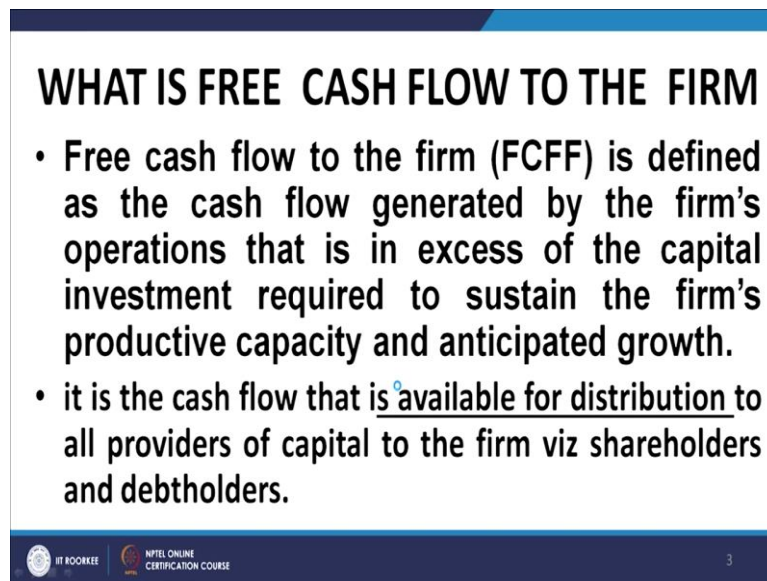
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One was the enterprise discounted cash flow, enterprise DCF. Then we had the equity cash flow discounting method, we had the adjusted present value method and then we had the capital cash flow method. These are all variants of free cash flow, the nuisances of which we shall come to know during the course of this lecture.

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WHAT IS FREE CASH FLOW TO THE FIRM

- Free cash flow to the firm (FCFF) is defined as the cash flow generated by the firm's operations that is in excess of the capital investment required to sustain the firm's productive capacity and anticipated growth.
- it is the cash flow that is available for distribution to all providers of capital to the firm viz shareholders and debtholders.

So, what is free cash flow to the firm? We define this expression free cash flow to the firm is defined as the cash flow generated by the firm's operations, that is in excess of the capital investment required to sustain the businesses, to sustain the firm's productive capacity and anticipated growth.

In other words, it can be said to be more precisely the cash flow that is available for distribution to the providers of long term funds to the company to the providers of capital to the company, company that is the shareholders, the preference shareholders and the lenders, the long term lenders who have provided, who have lent long money or long term basis to the company. And how do we compute roughly? How do we compute the free cash flow to the firm?

Free cash flow to the firm is the surplus cash flow that remains after meeting all operational cash expenses, taxes, necessary capital expenditure and escalation in networking capital. So, we discussed this in the last lecture. As far as the free cash flow to equity is concerned, it is the cash flow that is available for distribution to the equity shareholders. In other words, after meeting the claims of the long term lenders as well as the preferred shareholders, after meeting their claims, whatever remains for the equity shareholders is called the free cash flow to equity.

It is calculated by the surplus amount remaining after meeting all operational cash expenses, interest in taxes, preferred dividends, necessary capex and the escalation in working capital, if any. Now, how do we compute the value of a firm using the free cash flow to the firm

method and the free cash flow to the equity method? Well, we use the enterprise DCF which gives us the value of the enterprise.

And how do we get it? We get it by discounting the expected future cash flows over the life of the firm discounted at the weighted average cost of capital, that is the conventional approach to the valuation of the firm to calculate the intrinsic value of the firm. I repeat, in the, in the enterprise DCF method, what we do is we work out the expected cash flow stream over the remaining life of the firm, which is usually assumed indefinite.

Because of the going concern assumption, and we discount that at the weighted average cost of capital which is assumed to reflect the riskiness in the realization of the expected cash flows. As far as the equity discounting, discounted cash flow approach is concerned, what we do is we discount the expected equity cash flows or the free cash flows to equity at the cost of equity, which is assumed as the, required rate of return to equity shareholders.

And which reflects the riskiness of the realization of the expected cash flows. Now, this is a very important point you see, before I get into this, I must emphasize that whenever we talk about a valuation exercise or an analysis exercise in finance, we have to focus on or we have to ensure compatibility between the various parameters that we are using.

When we are using discounted cash flow approaches to the valuation of an asset or a company or equity, any entity for which is to be valued, then we need to consider the relationship between the cash flows that are being discounted and the source of those cash flows. In other words, very important that when you are discounting the cash flows, the value that you will get is the value of the assets that are generating those cash flows.

Conversely, if you want to value an asset, we should consider the cash flows that are pertinent to or that have an access with the, the asset that is being valued. So, here, because we are valuing the firm and we are, we are focusing on the cash flows that are generated by operations. So, what we will get on the left hand side is the value of the operations of the firm.

So, I repeat, I reiterate this very fundamental principle and a very important principle, which is occasionally overlooked by the students, that is that there must be compatibility between what you are valuing and how you are valuing. If you are considering the valuation of an asset, you must relate the cash flows that are relevant to that assets that are expected to arise, that are expected to arise from that asset.

If you are valuing equity, you should relate those cash flows, which are expected to relate to the equity as we have talked about in the case of free cash flow to equity discounting. So, this is very important, in the case of, in the case at hand the case that we are considering here, because we are considering the cash flows from the firm, we shall be getting the value of the firm. And because these cash flows from the firm relate to the operations or are being, the cash flows that emerged from the operations of the firm that is the routine business of the firm.

We must therefore, or we will get therefore the value of the operations of the business, the value of the business value of the entity comprising of its operations, the routine operations, business operations. What it means is or, or what needs to be emphasized as a sideline is that those assets which do not contribute these two these cash flows will not be included in the valuation that we get on the left hand side of this equation.

I repeat those assets, who do not contribute to the generation of the cash flows that we are discounting will not form part of the valuation. And therefore, they have to be valued separately and after valuing them separately on an appropriate basis using an appropriate method, the value of those assets need to be added to the value of operations to arrive at the total value of assets of the firm or the total worth of the firm.

So, this is a very fundamental thing, that the DCF valuation of the firm gives us the value of the operations of the firm. Non-operating assets, which do not contribute to the free cash flows to the firm that is there in the numerator will not form part of the valuation that you get on the left hand side. That value or the value of those non-operating assets needs to be calculated separately and then added on, to the value of operations that will get by the DCF method to arrive at the total value of the worth or total worth of the firm.

So, non-operating assets should be valued separately and added to the value of operations to get the total value of the enterprise. I reiterated, reiterated this principle of consistency or compatibility you may say, compatibility between what is being valued and generation of the valuation valuing stream. Significant non-operating assets, such as excess cash, not total cash is represented in the balance sheet.

Because part of it may be necessary for the smooth sustenance of the business operations, that will obviously form a part of the working capital, but this excess cash which is not required by the business as such, excess marketable securities, investments land held for investment purposes surplus land which is not contributing to the generation of cash flows, all these

things will need to be valued separately and then added to the value of operations, worked out by the enterprise DCF method.

Now, non-operating assets why value separately? The reason I have explained; we have to be consistent. Because, the cash flows that we are working out the cash flows that we are calculating or cash flows of operations and therefore, they will give the value of the operations only. The capital value that we arrive at is the capital value of the future cash flows from operations and that represents the value of the operations.

And number 2, there is another important point in this and that is, that certain assets may not be amenable to DCF valuation, they may not generate cash flows. And as a result of it, they may not be amenable to DCF valuation. For example, you can have surplus land which is not contributing to cash flows. You can have marketable securities for which your short term investment has been made by the company.

You can have investments in associate concerns. Again, which may not be valued on the basis of cash flow, you can have shares in a company which is approaching liquidation, which is in winding up again in, that cannot be DCF valuation, cannot be used for the valuation of those things. So, there can be multitude of situations, where the assets are not amenable not compatible with the methodology of DCF valuation.

Then you can have contingent claims like options, options again, are not very amenable to DCF valuation, you have to use different option pricing methods, patents, copyrights, unexploited assets and other options there. These are examples of assets where the standard DCF valuation may not be justified. Similarly, if some assets are inefficiently or inadequately utilized, like the example I gave you of surplus land, you may have difficulty in valuing them using a DCF methodology.

They may need to be valued on the basis of the current market value or liquidation value as the circumstances may direct. So, when, when do we or when should we use free cash flow to the firm valuation, when the company has negative free cash flows to equity in other words, if the company has a regular sustained stream of free cash flows to equity, it would be easier to do the valuation directly of equity using the free cash flow to equity discounting.

But however, if the structure, the capital structure involves a lot of depth, a significant amount of depth, then and if the, if the there is substantial volatility in the cash flows to equity, then it would be better to use the free cash flow to the firm method and use it for the

valuation of the firm. And then from there, work out the value of equity. Now, so, I just mentioned that free cash flow to the firm is more compatible when the company has a substantial amount of debt.

And the capital structure is not particularly, not particularly stable. In other words, if the capital structure is volatile, because of the existence of substantial amount of depth, it is the free cash flow to the firm method which is more appropriate. And if it has a stable capital structure with a regular stream of FCFE, then of course, FCFE can be the preferred approach. Merits of the free cash flow models, your dividends share purchases and share issues have no effect on DCA, on FCFF and FC FE.

Changes in leverage also have a minor effect, when you calculate FC FE and FCFE within certain ranges. Of course, if the change in leverage is substantial, then naturally there would be distortions between the FCFE and the FCFF. Then the free cash flow methods are more rational than income based methods, because of the reason I mentioned, right at the introduction of this particular topic. Cash flows are the preferred mode of valuation or preferred basis of valuation.

Because they are more, they are less susceptible, they are less susceptible to accounting adjustments, accounting policy changes and the impact of use of different accounting policies across the firm spectrum or the various firms in an industry. Then, free cash flow method also considers cash flows that do not appear on, in the income statement like capital expenditure, as well as escalations and networking capital which may not find its way into the income statement but do find its way, or do find their way into the free cash flow calculations.

Now, the ownership perspective I also alluded, as far as the ownership perspective is concerned when we talk about the free cash flow models, the ownership perspective is that of an entity or that of a valuer, who can change the firm's dividend policy. And in other words, here it is, he has a control perspective, he is not bothered by how much dividend is going to be declared. Because at the end of the day, he could be a significant contributor to the decision making and so far as the dividend policy is concerned.

And therefore, what is actually the actual dividend policy carries no significance for him, as in when he takes over the control or the ownership of the company or if he have the ownership of the company, he can very well dictate and alter the dividend policy and adjust the dividend rates accordingly.

So, what is more important, what is more pertinent for a person who is having that that kind of a stake is that he should know, what is available for distribution rather than what is actually distributed. Because, what is actually distributed can be managed by him, what is available for distribution is what he would be willing to pay a price for. The ownership perspective in the dividend model is that of a small shareholder, who does not have much say in the affairs of the company in ground reality.

And who is more satisfied than not, with the amount of dividend stream, that is, he is receiving from his ownership of the shares of the company. And of course, if investors are willing to pay a premium for the ownership of an entity naturally, there would be divergence between the valuation that is arrived at on the basis of the free cash flow basis model and the dividend discounting model. So, then we quickly recap, this is a very important slide. We recap between the free cash flow to the firm and free cash flow to equity.

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Free cash flow to the firm as worked out from the perspective of a bucket of investors, that bucket of investors consider, consists of the long term lenders, long term providers of capital which may include the long term lenders, the preferred shareholders and the equity shareholders. Free cash flow to equity is calculated from the sole perspective of equity shareholders.

And again as I mentioned just now, to reiterate, free cash flow to the firm has a perspective of either free or both free cash flows have the perspective that they involve the taking of control or the having a substantial stake to manage the dividend policy of the entity. 3; difference

between free cash flow to equity and dividends, so this is an important thing, important from the point of understanding.

As I have emphasized again and again, free cash flow to equity is the cash that is available for distribution to the equity shareholders. Of course, after meeting all the claims of long term lenders, preferred shareholders and meeting all expected or anticipated capital expenditure and escalations on working capital. So, that is one part, as far as dividends are concerned, they are discretionary.

So, discretionary in the sense that they are recommended by the board of directors and actually declared by the shareholders in general meeting. So, the fact that they are discretionary means that, they can be altered at the level of the decision, the top level decision making of the company. Usually what happens is that, the companies they tend to maintain a smooth rate of dividend, a smooth trend in dividends, maybe usually.

And that dividends are not as volatile as the free cash flows may be in times of recession, companies may be reluctant to cut down on rates of dividends and in times of boon, they may be preferring to retain a substantial part of the profits and maintain the reasonable growth rate maintain a conservative growth rate and dividends. So, what the takeaway from this the message that I want to convey is this that, dividends may be, the dividend stream may be influenced by the extraneous influences of the shareholders and the board of directors.

Whereas, the free cash flow to equity reflects the performance of the company and so far as the operations are concerned. So, when to use the free cash flow models? We will discuss that, but let us quickly recap. The company does not pay dividends, the company pays dividends, but the dividends paid vary significantly from the company's capacity to pay dividends. Free cash flows align with profitability within a reasonable forecast period.

And the investor takes a controlling perspective. So, these are four situations, where it would be more appropriate to use the free cash flow model rather than the dividend discounting model. Now, we can as I mentioned, what we have to value the equity of a company using the free cash flow method, what we can do is either to value the firm by calculating the value of the or the discounted value of the free cash flow to the firm, using the weighted average cost of capital.

The figure you get on the left hand side is the total value of the firm. Of course, for the moment we ignore the issue of non-operating assets, which we have discussed in detail. That

is assume that there are no non-operating assets. So, the value on the left hand side we get the value of the firm, which will comprise of usually the equity shareholders, the preferred shareholders and the long term lenders.

So, if you can deduct their from the market value of the long term lenders or the long term debt that is outstanding with the company, the preferred shareholders, value market value of preferred shareholders, and what you end up with is the residual value, which will reflect the value of equity of the company, this is called the indirect approach or the FCFF approach to equity valuation.

Then we have the direct approach for equity valuation in the, in this direct approach you simply discount the free cash flows to equity at the cost of equity or the required return of equity shareholders. And what we end up on the left hand side is directly the value of the equity shareholding of the company. So, we have two approaches to valuation, one is the direct method. Where you straight away discount, work out the free cash flow to equity, which is the cash flow that is remaining after the, again here the issue of compatibility manifests itself.

If we are using the direct method, what we are using is the free cash flow to equity and that is after all the stakes of lenders as well as preferred shareholders are taken care of and whatever remains is the, the cash flow available to equity and what we get on the left hand side is the value of equity. And we can use the indirect method, where we value the or we use the cash flows which are available to the bucket of investors comprising of the lenders, the preferred and equity shareholders.

And what we get on the left hand side, is the value of this entire bucket which comprises of the lenders, the preferred shareholders and the equity shareholders from which if we deduct the market value of lenders and those preferred shareholders, we end up with the value of equity, this is the indirect method. Then just as we have the multistage models in, in the case of dividend discounting, we had a two stage model, we had the H model we had three stage models and so many.

We could have n stage models as well, we can use similar stage modeling, in the case of free cash flows. You see, the issue is here again we have an infinite stream of cash flows to value or to arrive at a finite value on the left hand side. And therefore, we need to impute a certain pattern on this infinite stream of cash flows.

And on the basis of the understanding or the perception of the analyst, we can use that, you can split up that infinite stream into any number of stages that he deems, representative of the prospective progress of the firm in the future. And on that basis, he may use one stage model, the Gordon model or the two stage model with a high growth rate initially and then a low growth rate or the H model with a gradual fall in growth rates and in n types of such models can be used.

You see the basic thing is, you have to sum an infinite series that is, what is the end, at the end of the day, the math behind this. And to involve that math, we need to give it a financial reasoning based on the understanding or the perception of the analyst. How do we compute the free cash flow to the firm? This is interesting.

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COMPUTATION OF FCFF

$$FCFF = EBDIT(1-T) + DT - CAPEX - \Delta NWC$$
$$= (EBIT + D)(1-T) + DT - CAPEX - \Delta NWC \quad (1)$$
$$= EBIT(1-T) + D - CAPEX - \Delta NWC \quad (2)$$
$$= (PBT + I)(1-T) + D - CAPEX - \Delta NWC$$
$$= PBT(1-T) + I(1-T) + D - CAPEX - \Delta NWC \quad (3)$$
$$= PAT + I(1-T) + D - CAPEX - \Delta NWC \quad (4)$$
$$= CFO + I(1-T) - CAPEX \quad (5)$$

Now, we what we do, the formula for calculating free cash flow to the firm is given on this slide from various sources. So, if we start from EBDIT, then we take the post-tax EBDIT and EBDIT means, earnings before depreciation interest in taxes. We multiply it by 1 minus the tax rate to get the post-tax EBDIT. We add the depreciation tax shield, we deduct capex and that is the incremental amount that is given or that is used in the financing of capital assets.

And we also deduct delta NWC, that is the incremental increase in net working capital. Now, EBDIT is nothing but EBIT plus depreciation. So, on that basis, we get the second formula, that is EB, this is, this is formula number 1 the first one. Then this is formula number 2, then using, noting that EBIT is nothing but PBT plus interest, we get formula number 3. And then knowing that PAT is nothing but PBT into 1 minus T, we get formula number 4.

And then formula number 5, represents the same in terms of the cash from operations, CFO is the cash from operations. Please note if we are using cash from operations for calculating free cash flow, then we need not include away, need not add the depreciation. Because CFO itself is the, is adjusted for the depreciation being the cash, cash flow it is adjusted for depreciation.

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EFFECT OF INTEREST & DEPRECIATION

		By EBDIT	100
Depreciation	0		
Interest	0		
Tax	30		
PAT	70		
CASH FLOW	70		o

COMPUTATION OF FCFF

$$FCFF = EBDIT(1-T) + DT - CAPEX - \Delta NWC$$
$$= (EBIT + D)(1-T) + DT - CAPEX - \Delta NWC \quad (1)$$
$$= EBIT(1-T) + D - CAPEX - \Delta NWC \quad (2)$$
$$= (PBT + I)(1-T) + D - CAPEX - \Delta NWC$$
$$= PBT(1-T) + I(1-T) + D - CAPEX - \Delta NWC \quad (3)$$
$$= PAT + I(1-T) + D - CAPEX - \Delta NWC \quad (4)$$
$$= CFO + I(1-T) - CAPEX \quad (5)$$

Now, in the arrival of these formulas, we need to look at the impact of interest and depreciation. Let us look, take a simple case. Let us say the EBIT of a firm is 100, EBDIT, I am sorry. EBDIT of a firm is 100. And let us assume that to start with that both depreciation

and interest was 0. Then in that case, assuming the tax rate to be 30 percent what we get is taxes 30 percent profit after tax is 70 rupees and the cash flow is also 70.

Because there is no depreciation and hence no adjustment on account of non-cash charges needs to be made. This is the situation that we start with. So, here let us recall the important factors or important features, PAT is 70, cash flow is 70, depreciation is 0, interest is 0. Now, let us see the impact of interest. Now, let us assume that the company is paying 10 units in terms of interest. If the company pays 10 units in terms of interest, the profit before tax goes down to 90 and the tax amount is 27.

And therefore, the profit after tax is 63, the cash flow is also 63. I am talking about the operating cash flow here, in all cases. So, operating cash flow is 63. And again, if you note we do not have to make any adjustment in the profit after tax to arrive at the cash flow. Because the deposition is 0, but the important observation is this, that if you debit an interest of 10 the cash flow changes by how much?

The cash flow changes with 7. The decrease in the cash flow is 7. In other words, the impact of the tax shield, interest tax shield is manifest here. If you are paying 10 rupees of interest on account of borrowings, the actual cash flow decreases by only 7 units. In other words, you can say that the government is financing 3 units or 30 percent of the interest that you are paying to the lenders.

I repeat, if an interest of 10 units is debited to the account, then the cash flow decreases by only 7 units. In other words, you pay 10 units to the lenders, out of these 10 units 7 units is the cost that is born by the company in terms of decrease in cash flow and three units is a finance by the government, which you may assume for the sake of understanding that this three units financed by the government is also added on and then passed on to the lenders.

So, this is the impact of interest and that is why, if you look at this figure here, when we calculate the free cash flow to the firm, what we add back to the profit after taxes I into 1 minus T. It is not the entire I that we add back, we add back I into 1 minus T because the cost to the firm or the on account of interest is I into 1 minus T, I into T is financed by the government it goes directly to lenders you may assume.

And therefore the impact on the company, impact on the company of this interest of I is only I into 1 minus T. I repeat the interest tax shield operates and because of the operation of the interest tax shield, the net cash flow, the net decrease in cash flow on account of payment of

interest of I is I into 1 minus T. Because I T amount decreases on account of tax, I into T amount decreases on account of tax. And therefore the net cost is I minus IT that is I into 1 minus T. Let us now look at the impact of depreciation. Now, let us assume that the interest is 0, but there is a charge of 10 on account of depreciation.

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EFFECT OF DEPRECIATION

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

EFFECT OF INTEREST & DEPRECIATION

		By EBDIT	100
Depreciation	0		
Interest	0		
Tax	30		
PAT	70		
CASH FLOW	70		o

Now, again, the tax amount comes to 27. The PAT comes to 63. But here, you look carefully, the cash flow now becomes 63 plus the amount of deposition that is 73. Now, here we have a very interesting phenomenon taking place. If you are debiting 10 units on account of depreciation, the increase in cash flow that you are getting is, let us go back. The increase in cash flow that we are getting is plus 3.

In other words, the debiting of depreciation is not only, not changing your cash flow, not only not changing your cash flow, it was 70 earlier it continues to be 70. In addition to that, it is giving you an incremental cash flow of plus 3, which is on account of the depreciation tax shield. What is happening is, when you are debiting 10 units on account of depreciation, there is a reduction in the tax liability of plus three units.

The, let us say if the earlier tax was x then you have to pay a tax of x minus 3. So, you get a saving of three units and tax, in other words, the government finances three units of tax. So, this adds to your cash flow. The cash flow, you see the first point is when you are debiting 10 units to the on account of depreciation you are not affecting the cash flow. You are not affecting the cash flow in the sense that, it is a non-cash charge.

But, that is one part of the story. The second part of this story is because you are debiting 10 units to the profit and loss economy. This is a permissible tax deductible expense. Therefore, you the tax amount decreases by three units. And therefore, in other words the cash flow increases by three units. So, there is a dual effect that take place, when you talk about depreciation. So, let us try to compare the interest versus depreciation treatment.

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In the case of interest, the actual cash outflow is I, that you are paying on account of interest. The tax shield is IT, the protection or the saving and tax is IT. And therefore, the net cash outflows are I into 1 minus T. And we, we need to work out the cash flow before the claims of this entire bucket of lenders plus preferred shareholders plus equity shareholders. So, that is why, this I into 1 minus T is added back, when we work out the free cash flow to the firm.

Now, what is the, what happens in the case of depreciation? The actual cash outflow is 0, the tax shield is DT, please note. This tax shield is a cash item whereas, the, the debiting of depreciation is not a cash item. So, we need to add back D into 1 minus T because this is the, it is not a cash flow at all. D if you consider the (())(31:37) factor effect on the debiting of D to the profit and loss account, D into 1 minus T is the effect.

It is the after tax effect of that and that will have to be added back. Why? Because this is not a cash flow, D is the depreciation and this is the post-tax depreciation but being a depreciation, it does not entail any cash flow. However, D into T is also required to be added back, because this is a saving in the amount of tax, that you get on account of, on account of the tax shield on depreciation. And the total amount that needs to be added back is D into 1 minus T plus T which is D, D into 1 minus T plus DT, I am sorry, which is D. As you can see here.

PAT as you can see in equation number 4 here, PAT plus I into 1 minus T plus D. It is not D into 1 minus T. Because D into 1 minus T is one part of it and the second part is DT, which is also a saving, on account of saving in taxation. So, it is D into 1 minus T plus DT, that is equal to D. So, that is how the depreciation and a tax are to be treated, in the case of calculation of free cash flows. We shall continue after the break. Thank you.