Time value of money-Concepts and Calculations
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Lecture No - 15
Valuation of Shares

Welcome to the lectures on Time value of money-Concepts and Calculations. The topic of the today's lecture is valuations of shares.

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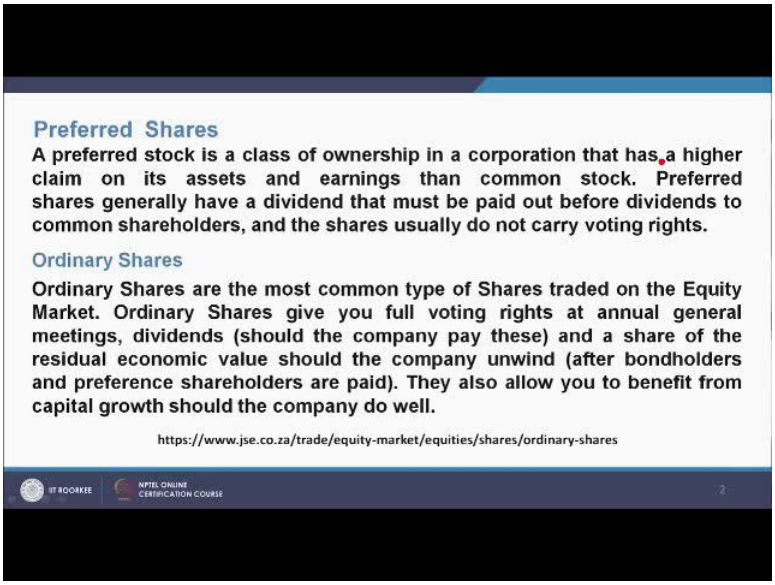

There are many types of shares out of which preferred shares, ordinary shares, etcetera. Now, let us see what a preferred share is. A preferred stock is a class of ownership in a corporation that has a higher claim on its assets and earnings than common stock or common shares. Preferred share generally have a dividend that must be paid out before dividends to common share holders and the share usually do not carry voting rights and for ordinary shares.

Ordinary shares are the most common types of shares traded on the equity market. Ordinary shares, give you full voting rights at annual general meeting dividends should the company pay these and a share of the residual economic value should the company

unwind after the bond holders and preference share holders are paid. They also allow you to benefit from capital growth should the company do well.

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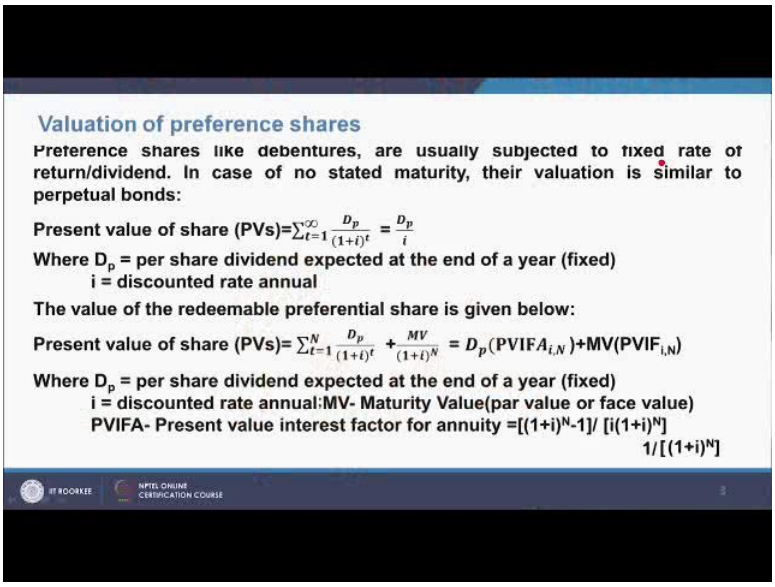

Valuations of preference shares, preference shares like debentures are usually subject to fixed rate of return or dividend. In case of no stated maturity their valuation is similar to perpetual bonds. The present value of this shares PVs is equal to summation t is equal to one to infinite, D p divided by 1 plus 1 to the power t or is equal to D p by i. Where, D p is equal to per share dividend, expected at the end of the year. Which is fixed i is equal to discounted rate annually. The value of the redeemable preferential share is given below, present value of the share PVs is equal to summation t equals to 1 to N, D p divided by 1 plus i to the power t plus MV divided by 1 plus i to the power N.

Where, D p is equal to per share dividend expected at the end of the year. This is fix value i equal to discounted rate annual, MV is equal to maturity value, that is par value or face value and PVIFA is equal to present value interest factor for annuity, which is equal to N brackets 1 plus i to the power N minus 1, whole divided by i into 1 plus i to the power N. This is the present value of annuity and N is the maturity period in years and PBIF is the present value interest factor and is equal to 1 by in brackets 1 plus i to the power N.

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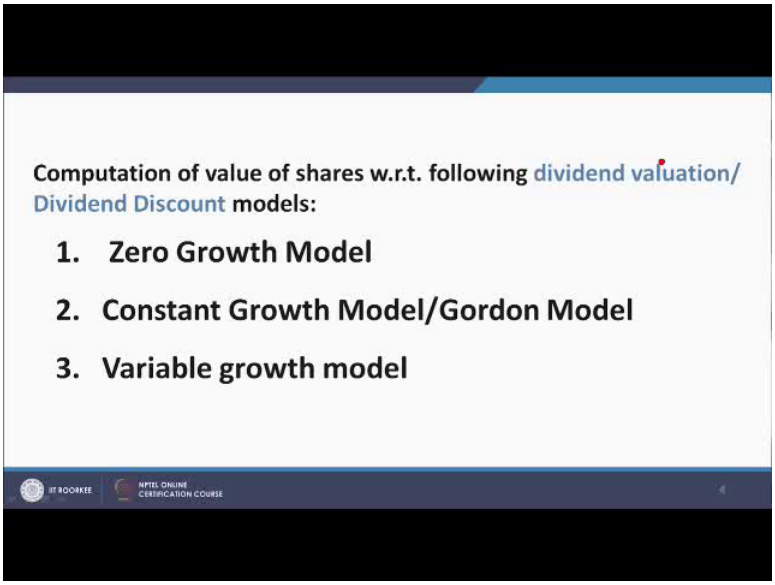

Computation of value of shares with respect to following, dividend valuation or dividend discount models. The first model will consider a zero growth model; the second model will consider constant growth model or Gordon model and third is the variable growth model, now to start with the zero growth models. In this approach to dividend valuation assumes a constant non growing dividend stream, with zero growth in the amount of dividend. Thus the value of the share is the present value of a perpetuity of dividends discounted at discount rate i.

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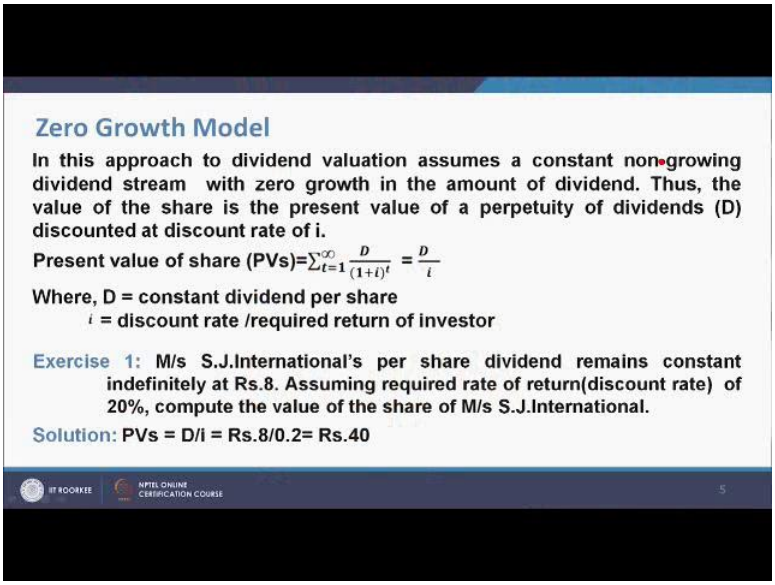

So, the present value of the shares is PVs is equal to in summation t equal to 1 to infinite D divided by 1 plus i to the power t and which is equal to D by i, where D is equal to constant dividend per share and i is equal to discount rate or required return of investor. Let us take an example

Example one Messer's SJ Internationals per share dividend remains constant indefinitely at rupees 8. Assuming required rate of return that is, discount rate of 20 percent compute the value of the share of Messer's SJ International the solution is PVs equals to D by i is equal to rupees 8 divided by 0.2, which is the value of i because i is 20 percent. So, rupees 8 divided by 0.2 comes out to be rupees forty. The Gordon growth model is used to determine the intrinsic value of a stock based on a future series of dividends that grow at a constant rate given a dividend per share.

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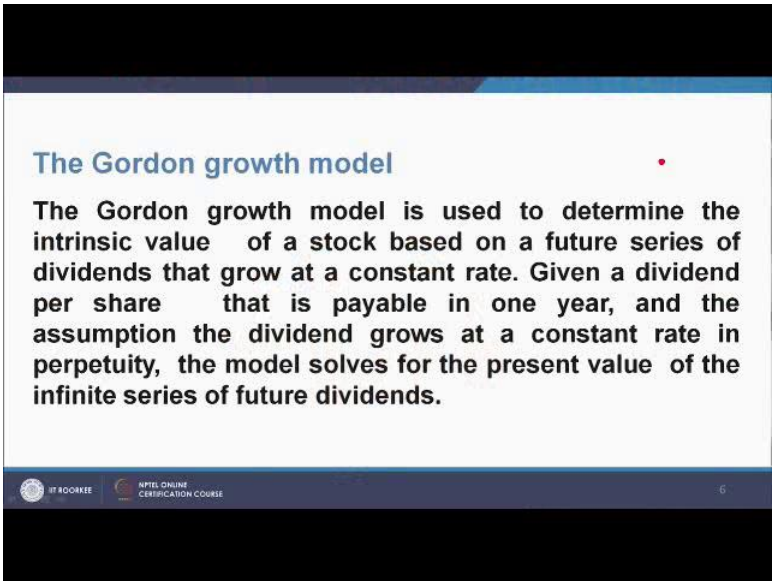

That is payable in 1 year and the assumption that the dividend grows at a constant rate in perpetuity. The model solves for the present value of the infinite series of future dividends.

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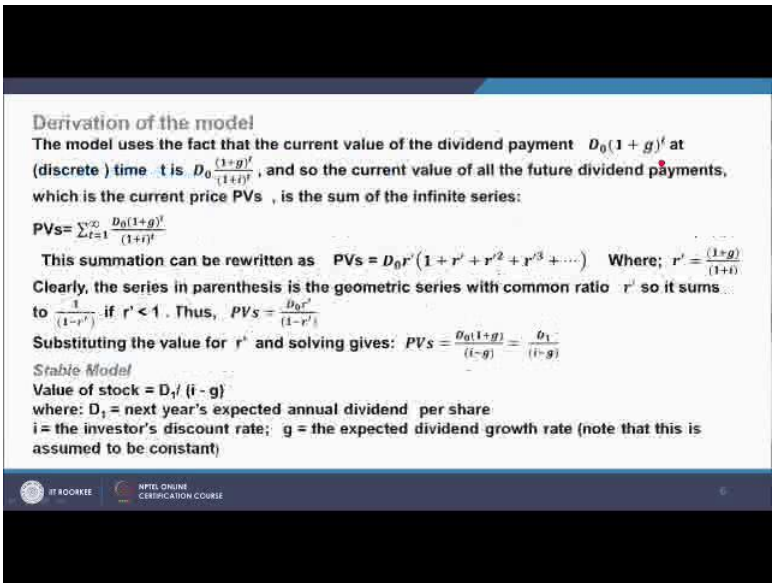

Derivation of the model, the model uses the fact that the current value of the dividend payment can be expressed as D 0 in bracket 1 plus g to the power t at discrete time t is D 0 1 plus g to the power t divided by 1 plus i to the power t. Now when I divide the dividend with 1 plus i to the power t, basically I am converting it into its present value and so the current value of the future dividend payments, which is the current price of PVs is the sum of the infinite series.

So, what I am doing that PVs is equal to summation t is equal to 1 to infinite D 0 1 plus g to the power t divided by 1 plus i to the power t. So, the present values of all the dividends are summed to find out the value, present value. This summation can be written as PVs D zero into r dash in brackets 1 plus r dash plus r dash square plus r dash q and so on so forth. Where, r dash is equal to 1 plus g divided by 1 plus i. Clearly the series in parentheses is the geometric series with common ratio r dash. So, it sums to 1 by 1 minus r dash, if r dash is less than 1.

Thus PVs is equal to D 0 r dash divided by 1 minus r dash. Substituting the value of r dash and solving gives PVs is equal to D 0 1 plus g in bracket divided by i minus g equal to D 1 divided by i minus g. The stable model is value of the stock D 1 divided by 1 i minus g, where D 1 is the next years expected annual dividend per share, i is equal to the investors discount rate, g the expected dividend growth rate. Note that this is assumed to be constant.

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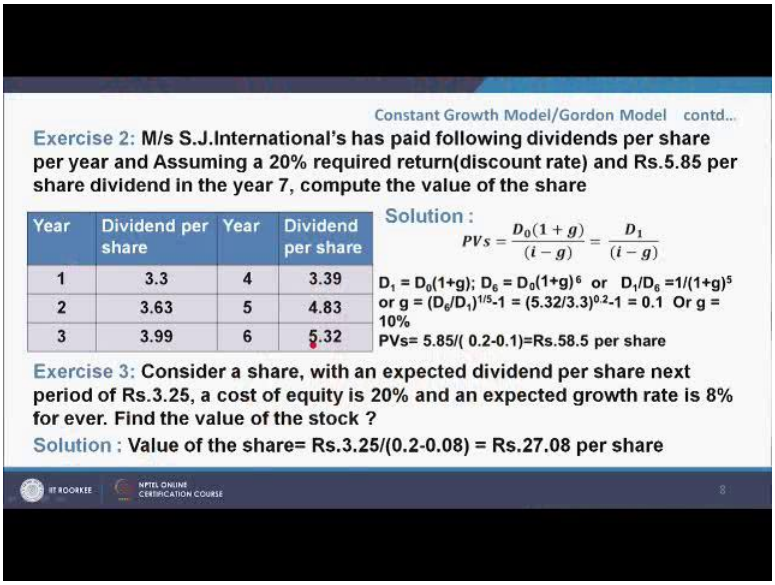

Now, let us take an example, exercise 2. Messer's SJ Internationals has paid following dividends per share, per year assuming a 20 percent required return that is, a discount rate and rupees 5.85 per share dividend in year 7. Compute the value of the share might as given that the for year 1, the dividend per share is 3.3, for the second year the dividend per year share is 3.63, for third year this is 3.99, for the fourth year this is 3.93, the fifth year this is 4.83 and sixth year this is 5.32. Now PVs is equal to D 0 1 plus g in brackets 1 minus g is equal to D 1, 1 minus g. D 1 is equal to 1 plus g and D 6 is equal to D 0 1 plus g to the power 6 or D 1 by D 6 is equal to 1 divided by 1 plus g to the power 5 or g is equal to D 6 divided by D 1 to the power 1 by 5 minus 1.

So, D 6 is 5.32, this 5.32 and D 1 is 3.3 and 1 by 5 is 0.2 and then minus 1 comes out to be 0.1 or g is equal to 10 percent and that is why PVs is equal to 5.85 because D 1 value is 5.85 divided by 0.2 minus 0.1 is equal to rupees 58.5 per share. This 5.85 has been brought from here and the 7'th year ok.

Exercise 3; consider a share with an expected dividend per share, next period of rupees 3.25. A cost of equity is 20 percent and then expected growth rate is 8 percent forever. Find the value of the stock or share value of the share is equal to 3.25 divided by in the bracket 0.2, which is 20 percent here and minus 0.08, this is growth rate is 8 percent. So,

divided by 100 is 0.08 and 20 percent divided by 100 is 0.2. So, 0.2 minus 0.08 is equal to rupees 27.08 per share. Now, let us see, what are the limitations of the Gordon growth model?

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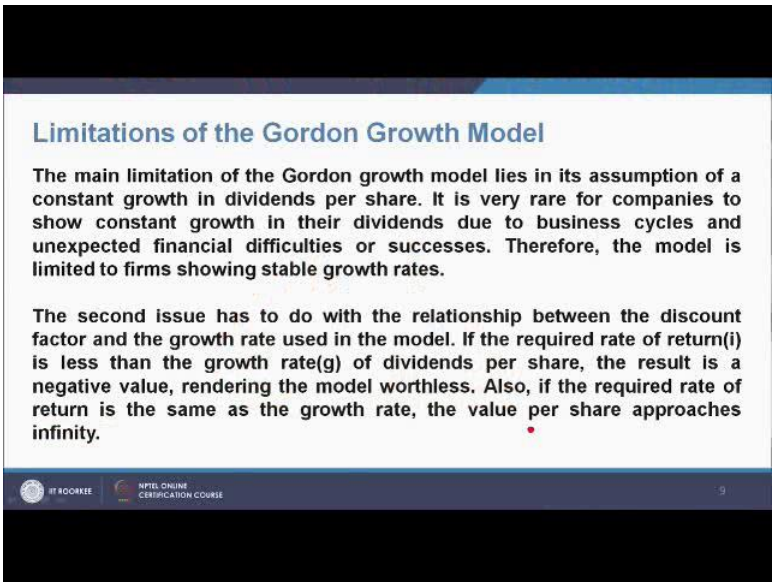

The main limitation of the Gordon growth model lies in its assumption of a constant growth, in dividends per share. It is very rare for companies to show constant growth in the dividends due to business cycles and unexpected financial difficulties or successes. Therefore, the model is limited to firms showing stable growth rates. The second issue has to do with the relationship between the discount factor and the growth rate used in the model. If the required rate of return i is less than the growth rate g of dividends per share. The result is a negative value rendering, the model worthless also if the required rate of the return is the same as the growth rate the value per share approaches infinite.

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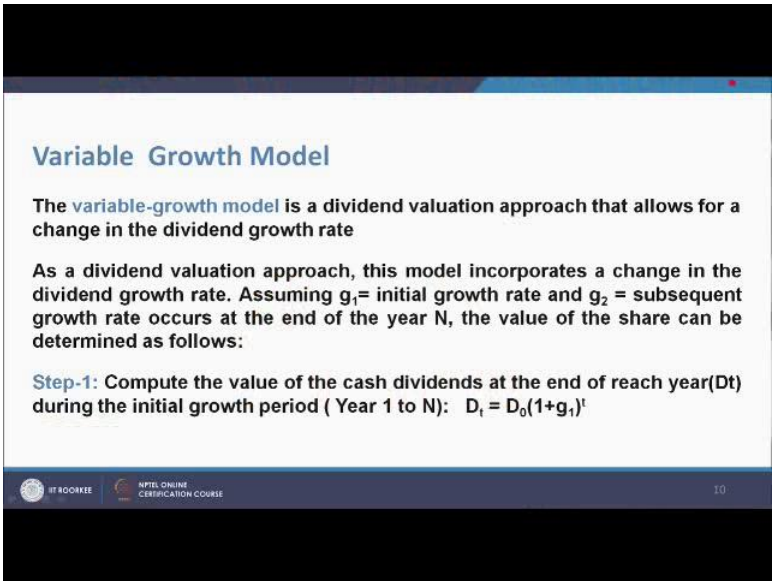

Now, let us take a third model which is variable growth model. The variable growth model is a dividend valuation approach that allows for a change in the dividend growth rate. As a dividend valuation approach, this model incorporates a change in the dividend growth rate assuming g 1 is equal to initial growth rate, g 2 equal to subsequent growth rate occurs at the end of the year N, the value of the share can be determined as follows.

Step 1, compute the value of the cash dividends at the end of each year, that is D t cash dividend at the end of each year is D t, t is time during the initial growth period and initial growth period is year 1 to N. So, D t is equal to D 0 1 plus g 1 to the power t and this is for initial growth period year 1 to N.

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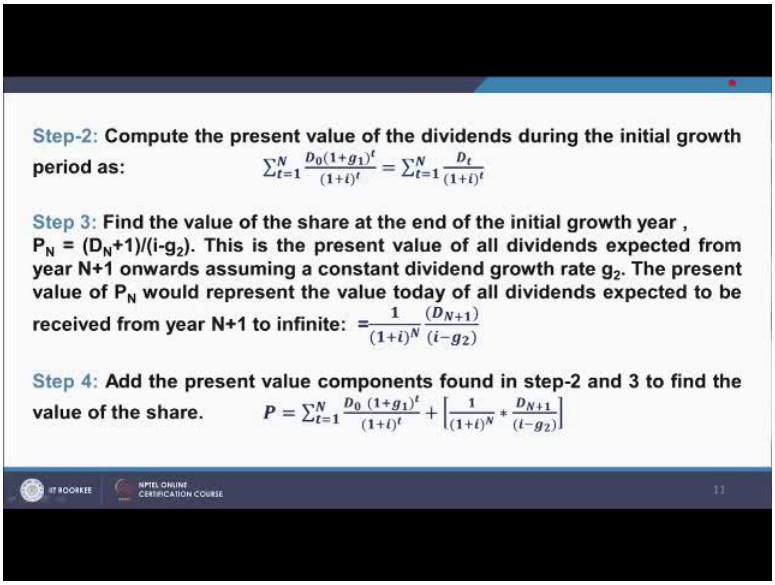

Step 2, compute the present value of the dividends during the initial growth period as summation 1 to N D 0 1 plus g 1 to the power t divided by 1 plus i to the power t when we are dividing it by 1 plus i to the power t, we are basically converting into the present value. So, this is equal to N summation t is equal to N D t divided by 1 plus i to the power t.

Now, step 3, find the value of the share at the end of initial growth year P N is equal to D N plus 1; that means, D at n'th N plus 1st period divided by i minus g 2 this is the present value of all dividends expected from year N plus 1 onwards assuming a constant dividend growth rate g 2 because in the second part which is N plus 1 onwards, the growth rate is g 2. The present value p n would represent the value today of all dividends expected to be received from year N plus 1 to infinite and this is equal to D N plus 1 divided by i minus g 2 into 1 by 1 plus i to the power N.

So, this converts all dividends, the summation of the dividends to its present value because I am multiplying with 1 divided by 1 plus i to the power N. Step 4, add the present value components found in step 2 and step 3, to find the value of the shares. The share value is equal to this is what I have got in step 2. So, this is here and, what I got in step 3, this is here.

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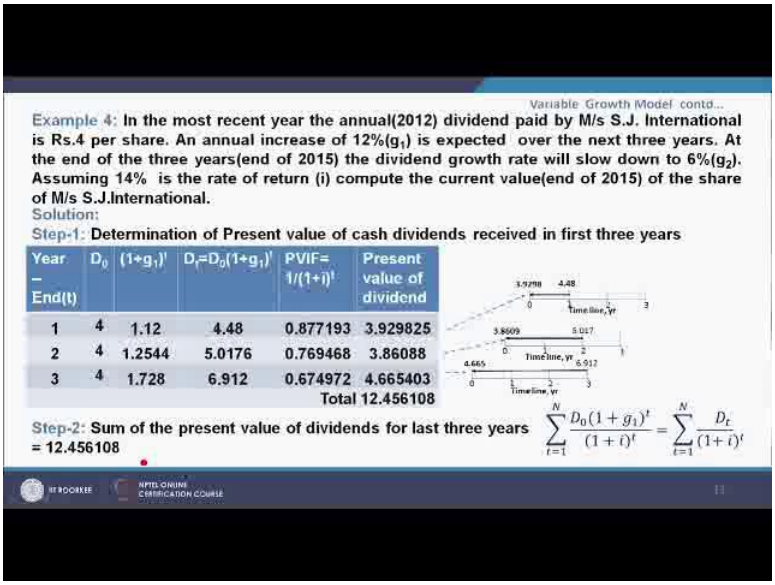

Now, let us take an example. This is example 4. In the most recent year the annual, that is in 2012dividend paid by, Messer's SJ International is rupees 4 per share. An annual increase of 12 percent that is, g 1 is expected over the next 3 years. At the end of the 3 years that is, end of 2015, the dividend growth rate will slow down to 6 percent. That is g 2, assuming 14 percent is the rate of return one, compute the current value at the end of 2015 of the share of Messer's SJ International. Now, let us see this solution. We will solve this problem step wise. Step 1, determination of present value of cash dividends received in first 3 years. Now, if you see this figure at the end of the first year, the D 0 value is 4, this is 1 plus g 1 to the power t. That is one plus g 1to the power 1 is 1.12 and hence when we multiply this 2, this comes out to be 4.48 and this is the value of D t is equal to D 0 1 plus g 1 to the power t, yet to the power t.

Now, if you find out the present worth factor, this is 1 divided by 1 plus i to the power t and the present worth factor is 0.877193 and hence present value of this dividend is equal to this dividend into this present worth factor gives you 3.929825. Now, here pictorially this is shown. At the end of first year this is 4.48 rupees and when this will be brought to the present value as D is equal to 0, this becomes 3.9298. Similarly, in the year ending 2 D 0 value is 4 1 plus g 1 to the power t, here t becomes 2 becomes 1.2544.

When these two are multiplied, this becomes 5.0176. So, D 2 is equal to D 0 1 plus g 1 to the power t and here the value of t will be 2.

So, this is the value. So, now, the present worth factor for this that is 1 by 1 plus i to the power 2 whole to the power 2 is 0.769468, when I multiplied this, with this it becomes 3.86088. Now if I see this pictorially at the end of the second year this value is 5.017 this is the same value and when this will, the present worth will be calculated it will be brought to this 09. When you brought it to the 09, this becomes 3.8609 which is the present worth of this value.

Now, if you see the year ending 3, this is the D 0 is 4 and the growth factor that is 1 plus g 1 to the power t is 1.728, then this D t is equal to D 0 1 plus g 1 to the power t is the multiplication of this and this comes out to be 6.912. Now, if you see the present worth factor, this is 1 divided by 1 plus i to the power 3 comes out to be 0.674972 and we multiply this with this, the present value of this becomes 4.665403 and we add this 3 present values, it is 12.456108.

So, the sum of the present value of the dividend for last 3 years, this three years is equal to this. This is given by the formula this i t is equal to 1 to N D 0, this is N is 3 here 1 plus g 1 to the power t divided by 1 by 1 plus i to the power t. It is t equals to N D t 1 plus i to the power t here come out to be 12.456108. Now step 3, the value of the share at the end of initial growth period that is end of 15.

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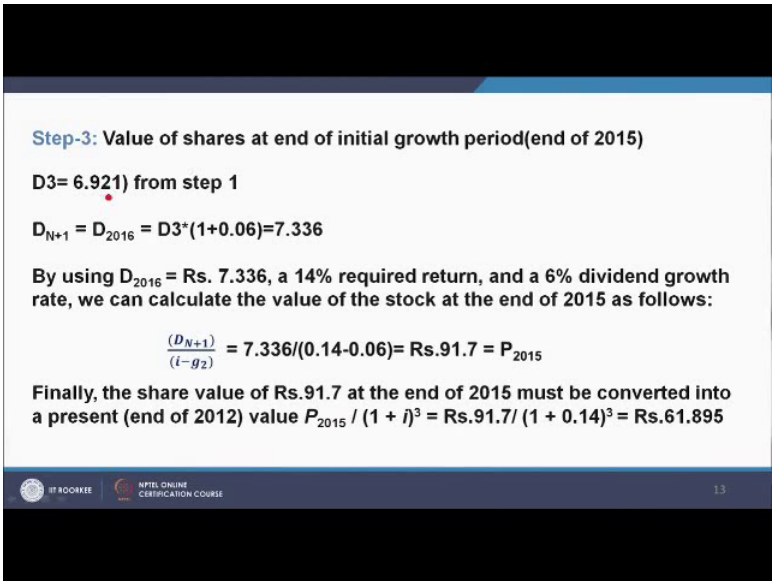

Is D 3 is equal to 6.921. This we have taken from the step 1 and D N plus 1 that is 4'th year and our 4'th year is equal to D 2016 is equal to D 3 into the growth rate. This is g 2 1 plus 0.06 because after the third year, the growth rate changes to g 2. So, we have taken the new growth rate 0.06, is 6 percent comes out to be 7.336.

So, by using D 2016 are equal to 7.336 and 14 percent required return and a 6 percent dividend growth rate. We can calculate the value of the stock at the end of 2015 as follows; D N plus 1 divided by i minus g 2 is equal to 7.336 divided by in bracket 0.14 minus 0.06 is equal to 91.7 and this is p 2015. Finally, the share value of 91.7 at the end of 2015 must be converted into the present value that is end of the 2012. So, we have to divide it by 1 plus i to the power 3, it converts into this 91.7 converts into rupees 61.895. Now step 4, the value of the shares end of initial growth period that is the end of 12 is the earlier the present value of the 3.

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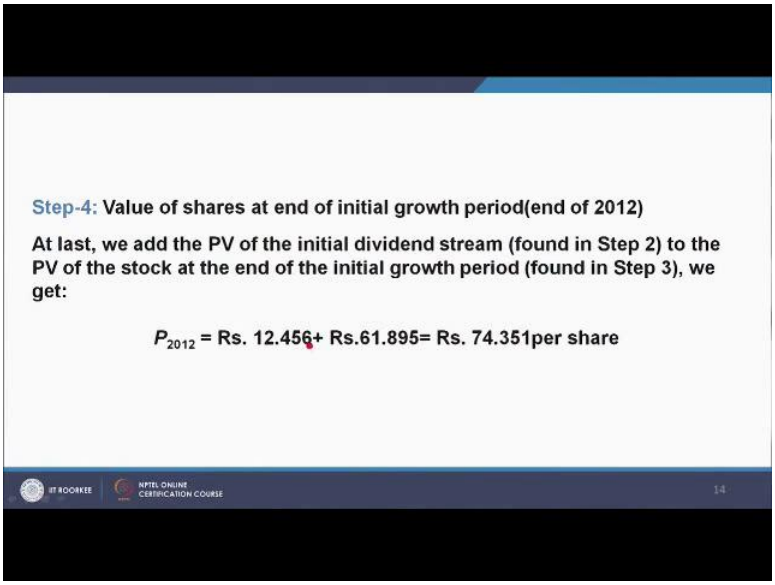

We have the already calculated, it is 12.456 and 61.895. So, we add them all to rupees 74.351 per share. At last we add the PV of the initial dividend streams found in step 2 to the PV of the stock at the end of initial growth period found in step 3, we get this.

Now, other approaches to valuation of shares. In addition to the dividend valuation approach discussed above; there are other approaches for valuation of shares and these are one book value, second liquidation value and third price earnings multiples.

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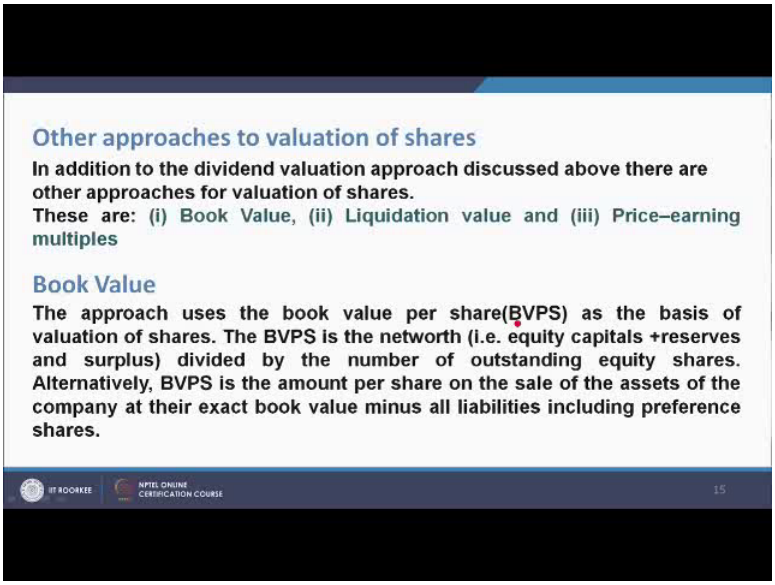

Now, book value, the approach uses the book value per share BVPS as the basis for valuation of shares. The BVPS is the net worth, that is equity capital plus reserved and surplus divided by the number of outstanding equity shares. Alternatively BVPS is the amount per share on the sale of the asset of the company at their exact book value minus all liabilities including preference shares.

Now, let us take an example to demonstrate this example 5. Messer's SJ International has total asset of rupees 70 crore. Total liability including preference share is 50 crore and 10, 00,000 shares. Calculate the book value per share.

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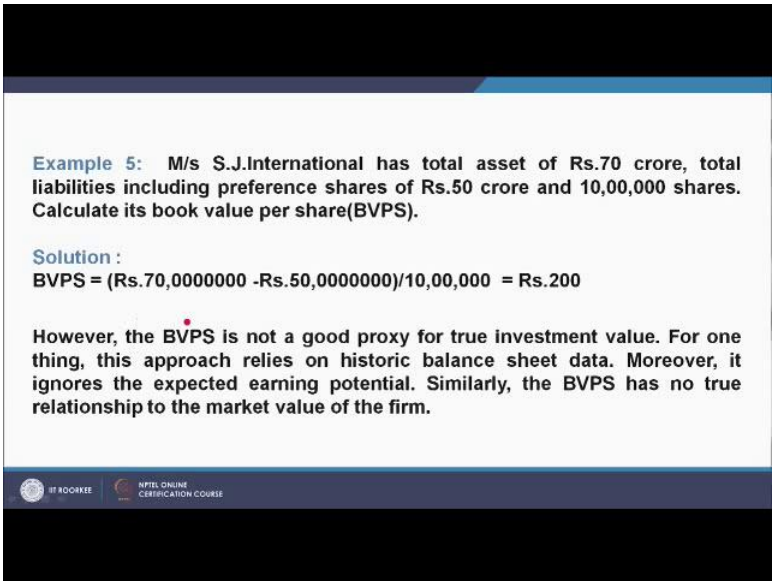

So, this is equal to, this is asset 70 crore minus 50 crore, is liabilities divided by 10, 00,000 is equal to rupees 200. However, the BVPS is not a good proxy for true investment value. For one thing, this approach relies on historic balance in data. Moreover it ignores the expected earning potential. Similarly, the BVPS has no true relationship to the market value of the firm.

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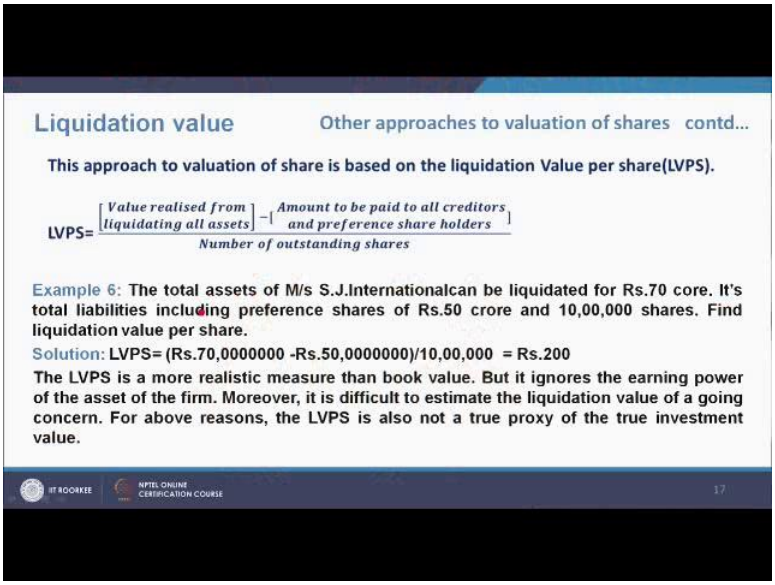

Now, the second 1 is liquidation value. This approach to valuation of share is based on the liquidation value per share, which is equal to LVPS is equal to value realized from liquidating all assets minus amount to be paid to all creditors and preference share holders divided by number of the outstanding shares. Let us take an example to demonstrate this example number 6. The total assets of Messer's SJ International can be liquidated for rupees 70 crore its total liability including preference share holders is 50 corers and 1000000 shares. Find the liquidation value per share. It is 70,000 minus 50 divided by 10, 00,000 is equal to 200.

The LVPS is a more realistic measure than book value, but it ignores the earning power of the assets of the firm. Moreover it is difficult to estimate the liquidation value of a going concern. For above reasons, the LVPS is also not a true proxy of the true investment values.

Now, price oblique earning that is PE ratio. The price earning PE ratio reflects the amount investors are willing to pay for each rupee of earning. The price earning multiple approaches is a popular technique used to estimate the firms share value, calculated by multiplying the firms expected earnings per share by the average price oblique earning PE ratio of the industry.

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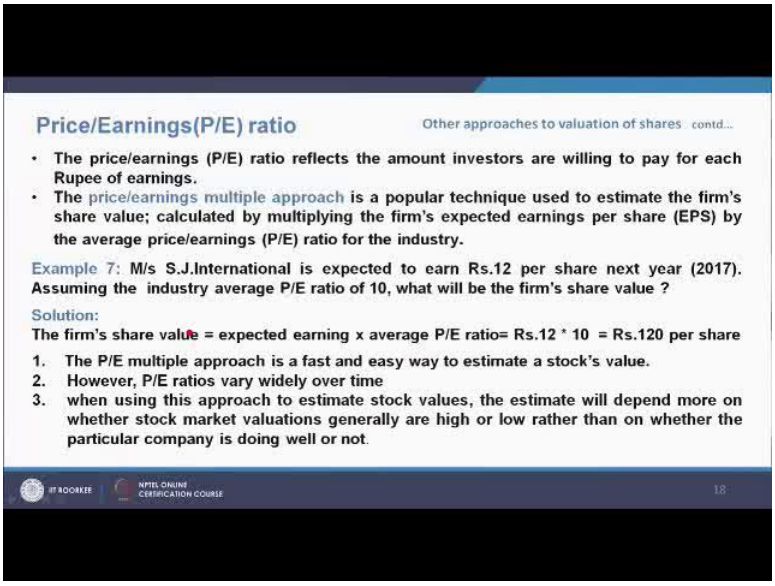

Now, let us take an example, example 7. Messer's SJ International is expected to earn rupees 12 per share next year, that is 2017. Assuming the industry average PE ratio to be 10, what will be the firms share value? Solution, the firms share value is equal to expected earning into average PE ratio. So, is equal to rupees 12 into 10, it comes up to be rupees 120 per share. The PE multiple approach is a fast and easy way to estimate a shock value; however, PE ratio vary widely over time. Third, when using this approach to estimate stock values, the estimate will depend more on whether stock market valuations generally are high or low rather than on whether the particular company is doing well or not.

Relationship among decisions returns risk and share values, any action of the financial manager that increases the level of expected return that is D 1 comma g.

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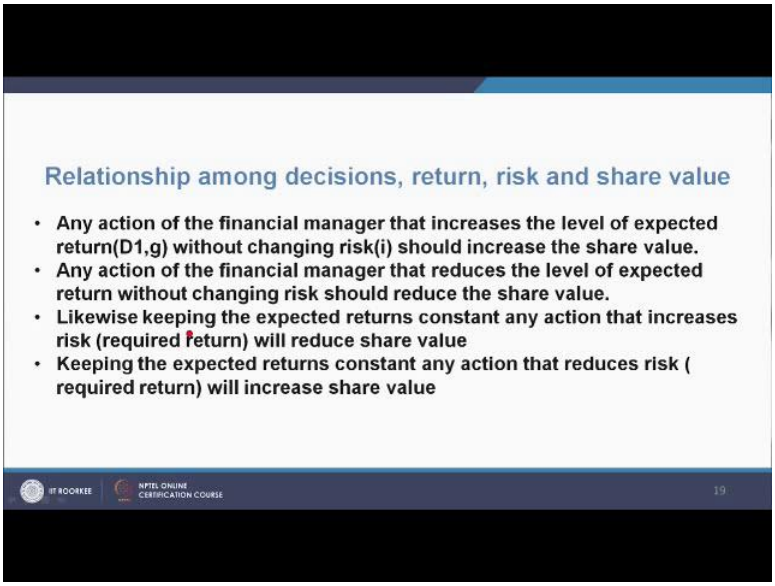

Without changing risk I should increase the share value. Second the action of the financial manager that reduces the level of expected return without changing risk should reduce the share value. Third likewise keeping the expected return constant, any action that increases risk required return will reduce share value. Forth keeping the expected returns constant and any action that reduces risk that is required return will increase share value.

Summary what we have thought in this lecture. Ordinary shares and preference shares discussed.

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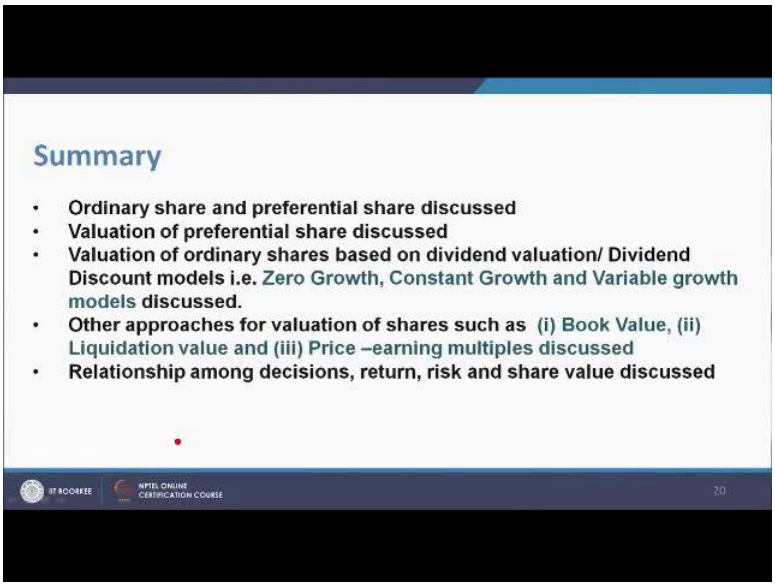

Valuation of preferential share discussed. Valuation of ordinary shares based on dividend valuation or dividend discount models that are zero growth, constant growth and variable growth models discussed. Other approaches for valuation of shares such as book value, liquidation value and price earnings multiples discussed. Relationship among decisions return risk and share value discussed.

With this lecture I am ending my course. I hope you should have enjoyed my course and best luck for you for the examinations.

Thank you.