International Finance
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Lecture - 23
International Capital Structure and
Capital Assets Pricing Model

Today session number 23 we will be discussing about international capital structure and the capital asset pricing model. This primarily a part of corporate finance and integration of foreign exchange in corporate finance. This international capital asset pricing model we generally call it as international corporate, corporate finance, where the capital or capital structure of company generally influenced by their diversification of capital structure. Diversification here means, they are sourcing their capital from different countries in foreign, in foreign exchange.

When company sources their capital structure in from different countries the domestic capital asset pricing model will not be valid, because here the domestic market is not only influenced, but also significantly influenced by the international capital market because the foreign exchange or the domestic international debt and international equity market influence the beta of the company.

So, here we will be discussing how the domestic capital asset pricing model can be transformed into a global capital asset pricing model and how the corporate can experience the global beta in their pricing of their cost of the equity. We will also be discussing, we will also be discussing about the segmentation and integration of financial market and how segmentation and integration can play a a vital role in diversification of company capital structure.

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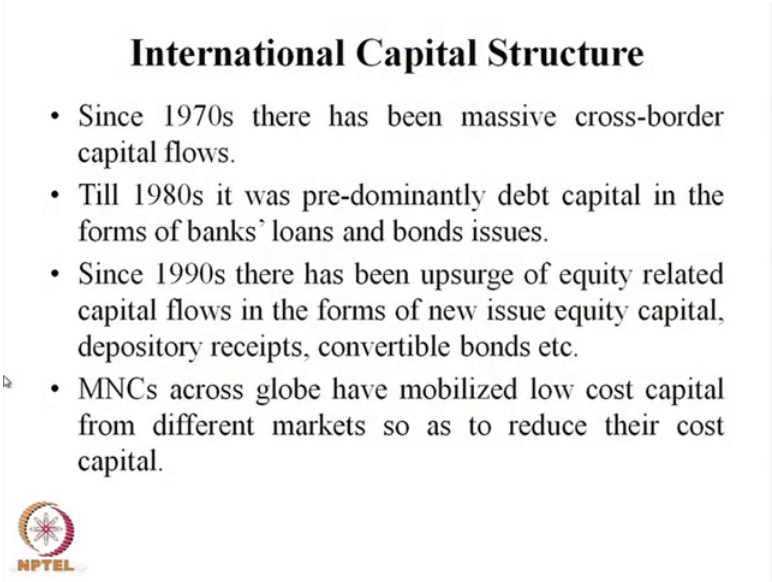

Here when we mention that international capital structure, we have to understand that the prior to nineteen seventy there was no international market. As we discussed earlier session, the gold the US dollar was linked to gold and other countries domestic currency linked to US dollar, and there was no development of international capital market and domestic companies generally source their capital from domestic market itself. After nineteen seventy when US dealing their currency that is US dollar from gold and allow the allow its own currency to freely, freely determined by the market forces, that time the international capital market developed US, there is deregulated there interest rate, exchange rate and allow the domestic company to migrate to different countries.

Soon after many other developed countries liberalized their financial market and allow the domestic MNC to source their fund from different markets. This process lead to development of international capital market, since 1970, there has been massive cross border capital inflow. Initially it was international debt in the form of sovereign debt, in the form of bank international, bank they flowed international debt this international debt continued to be a significant part of capital, capital structure or capital, capital source for many MNC company.

However, after 1980s the predominant of dollar as a predominant of US currency in the form of international debt, the reduce and many country, many country migrate to other other part of the globe other part of the globe to source their capital structure. If you

aggregate the international capital market it will be a different two different parts of development, till eighty's it was it was predominantly debt, after nineties some action of debt and equity, but later part of ninety it was primarily equity related a equity related capital structure. Many MNC in developing country also source their capital, particularly the equity from developed market particularly London and New York market.

These two markets were predominantly in the form of equity and debt floated by a different, different MNC of different countries. So, after ninety's it was dollar, it was equity finance in the form of international source of capital predominantly managed by many MNC and this change of capital structure from primarily domestic oriented debt to international oriented debt domestic equity to international equity. Since the in change the entire capital structure of the company and this this create a different kind of capital asset pricing model, which cannot be handled through domestic capital asset pricing model. You have to, you have to link the international beta in the pricing of cost of equity of MNC, and this has been a source of, source of finance in at present by many MNC company.

When you discuss about the ADR, GDR, how be had becomes a indirect link to equity a debt oriented capital. That time we will be coming we will be discussing when how GDR, ADR, has become a a primary source of raising of equity related debt instrument.

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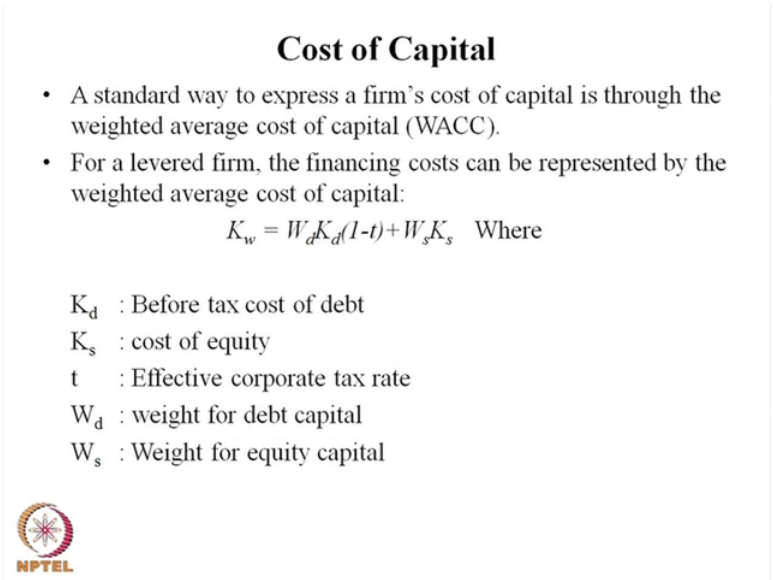

Here before discussing about the capital structure, we have to understand that capital asset pricing model. As we discuss, as we have we know from our corporate finance the primary way of calculation of walks of a company that is weighted average cost of capital here. A part of the capital from the debt side and a part of capital from the equity side. Equity and debt compose the capital structure of a company and the part and the overall cost of capital depends upon what is the cost of debt and what is the cost of equity.

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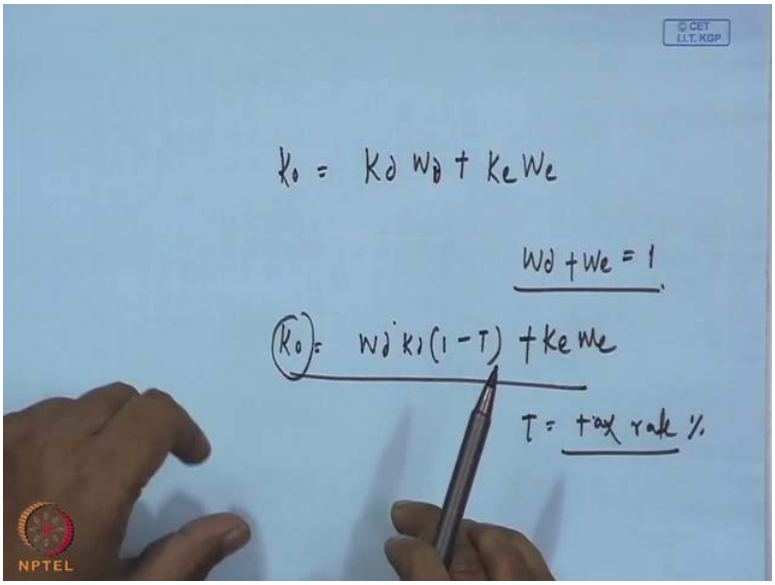

When you mention about the capital structure, the walks of a company is nothing but, nothing but that company that is K naught. K naught will be the K naught here, overall cost of capital for a company, which depends upon how much the cost of debt into the part of the W 1 here, W 1, W d is the weight of the debt in the total capital. Similarly, equity and weight of the equity here, here W d plus W e is the 1, because it is in parentage, total capital of the company, but here you have to understand that debt provide what is called tax relief to the company. So, debt linked debt lead to reduction of capital overall cost of capital, here we have to understand that here when you mention that K d K d is 1 minus tax rate plus K e into W e. Here T is the tax rate tax rate in percentage in percentage.

So, K the amount of debt is reduced as a reduce the cost of debt in the form of tax rebate, this is linked to this reduce the overall capital structure of a company. This we in

corporate finance we call it Wacc or weighted average cost of capital. So, here K o is the weighted average cost of capital, where debt and equity are part of the capital structure. Before, before going to the before going to the actual international, international form of capital structure you have to understand that, tax the equity provide some kind of leverage effect to the for leveraging the leveraging or reducing the overall cost of capital.

The promoters holding provide promoters holding is the equity, that equity provide us a room to leverage reduce the overall cost of capital by sourcing, by replacing equity by more and more debt, this is called leverage. Leverage effect of cost of capital and here we are leveraging the having equity we are leveraging the debt also.

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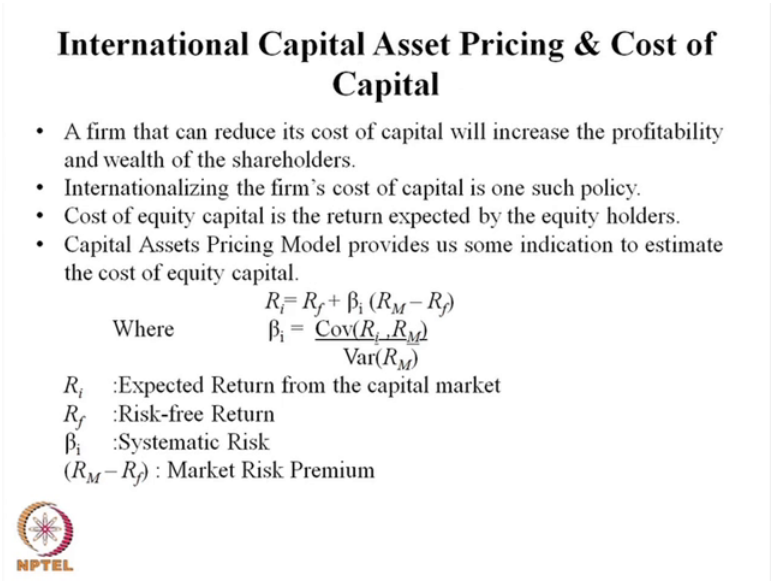

So, when you go for the international capital asset pricing model you have to price what is called the equity side and debt side separately. From the capital structure model we understood that, we understood that that the pricing of a pricing of a capital asset particularly the equity depends upon the risk premium. Because when you, when two part of the capital structure is one part is debt, another part is equity the debt has less risk compared to the equity.

Since equity holders are getting equity holders are absorbing the risk of the company as a owner of the company, they are supposed to get a risk premium because of their risk. The risk premium linked to the linked to the pricing of the cost of equity. So, when we discuss about the cost of equity, we have to understand that you have to price the cost of

equity first then you will go then you will go and price the Wacc's of the company or estimate the Wacc's of the company.

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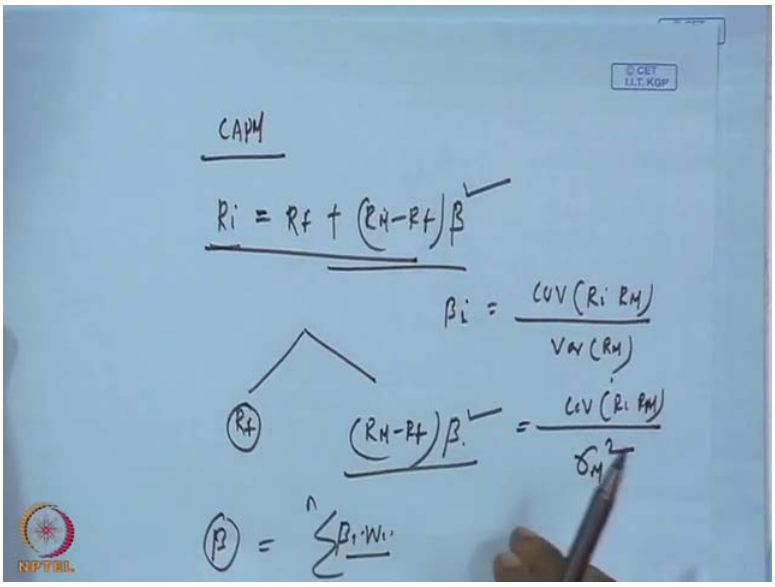

To understand that the when from the capital asset pricing model we came to know, we generally assume the cost of equity the cost of equity depends upon the risk premium and the beta of the beta of the company. So, cost of equity a price of the suppose cost of equity is R i the cost of equity, then we have to understand that a risk free interest rate and the market risk minus the risk free interest rate into beta of the company.

Here, R i is the cost of equity or return from the equity return from the equity or the return from the asset of the asset of a capital asset, primarily equity here. The risk free interest rate because if I invest in capital market, I have to if I have a some amount of money, I want to decide whether I should go for capital market that is equity investment or some other kind of investment, I have a opportunity cost because if I go for equity investment I should get a, I my opportunity cost is risk free interest rate, I supposed to get minimum return that is a risk free available in the market.

If I am investing in capital asset in the equity market, I suppose get a risk premium beyond the risk free interest rate. The risk premium depends upon which equity you are investing. Equity, every equity is a beta the beta we know that the proportionate change in the price of the equity return from the equity, to the proportionate change in the index

return. So, we when the company return is increasing, how much it is how much percentage increasing with the index of the market.

So, the relative strength relative return from the equity relative return of the equity against the market is the beta. So, beta each equity has a beta when you have a portfolio of equity you have to estimate the portfolio beta, which is nothing but the weight of each equity in the portfolio. That is portfolio single equity is that portfolio equity is the portfolio asset i 1 to n, there is a portfolio beta will come over here. Individual beta into the weight of the individual equity that if you multiply then you will get a portfolio beta, portfolio beta in a particular company there are many equities will be there.

So, each equity has a own weight and each equity has a own beta. So if you multiply the weight and beta you will get the portfolio beta of the portfolio beta of the company. So, when you understood when you understand that when I when we are going to invest in equity market, we should get a risk premium because we are absorbing the risk by investing in the capital market. The risk premium is nothing but the market return minus the risk free return into the beta of the equity.

So, here the beta of the equity is the index, the return of the equity against the index. We generally calculate the beta of the equity as we know in the from corporate finance, the covariance of covariance of equity and between the covariance of equity and the market depicted by the variance of the market, here R represent the return.

So, suppose our our asset is our equity asset is i then covariance of return of equity i in the market as R m is the market in case of India, suppose a N A C in return, N A C is the return of N A C and suppose R is the Reliance company shares the return of the Reliance company share, the covariance, the relation among these two return divided by the variance of the market. The variance of the market, give us what is called the beta of the company. In other words it will be covariance of R i and between R i and R m, divided by variance of the market, variance of the market that will provide the equity the return from the equity, or the beta from the market.

So, when you take the beta when you estimate the beta then after estimating the beta we know the return from the market, we know the risk free return you can calculate the return from the equity or the cost of equity indirectly. But here you have to understand that the beta is a systematic risk or the market risk of the market risk of the equity.

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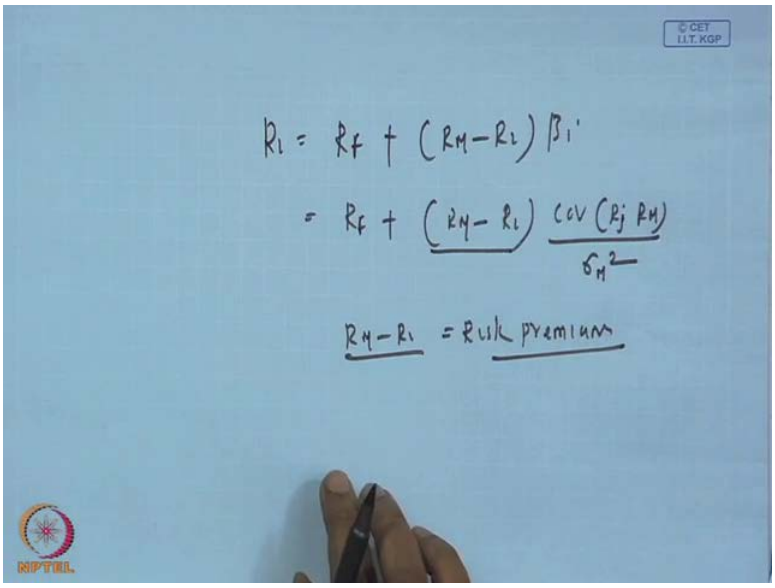

When I mentioned R i, R i here risk free return, market return minus risk free return into beta of i or risk free return R f is a risk free return market return minus the equity return into covariance of covariance of equity and market divided by market standard deviation, market risk that will be our that will be our beta.

Here you have to have these R m minus R i, R f minus R i is the risk premium, risk premium because by investing, by investing in equity market I suppose to get a premium, premium nothing but beyond the risk free interest rate. R f is the risk free interest rate available in the market and these two these provide us how to price a equity in the market, but when you discuss about equity in international market, it will be different capital asset pricing model or the pricing of a asset will be different from the domestic market.

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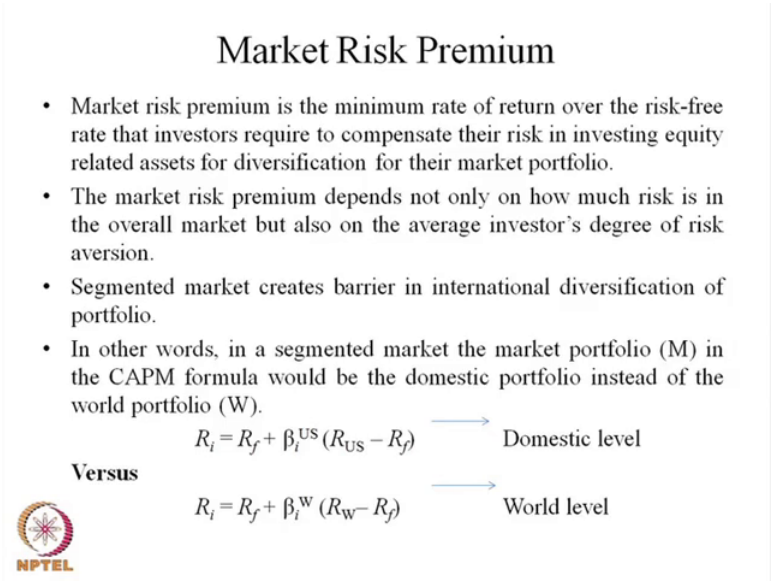

So, why a market premium arise? Market premium arise because that the individual is investing in a in a in a risky asset that is equity and he is suppose to get a premium for investing in the risky asset, but the market premium related to the market risk, that is the volatility of the index and also how much, how much risk the person is going to absorb as a investor. What is my risk appetite if you want to absorb more risk. Then risk premium will be more. You want to absorb less risk, risk premium will be less.

So, the risk premium depends upon not only from the volatility of not only the volatility of market, but also the risk appetite of the investor. So, generally, generally it depends upon a segmented market or a integrated market; segmented market, because in a segmented market the movement of free movement of capital is not there. Free movement of capital means there is a risk capital account convertibility is not 100 percent. There is a restriction in the movement of capital from one country to another country.

If the restriction is there, then domestic capital asset pricing model and the international capital asset pricing model will be different because since restriction is need not there the return from it is domestic market a returns in the an international market will be different. If restriction is not there, then there will be free flow of capital from one market to another market, from one country to another country, and in this way the law of one price prevailed.

So, that time the domestic market itself is international market. So, when you when you when we prepare the capital asset pricing model we have to understand that whether the country is integrated with the international financial market or there is a segmentation between domestic market and international market. If it is a segmented market then domestic capital asset pricing model will have different level then the world capital asset pricing model.

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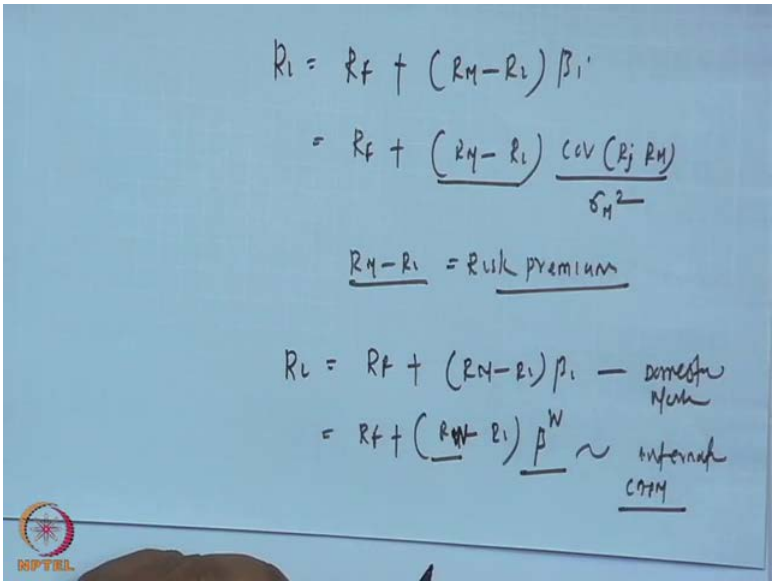

So, suppose in case of India a India where domestic capital asset pricing international integration is very less. We have a separate capital market for Indian context and also separate capital market for a world level asset. So, here when in case of India it will be return from return from the market that is NSE return from the equity and beta of the equity here domestic, domestic market and if you price for the international the risk free standard market return, market return is market return minus your market return become world return, world market return. That is W i put or W minus the interest here beta W, here R w and beta w are international market return here international pricing model. It will be international C A P M, capital asset pricing model.

So why, because in a when the country not integrated then domestic market will be separate and international market will be separate. Domestic asset price in domestic market depends upon domestic market market risk and the domestic market return. If the

international asset suppose rise in international market it depends upon international return and international beta.

So, here two different models will come because the markets are not integrated, they are segmented. There is a there are reservation or the restriction of movement of capital from one country to another country. So, we have a in Indian context if you see after the current account convertibility is there fully, but capital account convertibility is not fully. So, there is a restriction on the movement of asset movement of capital from India to abroad and from abroad to India. Restriction provide two different capital asset pricing model in case of India, one is the domestic market, another is a international market.

If you are taking into account international equity the new York stock exchange or the NASDAQ or the London market will be the world market for us, but for our own domestic country NSE may or BSE may be the market return. So, here if you take into account the two different pricing model for India, since Indian market is not fully integrated with the world market system. So we have a different capital asset pricing model.

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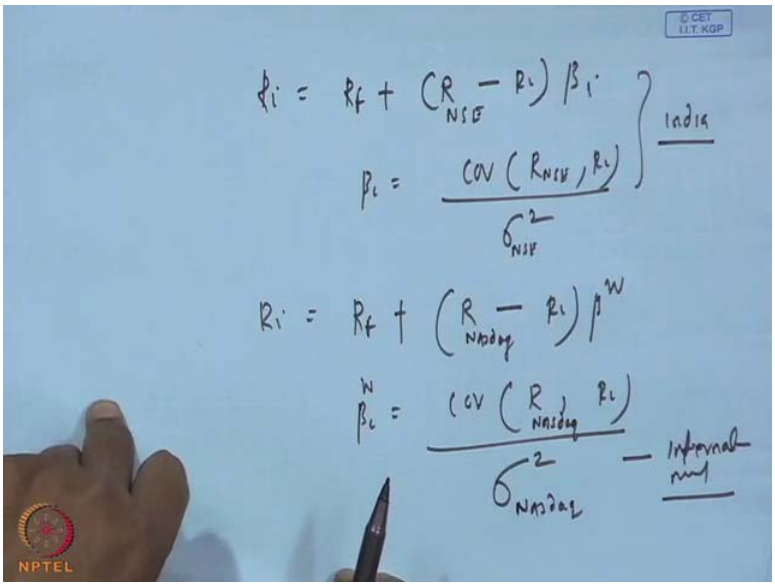

We have a one domestic asset capital asset pricing model where there price of equity depends upon the return and here R m will be, suppose in NSE return minus R i and beta of the R i and beta of R i will be covariance of NSE return and equity return divided by the NSE market risk.

Similarly, is a domestic capital asset pricing model. In India, it is India context since India is not fully integrated with the world financial system, but in case of world suppose if I take a equity market equity return of Infosys, Infosys listed in n listed in NYSE or NASDAQ. So, it will be different the risk free interest rate minus the here R n will be the NASDAQ return minus equity return and beta of world or beta of U S. So, here also separate and beta will be beta of world will be covariance of that covariance between the NASDAQ return and equity return divided by sigma of that is sigma square of NASDAQ.

So, it will be different because here it is international level capital asset pricing model. Here what we understand here, you understand that the capital asset pricing model depends upon segmentation or integration. If it is a integrated financial system the domestic capital asset pricing model will be same as international capital asset pricing model. If there is because there will be free flow of capital from one country to another country, the law of one price prevail in the market and there may not be any difference between domestic return and international return. But in case of segmented market they are segmented because of government policy, restriction on movement of capital and this lead to what is called a different return in different two different market.

In domestic return we have a different link and international return also different and this lead to what is called a international capital asset pricing model. Here you have to you have to introduce here international return and international covariance between equity and return and international market risk both and this concept segmented and integration generally prevail in all in all market. Because, you will rarely find any particular country market is fully integrated with the world financial system. It is not the completely integrated, is not also completely segmented there will be degree of integration and degree of segmentation.

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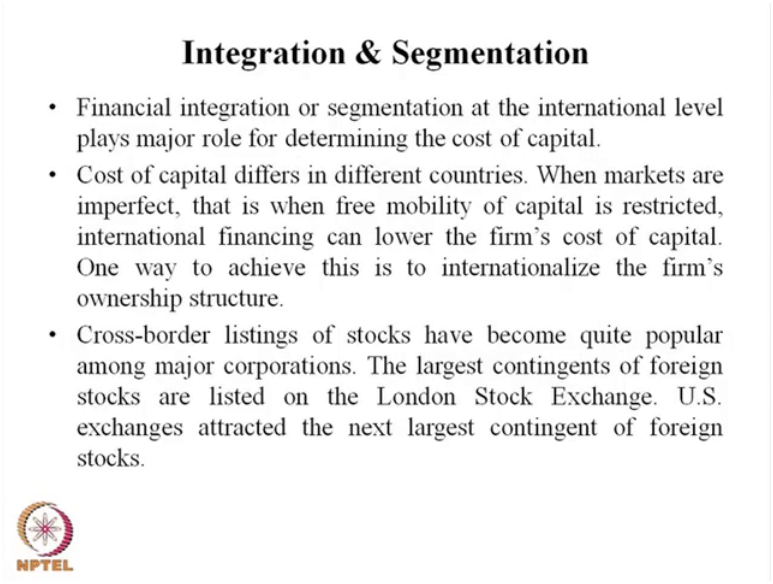

So, as mentioned here, the when the market is become integrated we observe that return from domestic market will be same as return from international market and there is a there is less scope for the company to source the capital from different country. And the domestic capital asset pricing model nothing but international capital asset pricing model, there is no further room to reduce the cost of capital.

However in case of in in case of segmentation, there will be scope for the domestic (( )) for company to raise capital from abroad as lowest possible cost and this leads to what is called reduction of overall capital capital, capital cost of capital for the company. And the cross listing of share or cross listing of debt provide some degree of some degree of benefit from the from the domestic company to reduce the overall capital structure, overall cost of capital. And when the capital structure of domestic company internationalize, it is not the domestic beta, but is the international beta who play the wait and rule in deciding the cost of equity and overall cost of capital for the company.

To understand that integration and segmentation two sides, two extreme side you cannot have completely integrated, you cannot be you cannot find a particular cannot find a particular country completely segmented. So, there is a degree of integration and degree of segmentation and always there is there is room for company to reduce the overall cost of capital by diversifying their domestic capital structure to for and putting international debt or international equity in the domestic capital structure itself.

So, when they diversify the capital structure by internationalizing the equity and debt, this this provide a difficult situation for the company to handle the overall cost of equity. It may happen that company may, company may lose some degree of independence some degree of corporate decision making process by diversifying their equity base. Because, when you internationalize or cross list your equity and then international pulls and pressure effect the corporate decision making process. And this provide some degree of restriction and some degree of what is called barrier for the company to over, over, over a emphasize on the international capital structure.

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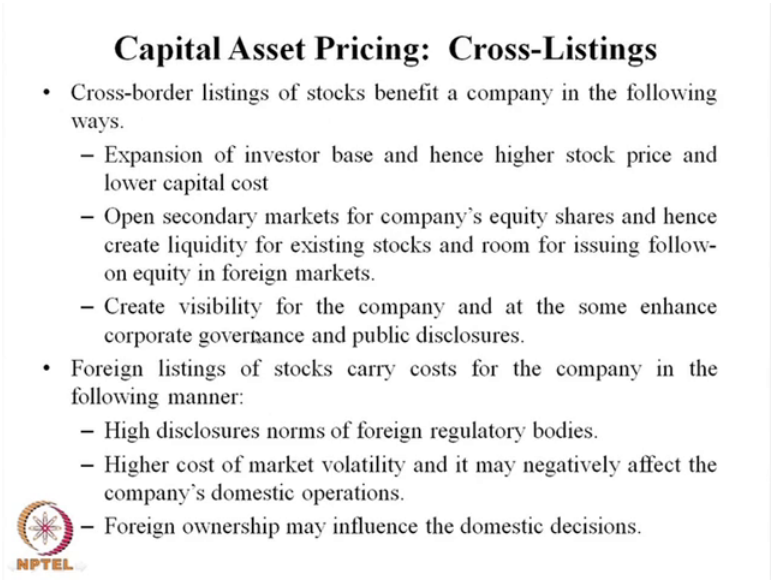

So, when you discuss about the benefit or the what is called a difficulties in international capital asset pricing model, you have to understand that the benefits are sometimes more than the some more than the what is called the problem of difficulties in in a international aspect of capital structure. The benefits are expansion of investor base. When you cross list the company a particular company cross list these equity they provide a large pool of investor.

The large pool of investor provide a what is called more liquid to the company assets or company equity. So liquidity or the aspect of company may increase because their shares will be listed in different company different stock exchange of the world. So, this secondary market trading will increase, a large investor pool also provide more liquidity to the company equity. Similarly, the company viability or the visibility of the company

also increase because this enhance the corporate governance of the company and company fix company, try to improve its corporate governance because they know that their shares are listed in different stock exchanges. This provide the market, market kind of what is called market pressure on the company to perform well. That also the market visibility provide some extent of extra pressure on the company to become more viable, to become more efficient and productive in handling the company, company day to day balance sheet.

So, company will be in pressure to provide more profitability for the investor or the share holders. However, there are many such kind of disadvantage in cross listing of equity or more emphasize on the diversification of international capital structure. The here company has to disclose, the high disclosure norms in as per the requirement of the regulatory requirement of the different stock exchanges. Company has to company has to manage the corporate governance and also there will be investor, international investor, international level of director or ownership in the company day to day basis. There are international ownership or the international director may influence the decision making process of the company on the every moment.

The foreign ownership may influence domestic decision process also. The higher the cost higher cost of market volatility and it may negatively affect the company domestic operation. It may happen that the international volatility will also come to the company day to day decision making process because stock markets are highly volatile, then international volatility may also effect the cost of equity of the company. There will be more demand on the on the part of the investor for provide more dividend and also provide pressure on the company to perform well in the capital market. So, definitely there are number of difficulties there are number of positive benefit for international, internationalization of capital structure of a domestic company.

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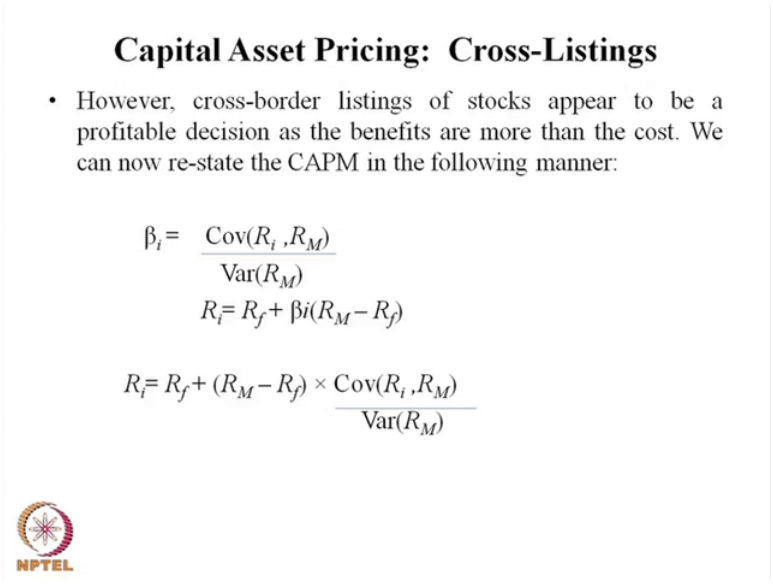

So, when you when you mention that there is a internationalization of capital structure of domestic company, you have to understand that how to estimate the capital structure. What are the, what are the pulls and pressure, what are the other variables which influence the capital structure of domestic company.

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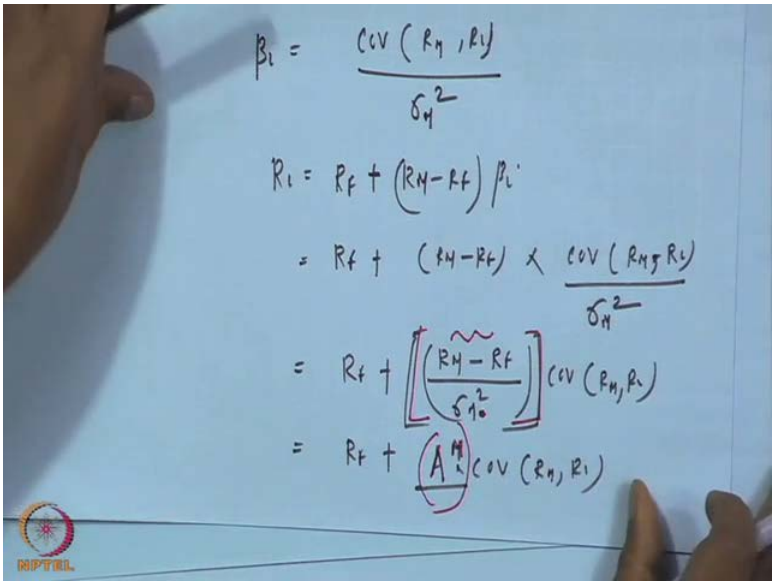

Here I mention earlier that the beta is be it when a company cross list their share the beta will be covariance of market and in a company return divided by market standard deviation or the market risk. Here R i is equal to that is, equity of that cost of equity will

be the cost of a risk free interest rate minus the market interest rate and beta of the equity. So, further you can write here, risk free interest rate R m minus R f. Here I put the beta value covariance of market and covariance of market and R i by variance of market, by standard deviation of the market. So, when you go for (( )) I can mention here that R f, R f and R m the risk premium, risk premium and covariance of R m and R i. This just I readjust the equation and I can write here, risk free risk free interest rate into a covariance of R m and R i, where A m is, A m is this part, this part is A m.

In other word, in other word it will be nothing but what is we are doing a separate calculation process where I am mentioning here some degree of what is called some what is called a separate capital, separate variable A m. A m is a value this is the value of A m and this is covariance of R m and R i. This this A m tells us that risk premium divided by volatility of the market. The risk premium that is R m minus R f plus by divided by volatility of the market, the market volatility that is A m for my sense. This equation aggregate risk aversion measure A m, A m also nothing but a aggregate risk aversion measures. How much risk are how much risk aversion, that is, a this is what is called this part is nothing but the risk premium divided by the volatility of the market. This part we are calling A m, A m is the aggregate risk aversion index, risk aggregate risk aversion index. We are putting separately.

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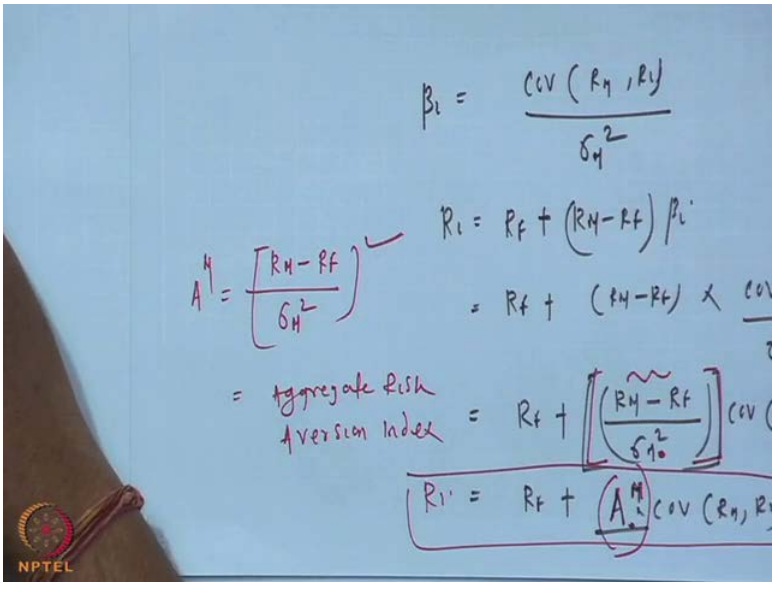

If you see in a here the A m here ,I mention A m, A m here risk premium the market risk minus the risk free interest rate divided by the sigma of the market is called the risk to volatility index, risk to volatility index or any other word. We call it aggregate, aggregate risk aversion index. Risk to volatility or aggregate risk aversion measure, risk and this if you put in a separately, it linked to covariance of market and individual equity or the that along with the risk aversion index provides us that is called the international capital asset pricing model.

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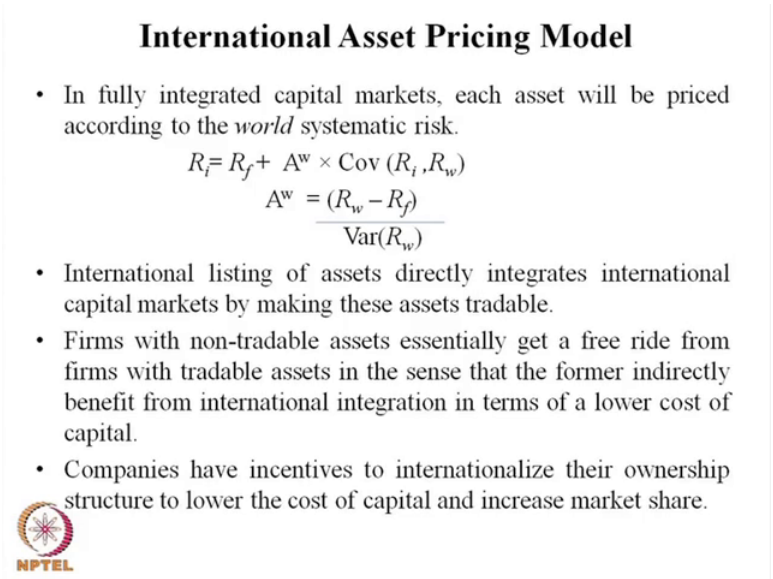

Then question is what is this, when we put separately in you fully integrated capital market each asset will be priced according to the world systematic risk. If the market is 100 percent integrate, there is no scope for no barrier for the movement of asset, the movement of capital. Then this A m become A w. In other word, when the market is fully integrated there is no scope for any kind of barrier in the movement of capital from one market to another market. Then this will be separately calculated. I put here R i, R f plus A w, A w into A w into covariance of world covariance of world and R i.

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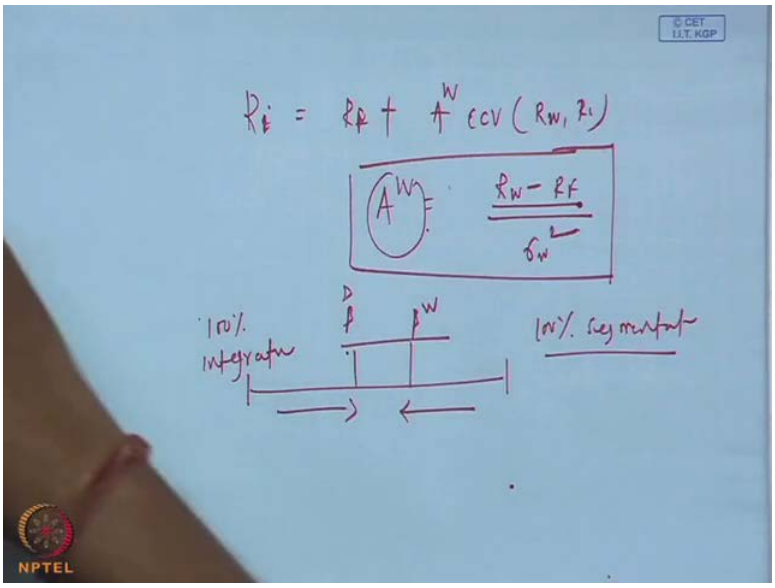

Here A w is the aggregate risk index, that is R w minus R f by sigma w square. Then when the market is fully integrated there is no scope for, barrier for any capital movement. This this will be the market, market beta or global beta. This will be global beta for us, this will be global beta for us and in this case each asset will be priced as per the market as per the international market because this kind of, this kind of thing will never find in real world. What is called entirely 100 percent integration, 100 percent integration and 100 percent segmentation. This you will rarely find in real world this 100 percent integration means each asset will be priced as per this world systematic risk, but 100 percent segmentation is each asset will price as per the domestic market risk.

But this is rarely happen, market will be some extent here either some degree of some degree of segmentation and some degree integration, somewhere the asset will be here and both domestic beta and international beta influence, domestic beta and international beta influence the capital structure of capital structure of a particular company.

So, when you mention that when you mention that 100 percent segmentation and 100 percent integration is not there, it will be in between these two. The international capital asset pricing model is not valid in a, if you say in a larger sense. Say similarly also domestic capital beta domestic beta also not valid in a larger sense. Some extent the both domestic beta and international beta influence the portfolio of portfolio of particular

company capital structure and therefore, you have to take care both side while pricing the asset of a asset at the international market.

So, when we see when you observe that if asset is, asset is listed in domestic market at the same time same asset is listed in the abroad international market. The cross listing you have to see which market, which market beta is more powerful, whether a domestic market a domestic market investor is pulling the beta of the company or the international market investor pulling the beta of the company. It depends upon whether there is a free flow of capital or restriction of capital. If there is some extent of restrictions are there it may happen both asset will be both beta will be different.

However, the different may not may not be there for long time, there will be some extends of pulls and pressure and if the domestic investors are able to purchase the abroad listed capital, abroad listed company shares or the abroad, abroad company invest abroad investor able to purchase domestic market domestic market companies (( )) equity, then the differential price or arbitrage opportunity will be reduced over the year because if you see that now a days. If I are investing both in Indian domestic market also in abroad market in the stock is listed in both both market even in India, another in abroad market the if I take the advantage of any kind of arbitrage opportunity and definitely the beta will be come down to the particularly domestic market beta and abroad market beta will be almost same, almost same as except the transaction cost, except the transaction cost.

So, both will be almost same and there may not be any differential arbitrage available to take advantage of the price movement. Therefore, therefore then in case of a cross listing of share because of the movement of capital or movement of f i or the movement of investor from one market to another market bring the beta at the global level or where there is may not be any arbitrage opportunity for individual investor, to take advantage of the two different price level. Therefore, in case of cross listing both the domestic, domestic market and also the foreign market pulls the beta to a particular level. Therefore, you have to understand that in case of segmentation and integration these two are extreme case and in between the beta will be priced or the equity will be priced as per the, as per the what is called strength and weaknesses of investor in the economy or the in domestic market also in abroad market.

So, here the A w, A w indicate the risk aggregation, risk aggregation index or the what another word I can I can call it as a global systematic risk, where A w capture the global systematic risk, where the risk premium is here, the risk premium is here the premium against the volatility of the world market; this this this capture the global aggregate risk index.

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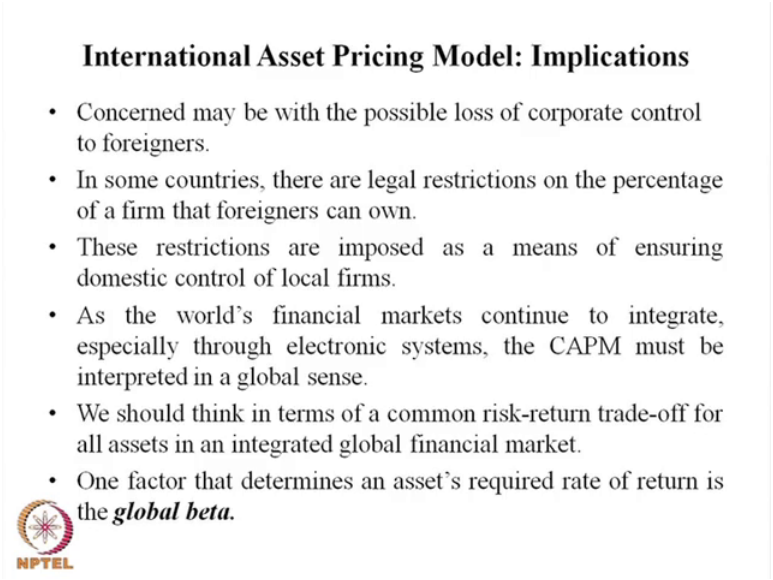

So, when we use this concept, when you use this concept in pricing of the asset or pricing of the equity asset, you should understand that these concepts this concept allow us to estimate the global beta.

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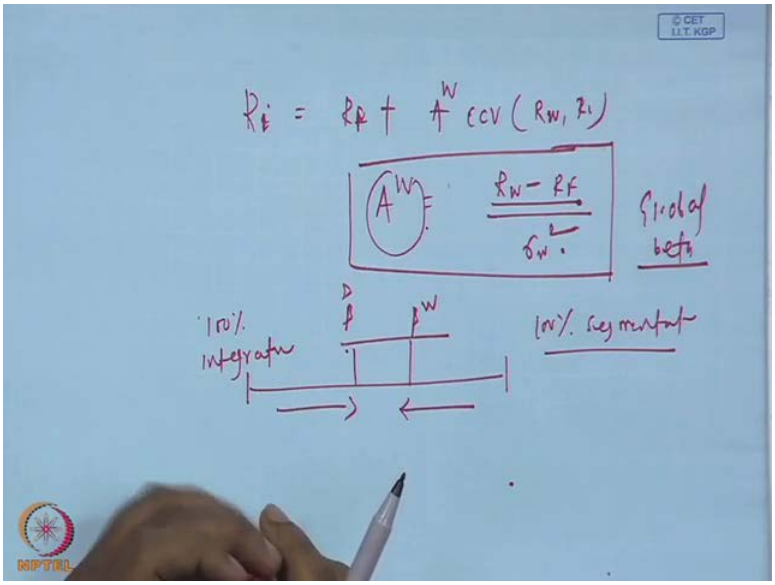

This concept allow us to estimate the the global beta global beta of a company, where the company cross listed, cross listed in many exchanges or more than one exchanges in in particular more and more than one exchanges in as for the pricing of the their asset. This is the global beta we have to estimate that. So, here the foreign exchange market play vital role because the global beta influence they influence the exchange rate also and also exchange rate is being in also influence the global beta, global beta also influence the exchange rate. So, exchange rate risk also factor in global beta itself. So, when you actually use in pricing of a asset, we should understand how to price the a cross listed share the cost of equity or the Wacc's of the company.

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Examples

- Compare the US$ cost of capital for IBM and Sony if US$ risk-free interest rate is 6%, global risk premium 4% and IBM & Sony's global equity betas in US$ estimated at 0.83 and 1.66 respectively.

Answer

US$ denominated cost of capital can be estimated using the following equation.

$$R_i = R_f + \beta_i^{US}(R_{US} - R_f) \text{ where}$$

Global Market Risk-premium : 4%

Equity Beta IBM: 0.83

Equity Beta Sony: 1.66 Risk-free interest rate in US: 6%

$R_{IBM} = 6\% + 0.83 * 4\% = 9.30\%$

$R_{Sony} = 6\% + 1.66 * 4\% = 12.60\%$

So, when through example we will do the same thing. Let us compare, let us see the example here, the example is here. The compare the US dollar cost of capital for IBM and Sony, if US dollar risk free interest rate is 6 percent global risk premium is 4 percent and IBM and Sony's global equity beta in US dollar itself 0.83 and 1.66 respectively. Here what we have given to us, you have to price the cost of equity in terms of US dollar, cost of equity in terms of US dollar for IBM and Sony.

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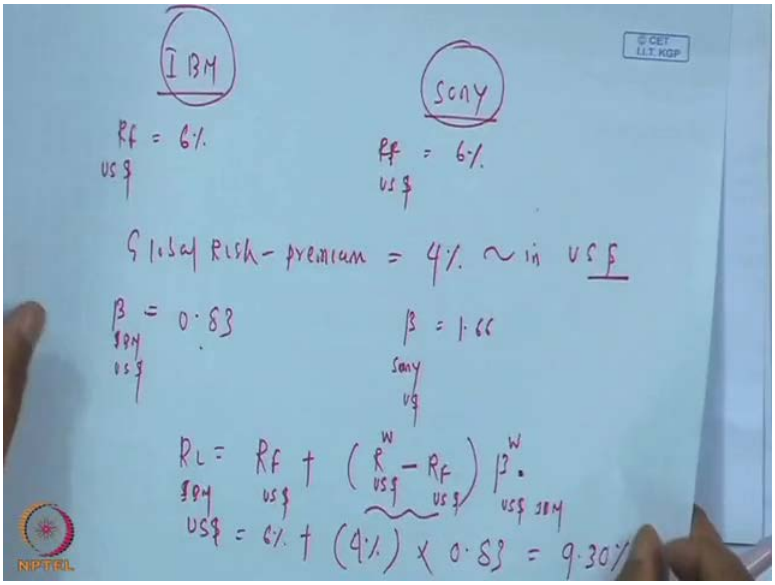

So, we have two company, one company is IBM another company is Sony. They are international company their equities are internationally, international, internationally listed in different stock exchange. You have to find there cost of cost of equity in US dollar. So, what given to us risk free interest rate both in US dollar, risk free interest rate in US dollar is 6 percent, this will be same for same for Sony and same for the IBM at 6 percent. It does mean US dollar risk free interest rate that is any particular risk free interest rate of US dollar at 6 percent.

Then we have given to us that risk premium the global risk premium, we have global risk premium given to us, global risk premium at present 4 percent in US dollar, global risk premium is 4 percent in US dollar. So, and also we know that in case of IBM the beta, beta of IBM in US dollar, US because it is listed in U S. So, global beta of IBM in US dollar, beta of I B M, IBM and Sony global equity beta; in case of IBM it is 0.83 and in case of Sony the global beta of Sony in US dollar, in US dollar it is 1.66.

This was given to us, but we have to price what is the cost of equity of IBM in US dollar? What is the cost of equity of Sony in US dollar? We know that cost of equity calculation R i is equal to, suppose it is Sony company IBM we are doing, IBM is nothing but we are calculating in US dollar. Cost of equity of IBM in US dollar will be risk free interest rate in US dollar plus the risk premium risk premium global risk premium global risk premium I put R w in US dollar minus risk free risk free interest rate in US dollar into beta of world beta or the in US dollar of IBM. If you know these then you can price the cost of equity of you can estimate the cost of equity of IBM. Everything we know that in case of risk free interest rate in in US dollar is 6 percent global risk premium is 4 percent.

So, global risk premium is this one for us, because risk premium nothing but the differential amount of market return and risk free return. So, we know that risk premium in each 4 percent into beta of beta of IBM that is world beta of IBM in US dollar is we know that beta of IBM 0.83. If you multiply these two three we will be getting that IBM, IBM cost of equity that is 9.30 percentage.

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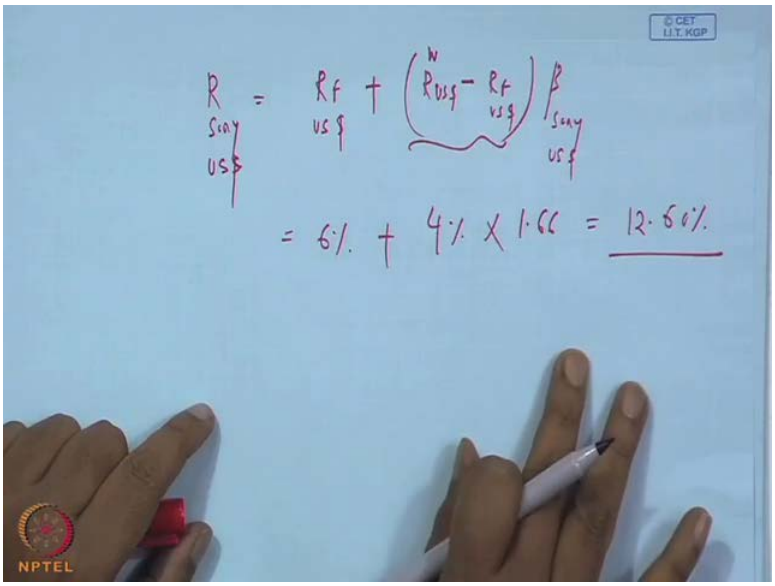

Similarly, you can calculate the Sony, Sony case will be till how much, so in same thing. So, here same formula you have to use that in case of Sony, Sony equity return in US dollar will be risk free interest rate in US dollar plus risk premium that is, risk premium risk premium of risk premium we also know and beta of Sony in US dollar also you have

to understand that. So, here we know the 6 percent, global risk premium this much is 4 percent and Sony beta is equal to 1.66 given to us. This will be 12.60 percentage is the cost of equity of Sony company in US dollar, cost of equity of Sony company in US dollar.

What does it mean here, because Sony company listed in particularly different market and you are estimating the cost of equity of Sony company in US dollar is 12.60 percentage, cost of equity of Sony company in US dollar is 12.6 percentage. So, question is here the risk premium is given to us, the global risk premium that is US dollar return, US dollar that is NYSE may be in NYSE return minus the risk free return of the US the risk premium given to us for that reason we are in a position to estimate it.

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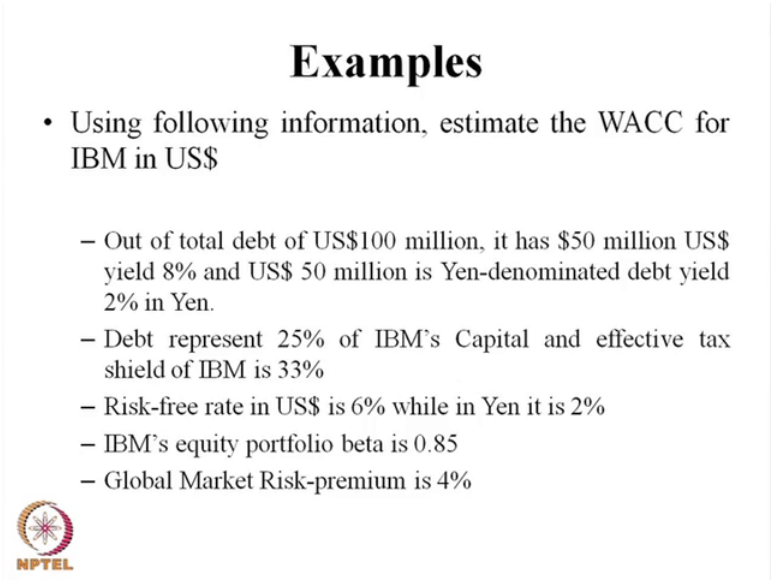

Now similarly, another example if you can do that here it is a very big example. So, you have to calculate the Wacc's of for IBM, Wacc's for IBM in US dollar. So what are the data given to us, the data is here we have given you have to estimate the Wacc's of IBM.

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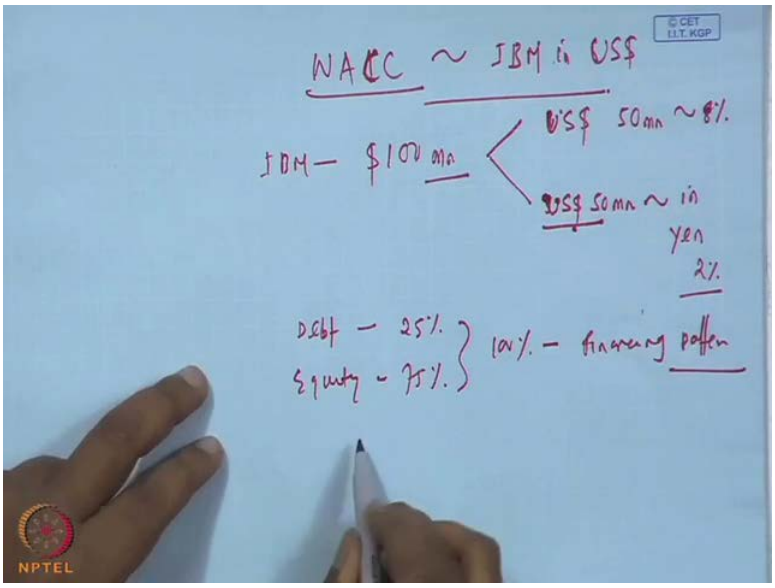

Wacc's means, Wacc is weighted average cost of capital of IBM, IBM MNC company in US dollar. You have to estimate that in US dollar, what is given to us given to us here out of out of total debt the IBM has 100 million debt. Out of total debt of 100 million it is 50, 50 million in the IBM has debt how much that debt? IBM has debt of 100 million, 100 million in US dollar and this 100 million in US dollar have two part, one part is 50 million US dollar yield 8 percent and 50 million is yen denominated debt yield 2 percent.

So, debt represent 25 percent of IBM capital and effective tax shield of IBM is 33 percent. Risk free interest rate in U S, US dollar is 6 percent while it in yen it is 2 percent. IBM equity portfolio beta is 85, 0.85, global market risk premium is 4 percent. So, 100 million debt is 100 million debt total debt and total debt 100 million divided into two part, one part is in US dollar, one part in US dollar 50 million and its cost is 8 percent and another part, another part is 50 million, 50 million US dollar, but it it is in, it is in yen, yen, 50 million US dollar. But, yen denominated cost, the cost is in yen the 50 million US dollar is amount but, cost the where the company is paying in yen return that is Japanese yen debt that is 2 percent, 2 percent in yen.

So, and the debt is the company debt, debt amount is company capital structure debt is 25 percent and equity the equity financing is 75 percent, this total 100 percent is financing pattern, financing pattern. So, debt financing is 25 percent equity financing is 75 percent. Now risk free interest rate given to us that is in US dollar 6 percent and while

yen it is 2 percent. IBM equity portfolio given to us 80.885 and global risk premium 4 percent given to us.

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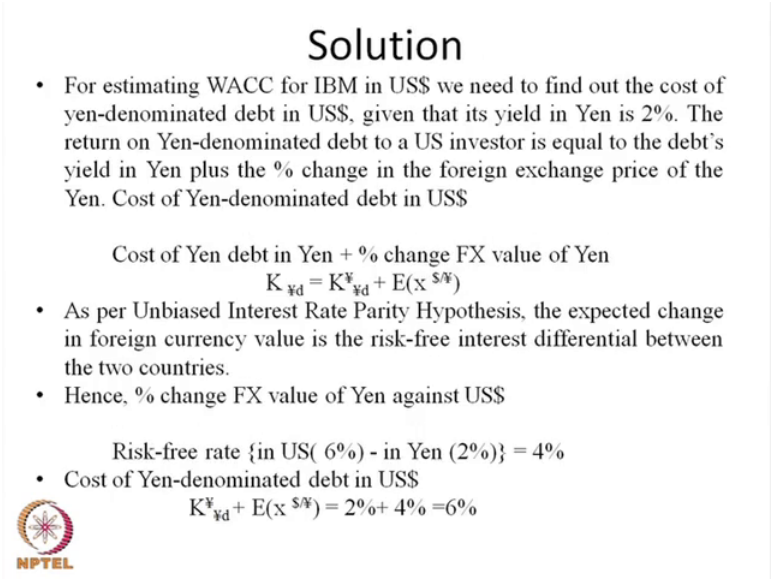

How you can estimate this because here I have to estimate the Wacc's of the company the Wacc's is nothing but the debt, debt part of cost and equity part of cost. Total will give us Wacc of the company, weighted average cost of capital. So, we have to see that in case of Wacc's the cost of yen in debt plus Forex market change of yen, we have to estimate the yen debt cost first yen debt cost first because the 50 million dollar debt is given to us. But, 50 million in dollar debt which is denominated in yen is not given to us. So, you have to understand the yen debt yen related debt cost first. So, yen related debt cost 50 million is there that debt is 2, 2 percent.

However, however the risk premium in the market is 6 percent. So, whenever there is a change in yen and change in dollar, the dollar or yen the relationship that is called interest rate parity, interest rate parity is 8 percent. That interest rate parity you have to understand that 6 percent is risk free interest rate in in US dollar and 2 percent risk free interest rate in yen. So, interest rate parity on that basis yen cost will change so the interest rate parity is 2 percent, 6 minus 2 percent, is a 2 percent interest rate parity.

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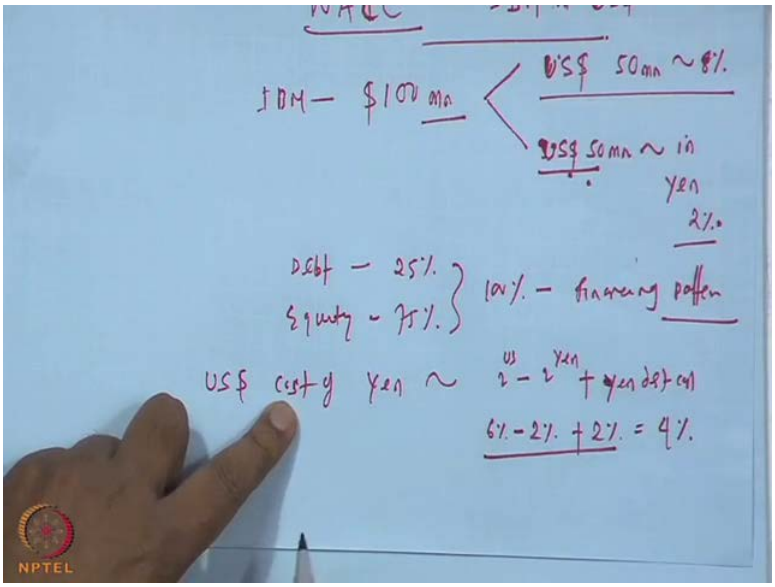

So, the debt part debt part you have to understand yen you have to estimate in US dollar. To understand that US dollar, US dollar cost of yen will be the interest rate parity the in US minus interest rate in yen plus you have to understand here the two separately coming that what is called yen debt cost plus yen debt cost. That will be the cost of cost of US dollar in yen. So, it will is interest rate parity is 6 percent in yen and US dollar 2 percent in yen and yen debt is 2 percent though, the cost of debt cost of yen debt in US dollar will be 4 percent.

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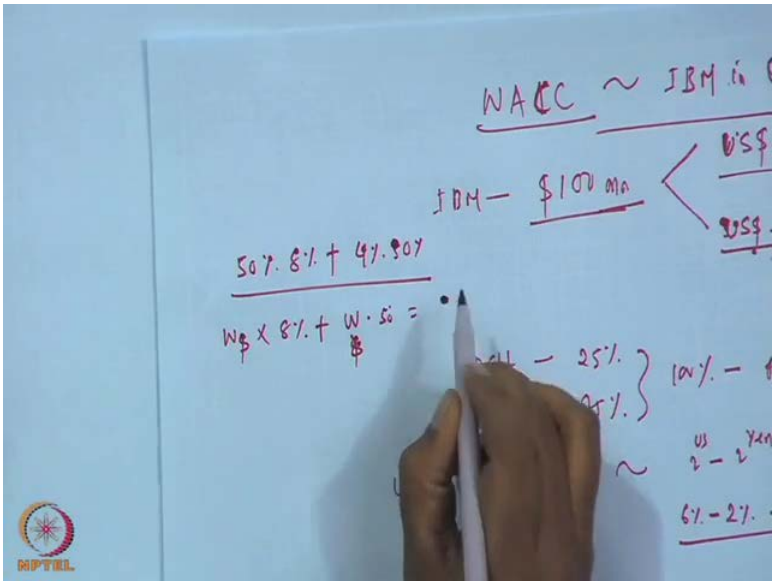

So, here if you see this is, this is 8 percent 50 million and 4 percent 50 million. So, the cost of debt 100 dollar, 100 million debt will be how much the 50 percent 50, 50 percent into 8 percent plus 4 percent of weight into 4 percent. Also at the rate of 4 percent at the rate of again 50 percent, that is the cost of debt. So, in cost of debt where what it mean the cost of debt is here debt, debt in dollar into cost of debt plus debt in debt in yen debt in dollar in cost of debt 50 percent that will give you the total cost of debt in yen.

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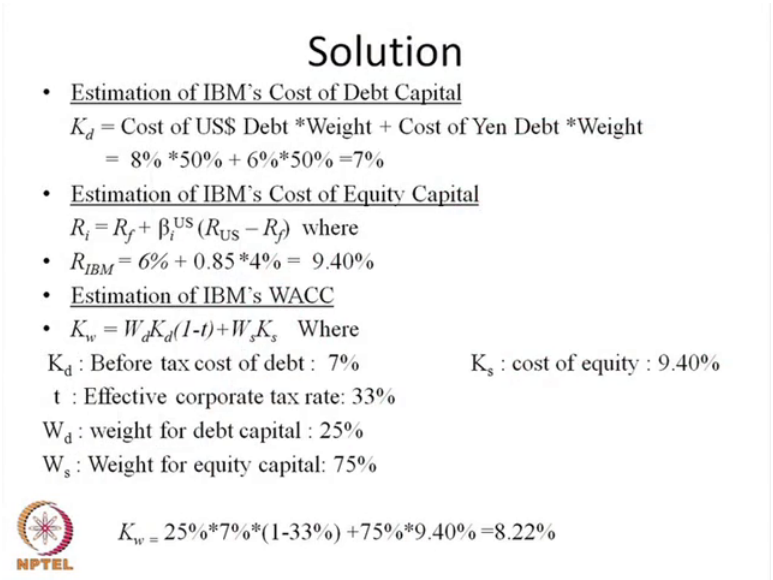

So, the total cost of debt if you see here is 8 percent and 6 percent, 7 percent and estimation of IBM equity as I know everything given to us 6 percent, 0.85 percent and 4 percent 9.40 is the IBM cost of equity. Similarly, cost of IBM Wacc's is equal to debt cost and minus 1 minus t. If you see the here one minus t is the tax rate, debt cost already calculate 7 percent and debt cost, debt already calculated 7 percent and 25 percent debt is there, 25 into 7 percent 1 minus 33 percent that is, cost of debt reduced because of tax and 75 percent into 9.4, 8.22 percent this is the cost of Wacc's of the IBM company.

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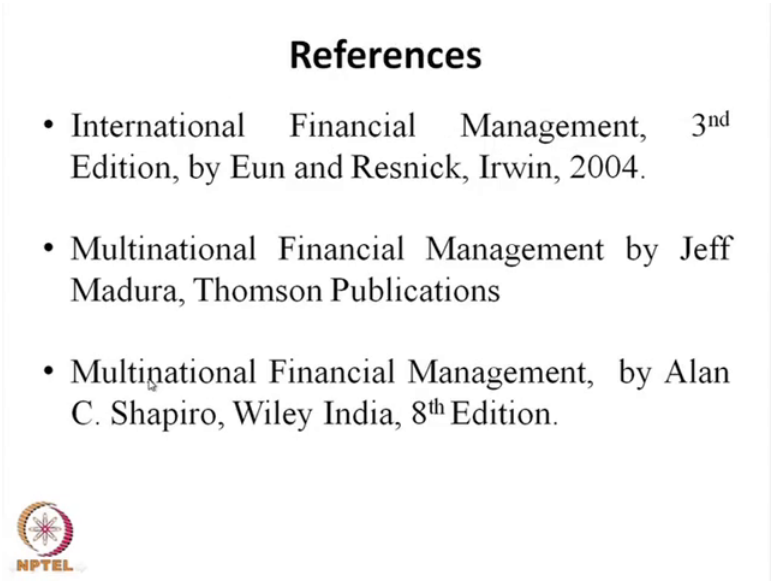

So, some references I have given to here you can go through the references.

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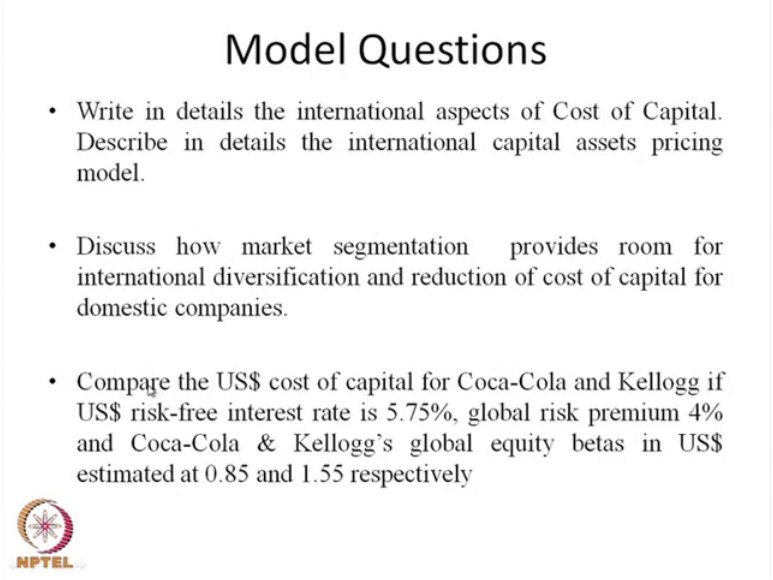

And some model question I prepared for you. Write in detail the international aspect of cost of capital? Describe in detail the international aspect of pricing model the both you have to describe. Write in detail about the cost of capital and describe the international capital asset pricing model. Similarly, how segmentation and and provide scope for diversification of cost of capital? You have to discuss about that and I have given you a small problem to you, compare the US dollar cost of capital for Coca Cola and Kellog. If

the risk free interest rate 5.75 global risk premium is 4 percent and coca cola and Kellog global equity beta in US dollar 0.85 and 1.55 percent respectively. You calculate the estimate the cost of cost of equity for Coca Cola and Kellog separately.

Thank you.