Investment Management
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Lecture - 12
Equity Valuation Models

Hello there welcome to the course Investment Management. And so far in this course we have discussed about the basic concepts and philosophies related to investment management. When it comes to decision making about investment management, the first question that comes to our mind is about the choice of assets.

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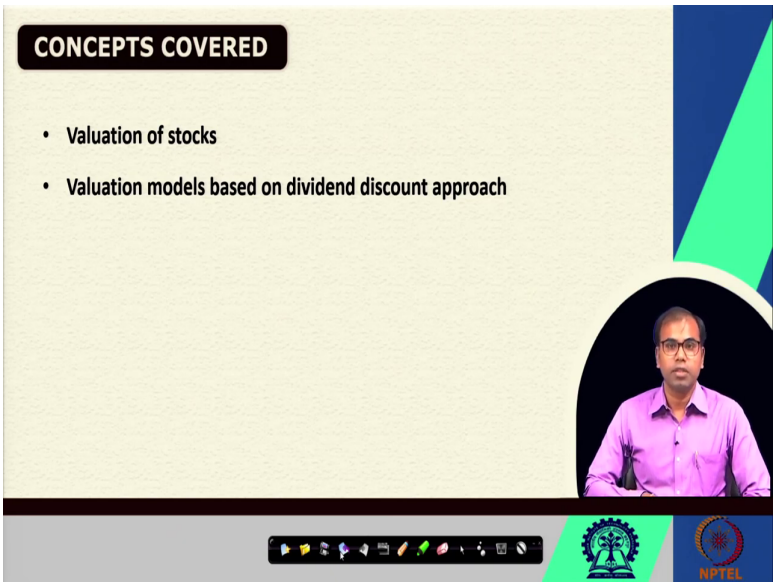

And soon after that we start thinking about the price or the value that we are going to get as part of our investment decision making. So, the natural question is are we paying the right price? Is the value of the asset that we are investing in, correct?

And to answer to these questions we first have to find the intrinsic value of financial assets. Earlier we have discussed about the valuation of bonds where we learnt that yield is something that we should keep an eye on and try to measure different bonds with respect to their yields that is yield to maturity and duration.

When it comes to equity assets, it becomes relatively easier because we know that the equity assets are expected to generate certain value in terms of dividend which are basically interim payment and some sort of terminal value when we sell those equity assets. But at the same time, it becomes tricky. So, to understand more about equity valuation, we will discuss in this session about some models where we will try to see the application of discounting approach or discounting method apply to dividends or cash flows.

So, to start with we will talk about the valuation approaches and then the valuation model based on dividend discount approach and subsequently discounting of cash flow approach.

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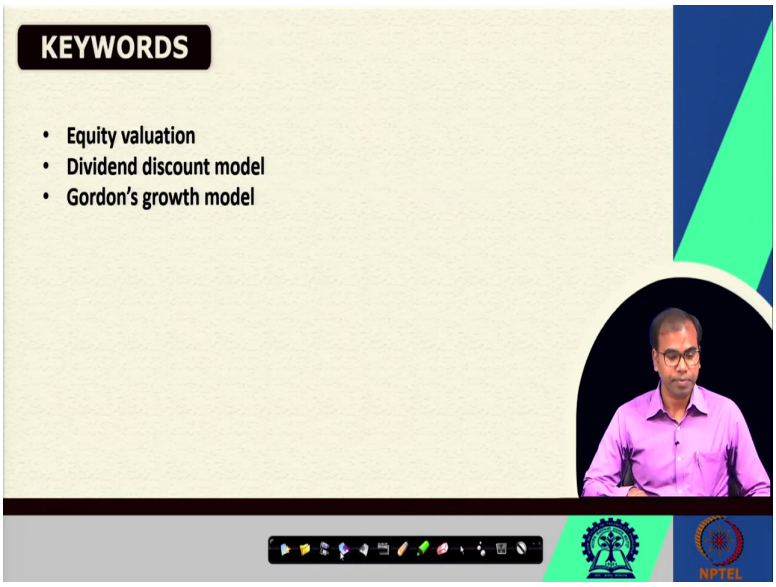

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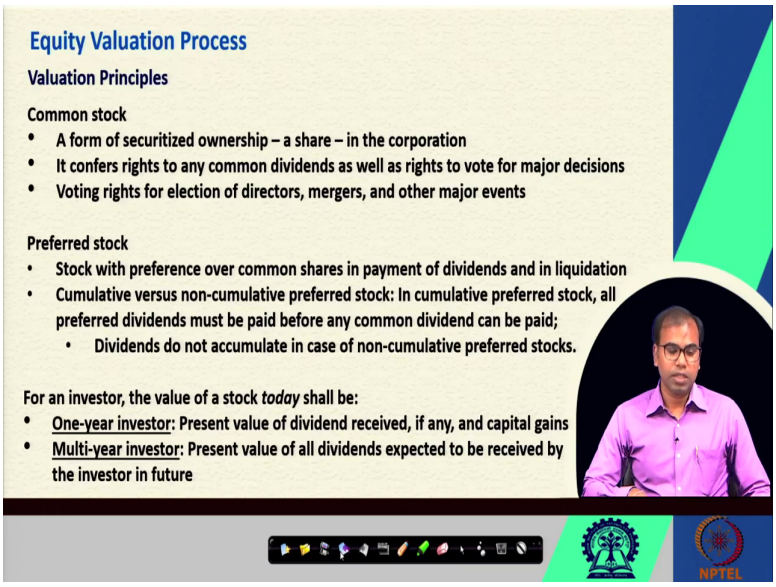

We know that there are two primary categories of shares. One is common equity share which is common stock which is basically a form of securitized ownership and it confers the shareholder that any right to vote for major decision in a company or in a firm.

And they are also entitled to any dividend if the company decides to declare. Whereas, in case of preferred stock, the stockholders who have preferred stocks and have preference over common shares in payment of dividends and in the case of liquidation. Typically, a preferred stockholder is entitled to receive preferred dividend before any dividend is to be paid to common equity holders.

And however, preferred stockholder do not have any voting right. In any circumstances when dividend could not be paid to preferred stockholder, then preferred stockholders are entitled

to receive accumulated dividends. Well, when it comes to valuing the stock or shares, most of the math models assume that we are talking about common stock.

Because common stock have a series of dividends and some sort of future value that we are hoping to achieve or obtain as part of the business growth or the sustainability. In the business where the business is expected to generate certain cash flows in future and those cash flows in part will be given to the shareholders who are owning those common stocks.

For an investor, when it comes to valuing the stock, essentially it could be the present value of all those future cash flows. Earlier we have discussed about present value of calculation method. Here if we talk about one year investor or an investor with one-year period, the present value of dividend that is to be given to the shareholder at the end of one-year and any capital gain which can be achieved after selling the share at the end of one-year will be considered as the value of the stock in today's term.

But when it comes to multi-year investor where an investor is holding a stock for multiple years, essentially the price of the stock or intrinsic value of the stock should be the present value of all the dividends that are expected to be received by the investor in future. Here we assume that the investor might or might not sell the share at the end of multi-period and the value of the share will be considered largely on the in terms of present value of the dividends to be paid to the investor in future.

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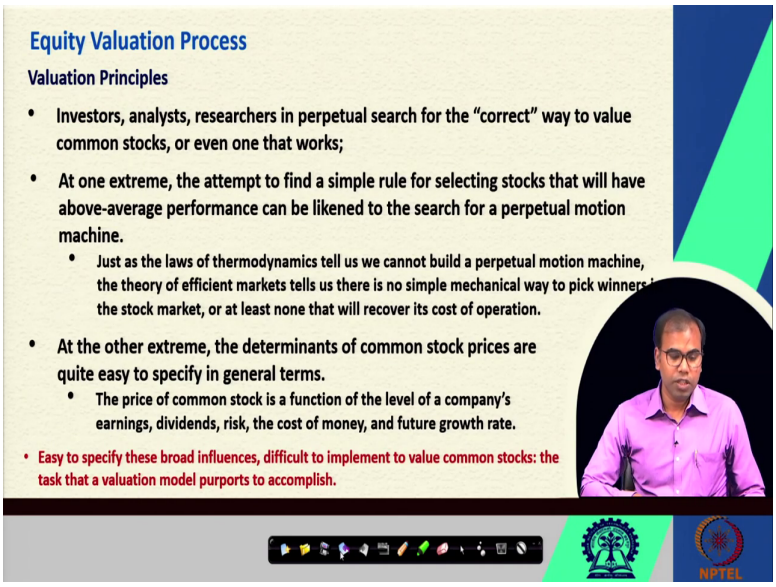

So, to begin with we will try to understand what valuation is and then we will talk about valuation models. As pointed out earlier, investors, analyst, researchers, all stakeholders have been in perpetual search for the correct or true or accurate way to value common stocks or even any method or any approach that actually works in the real world.

There are different approaches on one extreme we have people attempting to find a simple rule for selecting stocks that will have a above average performance and that can be likened in search of a perpetual machine.

Just like the law of thermodynamics tell us that we cannot build a perpetual motion machine in a very similar fashion in financial markets, the theory of efficient market tells us that there is no simple mechanical way to pick winner in the stock market. Here winner implies that a

stock that will always be giving better than average return to the investor or for that matter at least none that will recover its cost of operation.

On the other extreme, the determinants of common stock prices are relatively easier to specify in general terms. For example, the price of a common stock can be considered as a function of the level of companies earnings, dividends, risk, the cost of capital and to certain extent future growth rate. In isolation in most of the time or in some sort of combination.

Well, it is easy to specify these broad parameters or broad influences which essentially determine the current price or the value of common stock, but it is very difficult to implement these parameters or these influences to find the value of common stock and that is where the task of a valuation model purports to accomplish.

Basically, through valuation model we will try to find the intrinsic value of a common stock where we can assume that the common stock is going to pay dividend either for certain number of periods or for perpetuity. And accordingly, we will try to find the present value of those dividends or in case where there is a cash flow, we can try to find the present value of those cash flows. In order to arrive at the current price or intrinsic value of the share in order to make an investment decision.

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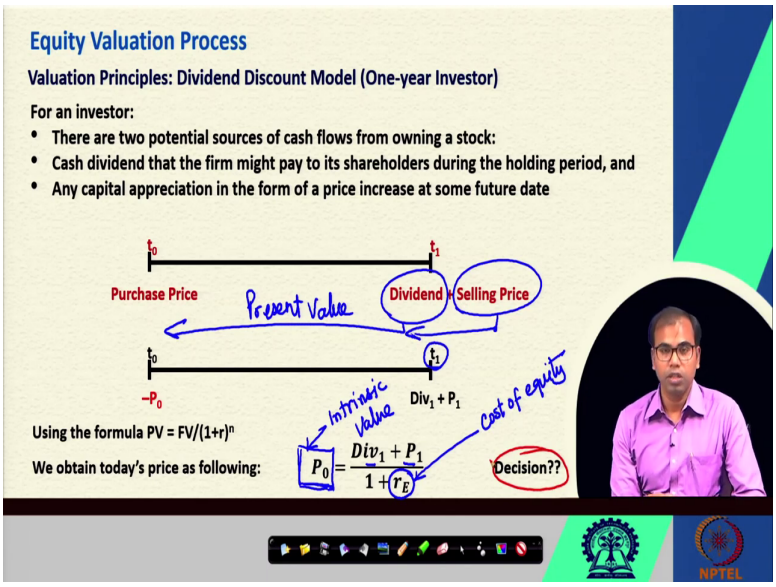

So, first we will discuss about a model called dividend discount model in the context of one-year investor. So, as highlighted earlier for any investor there are two broad sources of cash flows when it or the investor holds a common stock and the these two sources are the cash flow in form of dividend and cash flow in the form of selling price or the value at which the stock is sold at the end of one period.

So, cash dividend that is given by the firm to the investor during the holding period and the capital appreciation or the selling price that might be including the capital appreciation over and above the purchase price. As exemplified earlier if I buy a share for 100 rupees and after one-year, I sell that share for 120 rupees the capital appreciation part includes 20 rupees over and above of my 100 rupees of purchase price and in this one-year if I have received any dividend then that will be my interim income.

So, I will have two sources of or two potential sources of income or cash flows in this case one is dividend and another is selling price. When it comes to finding the present value of these two potential cash flows, we know that dividend is coming to me in the form of some sort of cash flow and then selling price.

So, all I have to do is I have to find the present value of this dividend as well as the present value of this selling price using some sort of discounting rate. Here in case of dividend discount model the discounting rate that we use to find the present value of dividend and selling price is the rate of return expected by the equity holders or we can also call it cost of equity.

To understand more about cost of equity we can refer to any basic course in corporate finance where we know how we arrive at this cost of equity that is r E as the discounting rate for finding the present value of dividend as well as the selling price that we are expecting to receive at the end of period 1. Now, using this approach which is basically finding the present value of two potential cash flows to arrive at something that we can say is the intrinsic value of this stock.

Now, if we believe in this model, we can say that P naught or P 0 is the intrinsic value of this particular stock based on dividend and the selling price that is expected at the end of period 1 that is at the at t 1. And these two values or these two cash flows dividend and price at t 1 is discounted using discount rate of r E.

So, we can say this should be P 0 should be the value of the stock given this information. Now, the decision here should be based on the intrinsic value. So, if we know that the P 0 is greater than the current market price of that share these are possible scenarios. So, P 0 or P naught can be greater than current market price which is the price at which the share is being traded at this moment when we calculated this value.

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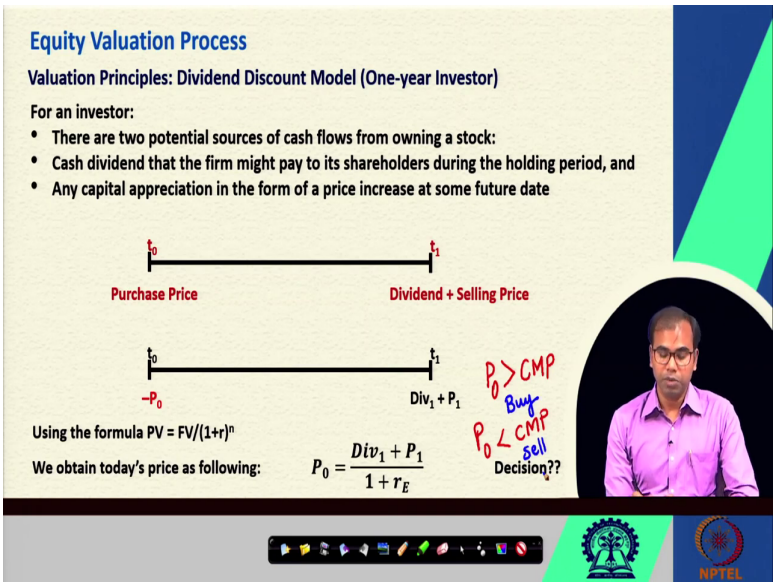

So, if P 0 is greater than current market price then it is better to buy this stock and if P 0 or P naught is smaller than current market price then it is preferred or it is recommended to sell if you hold or at least do not invest in that stock. What it implies is if intrinsic value is higher than the current market value it is expected that over a period of time the value of that share reflected in terms of price will increase to achieve the equilibrium at which it should be which is the intrinsic value.

So, if we buy such a stock at this price which is current market price, we can make money because eventually the current market price will reach to the level of P naught which should be the intrinsic value. And contradictory argument is with respect to the case where P naught is smaller than the current market price.

So, if P naught is smaller than the current market price then we believe that the share is being sold at the value that is higher than what it should be which means the ideal value the intrinsic value should be lower. But current market price is higher and that is why we should sell if we hold any stock, if we own any stock or we should not get into such an investment. So, this is the basic investment rule based on the value that we have obtained or we have calculated using this approach of dividend discount model.

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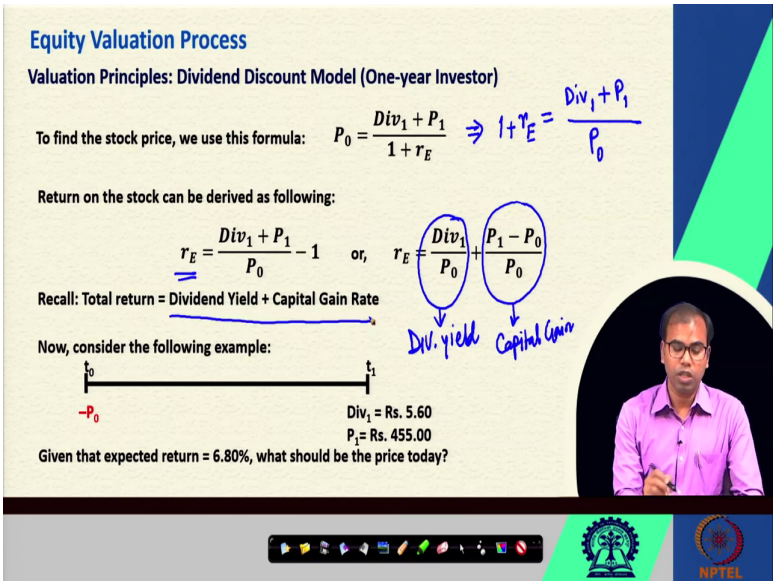

Now, if we try to understand this model little further to find the stock price we use this formula of discounting dividend as well as the future price with discounting rate that is r E. And we know that return on stock can be derived by modifying this formula further it is it is pretty much intuitive that if we extend this formula we know that 1 plus r E is equal to dividend in time 1 plus price in time 1 divided by price 0.

So, r E that is cost of equity or discounting rate is going to be dividend plus price in time period 1 divided by P naught that is price today minus 1 or we can have this in two different component one is dividend divided by P 0 and another component is P 1 minus P 0 divided by P 0 which is translated into dividend yield which is dividend as percentage of initial price and capital gain which is basically the rate or the profit that we have made over and above the purchase price.

So, these two are total return that we have discussed earlier. Now, let us consider this example where we have a case and we need to find the present value or the price today that should be here given that the stock is paying a dividend of 5 rupee 60 paisa and it is expected to be sold at 455 rupees. It is pretty much straight forward we know that the expected rate of return or r E is 6.80.

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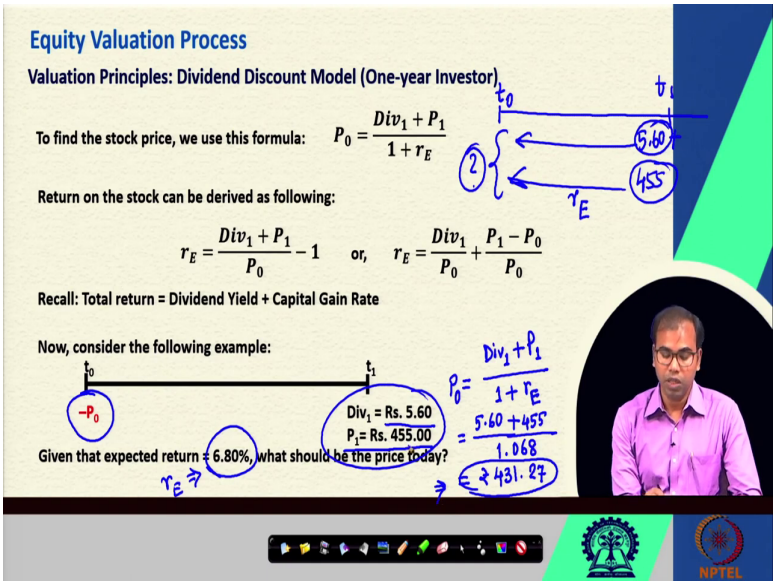

So, all we have to do is we just implement this formula as P 0 is equal to dividend in time 1 plus price in time 1 divided by 1 plus r E. So, here we have 5.60 plus 4 double 5 divided by 1.068 and this gives us a value of approximately 431 rupee 27 paisa.

So, the ideal value of this particular stock should be 431 rupee 27 paisa given this information. So, the fundamental argument here is if we have a stock where we have just one period t 0 and t 1 and we know that the stock is going to give dividend of 5 rupee 60 paisa and the present value or the selling price will be 455.

So, these two values should be brought to present time using an appropriate discounting rate which in this case is r E. And what will be the value of these two cash flows in present terms? Will be considered as the ideal intrinsic value of this particular stock. And if it is available for higher than this price then we should not invest rather we should sell and if it is available for less than this price then we should buy and hope that the price will achieve to this equilibrium and we will make money.

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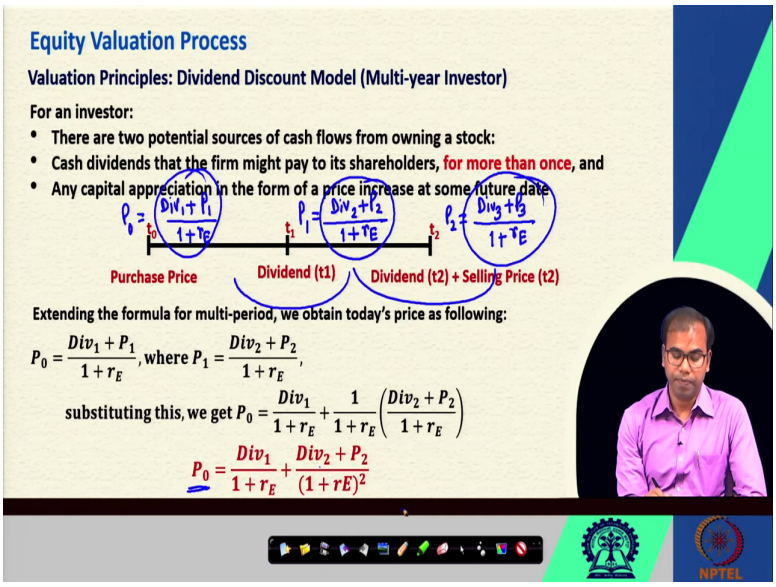

Let us now consider a case where there is multiple periods. So, far we have discussed about a scenario where there is one period. Now, we will consider the case of multi-year investor. Now, again the basic argument will remain same which means there will be two potential sources of cash flow one is dividend and another is selling price or the capital gain.

So, dividend will be in multiple scenarios or multiple occasions and selling price will be 1 which will be available at the end of time period which is considered for investment. I have already mentioned that in some cases it may be possible that this time period might not be really true or might not really be applicable, right.

For example, if I invest in a company or company share rather, I hope that the company will keep on doing business as per one of the accounting conventions any business is typically set up in order to keep on doing business till perpetuity.

So, if I am investing in a share for multiple periods, I assume or I believe that I will be getting dividend till perpetuity which means there will be no terminal value or there will be no selling price because I will invest in the business for eternity. But here that is not the case here we are assuming that after certain period maybe the investor will sell the stock and receive the selling price.

In this case dividends will be on multiple occasions as we can see dividend 1 and dividend 2 because it is a 2 period model. All we have to do is just modify the earlier expression earlier formula. So, we know that the formula for calculating today's price based on period 1 model or 1 period 1 year model we know that it is the present value of dividend and price at the end of 1 year.

Now, here it is important to note that is that price at end of one-year will be calculated by using dividend for second period plus price for second period divided by 1 plus r E. And then here we know that price at 0 is dividend for first period plus price for one-year and 1 plus r E. So, if we keep on doing that let us say in this case price at 2 will be dividend for third period price at t 3 and 1 plus r E.

We keep on doing for multiple periods we will find a very simplified formula and that formula will give us the present value of any share that is expected to keep on paying dividend till perpetuity So, in this case for two period model we have this price of the stock in t 0 as the present value of dividend for first period, present value of dividend for second period and price for second period. So, since it has to be discounted twice we keep on modifying the formula accordingly.

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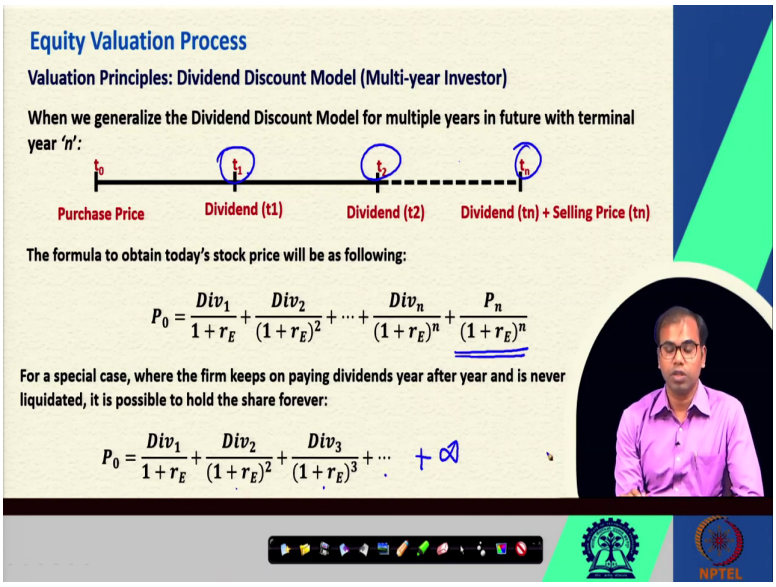

Now, if we try to extend this argument for multiple period further, we know that if this is the scenario where we have t 1, t 2, t 3, t 4, t n we can just modify the formula such that for every period there will be a dividend that is to be found in terms of present value that is to be brought to the present time to find after finding the present value. Then we have price at the end, nth year for period n t n that is to be calculated in terms of present value.

So, if we keep on paying dividend if we keep on receiving dividend from the company as an investor year after year and the company is never liquidated as per the basic accounting assumption it is possible for an investor to hold the share forever and keep on receiving dividends year after year till perpetuity which means dividend will be received in year 1, in year 2, year 3, year 4 till perpetual real time period.

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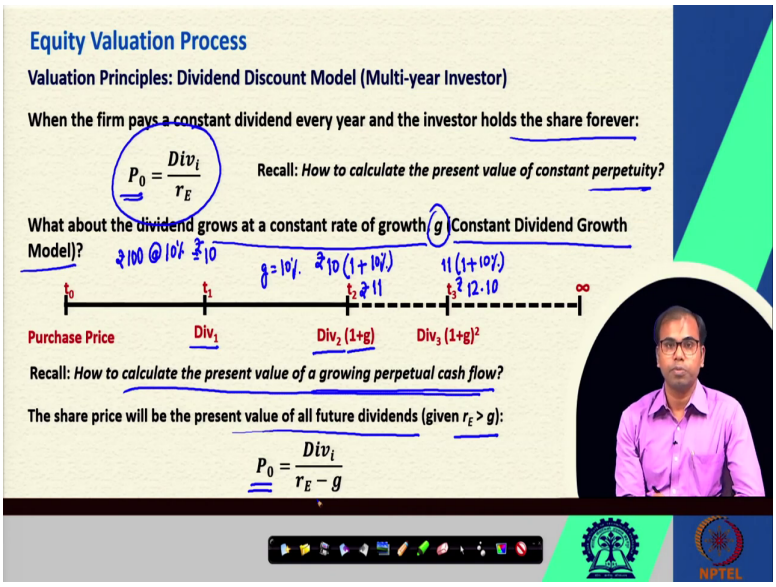

And if that is the case then we can apply the approach or the method to calculate the present value of constant perpetuity. I again recommend going through a basic corporate finance course to understand how to calculate the present value of constant perpetuity.

We when we try to relate this approach of calculating present value of constant perpetuity, we know that a firm that keeps on paying dividend constant dividend year after year till perpetuity. We can find the present value of all those dividends such that the value of this share in today's term will be denoted as the dividend that is expected in t 1 and the cost of equity or the discounting rate that we are using.

So, dividend by r E is the dividend discount model for multiple period which is basically infinite period. So, when the share is held for forever the dividend is to be paid at a constant

rate for forever then the present value of the such a share is calculated by using dividend divided by cost of equity as the current value of the share and again the rule applies the same.

We will have value of the share found thus in this way greater than the current market price then we should invest and if the value of the share which is denoted in terms of P naught is less than the current market price then we can sell or we should not invest in that case.

Now, this is about constant dividend payment. But in real world hardly there is any company that keeps on paying dividend at a constant rate. Because dividends are a function of companies performance and shareholders preference as well may be to certain extent external market environment.

Sometimes if the company is able to make much profit relatively higher profit than previous years the company might wish to pay higher dividends. If the company is on a growth path which means the company's business is growing year after year, then company might as well like to pay dividends higher and higher year after year.

So, what happens when the company pays a dividend that grows at a constant rate of growth, let us call this growth rate as g. So, if there is a constant growth dividend growth rate then we use a model called constant dividend growth model or also known as Gordon's growth model. What happens in this case is company pays dividend in first period next year company pays dividend, but it will be calculated with 1 plus g which is basically a growth rate.

So, suppose company pays a share price is 100 rupees the face value and dividend is paid at 10 percent in first year which means 10 rupee of dividend is paid in first year and if growth rate is let us say 10 percent again then in second year it will be 10 rupee into 1 plus 10 percent which means in second year the dividend will be 11 rupee. In third year, it will be 11 rupee into 1 plus 10 percent which is basically let us say 12.1 rupee.

So, in this way a dividend might keep on growing. So, if we already know about the way to calculate present value of a growing perpetual cash flow we know that share price or the intrinsic value of such a share of a company that keeps on paying growing dividend or

dividend at a constant growth rate can be calculated by using this approach for finding the present value of all future dividend where rate of expected rate of return or cost of equity is greater than growth rate in the dividend.

So, we have dividend divided by r E minus g as the in terms of the present value of such a stock.

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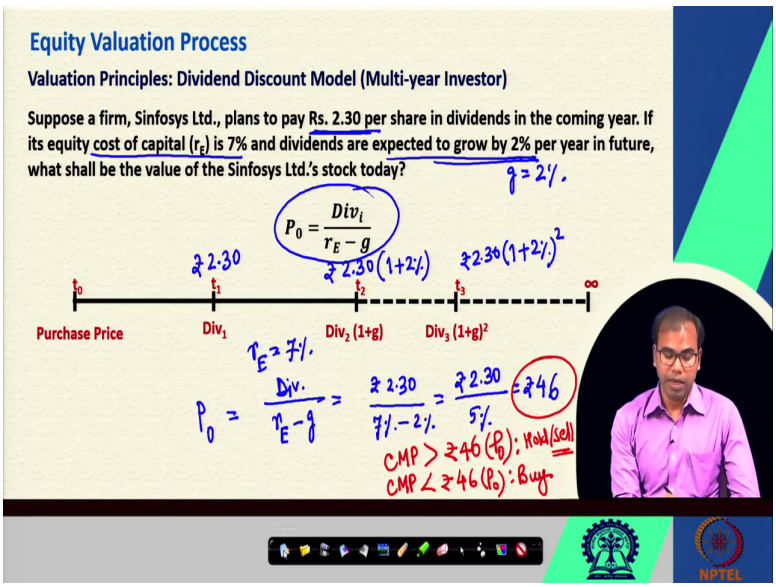

So, just to highlight this method through an example if we have a company that pay a dividend of 2 rupee 30 paisa per share in the coming year and cost of equity or cost capital is 7 percent and dividend are expected to grow at say 2 percent per year in future, what should be the price of the share?

So, what it says is in first year dividend is 2 rupee 30 paisa in second year dividend is going to be 2 rupee 30 paisa into 1 plus 2 percent which is growth rate. Similarly, in third year it is 2 rupee 30 paisa of dividend into 1 plus 2 percent to the power 2 and in all these cases r E is 7 percent. So, all we have to do is we have to apply this formula where we have P naught as dividend to be paid divided by r E minus g.

So, dividend is rupees 2.30 divided by r is 7 percent minus 2 percent. So, 2.30 divided by 5 percent. So, it is 46 rupee. So, the current market price or the current value of the share should be 46, if current market price is greater than 46 that is P naught then the rule is hold or sell rather sell. And if current market price is less than 46 that is P naught then the decision is buy. So, this is how we typically value a stock using dividend discount model for one period or multiple period.

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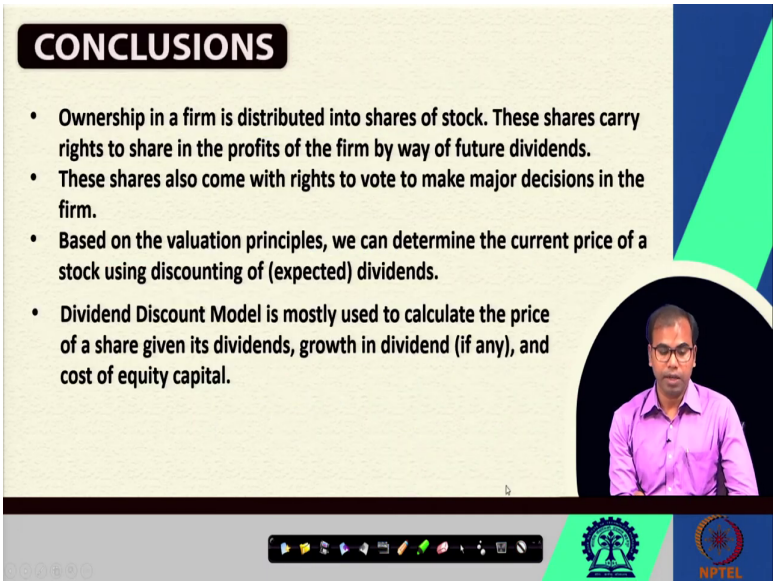

We will talk more about the growth, in dividends little more further. To conclude we have already mentioned that shares or stocks basically are instrument through which an individual or an investor can hold ownership in a firm or in a company and these share carry the right to share in the profit of the form in in terms of receipt of dividends.

The investor can also have a capital gain if the investor decides to sell. And based on the basic valuation principle we can determine the current market price or current intrinsic value of a share using dividend discount model which is based on the present value of future dividends.

And dividend discount model is mostly used to calculate the price of a share given that dividends are available at a constant rate for future period, if it is a multiple period case. Therefore, multiple year the same dividend is to be paid or in some cases if dividends are paid at a constant growth rate that also can be used for finding the present value of all such dividends to arrive at a current intrinsic value. That is all for now.

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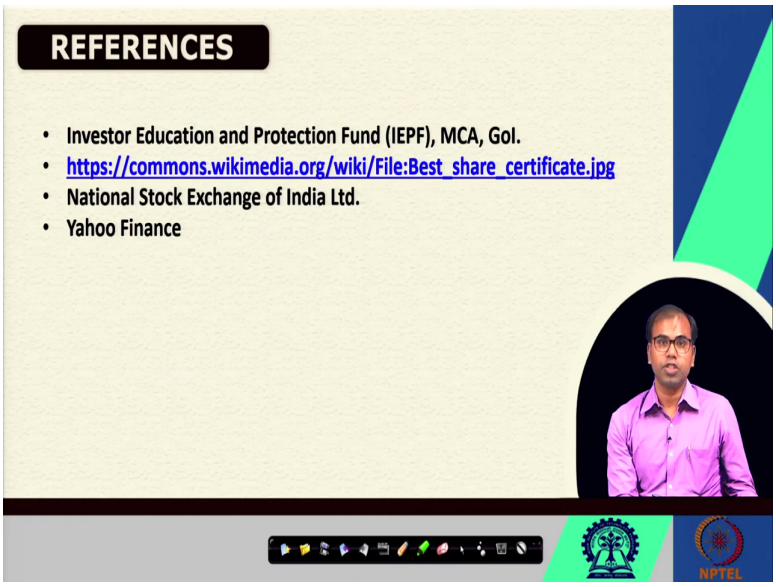

Thank you very much.