Security Analysis and Portfolio Management
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Lecture - 01
Overview and Introduction

Welcome to this course on Security Analysis and Portfolio Management. This is being brought to you by IIT Roorkee under the NPTEL program of the Government of India. Let us start with the focus areas of this course.

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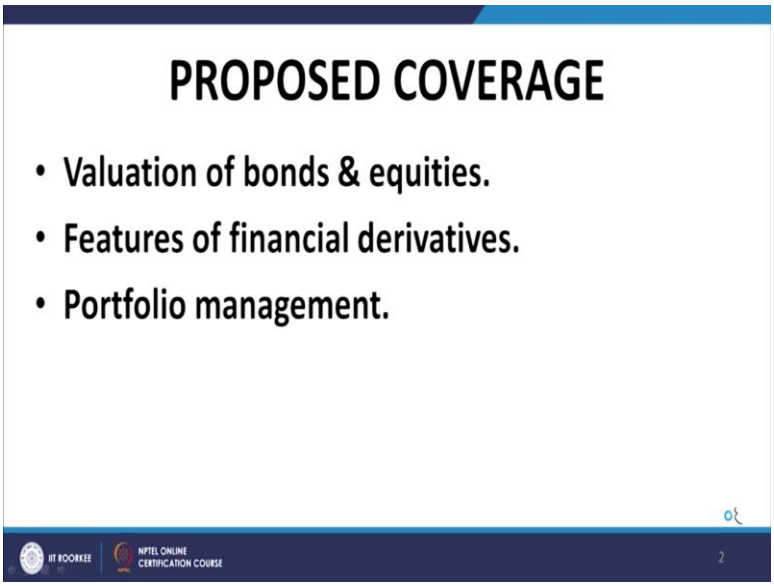

The focus areas of this course which I plan to cover ar:

(i) the valuation of bonds & treatment of interest rate risk;

(ii) the valuation of equities & fundamental analysis;

(iii) features of financial derivatives

(iv) mean-variance portfolio analysis & management

(v) the CAPM, APT portfolio models.

The course is very much relevant to the MBA students. In fact, security analysis and portfolio management is a traditional elective that is offered in the finance stream of all business schools for MBA students. The students of Chartered Financial Analyst (CFA) program will also find it extremely useful, as indeed will the students of professional courses like Chartered Accountancy, Cost Accountancy and Company Secretaryship. The students of commerce and management, undergraduate and graduate courses will also find it quite useful.

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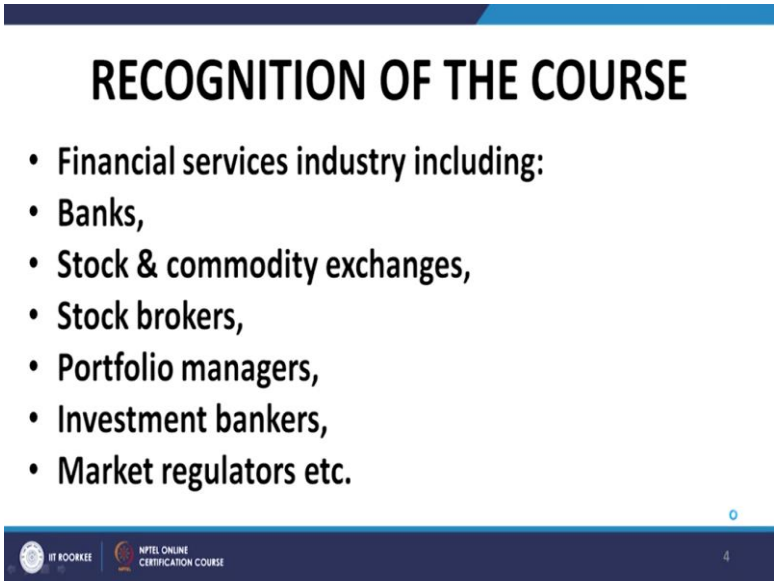

This is a standard course. Therefore, it attracts widespread recognition in the entire spectrum of financial services industry that includes banks, stock exchanges, commodity exchanges, stockbrokers, portfolio managers, investment bankers, and market regulators. So, the recognition of the course is quite widespread.

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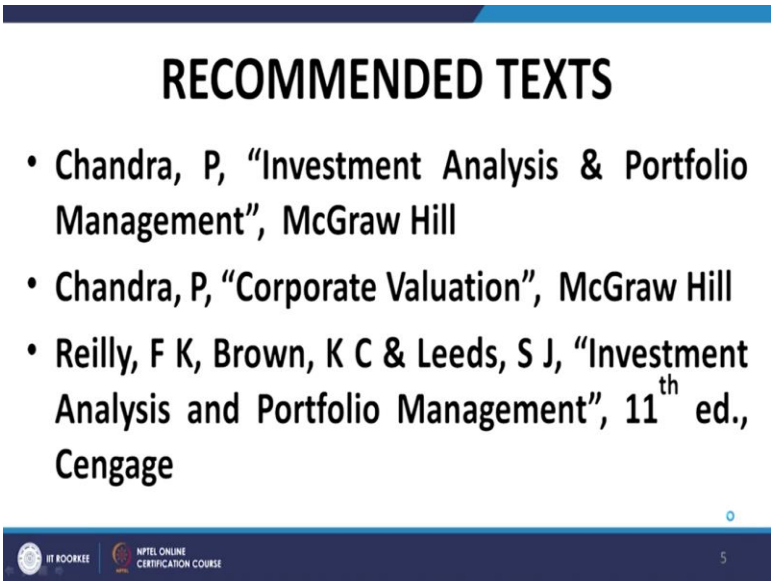

Now, we come to the recommended texts. As far as the security analysis part is concerned, the texts are listed on this screen. Prasanna Chandra's text "Investment analysis and portfolio management", a McGraw Hill publication.is very useful. It is very, very well written, very attractive style. Prasanna Chandra has another very valuable text by the name of "Corporate Valuation" which will also be useful in the context of valuation of equity shares.

Then we have Reilly, Brown and Leeds, "Investment analysis and portfolio management". This is again a standard textbook which covers the content of this course in a lot of detail. But my favorite, as far as portfolio management is Elton and Gruber's text,

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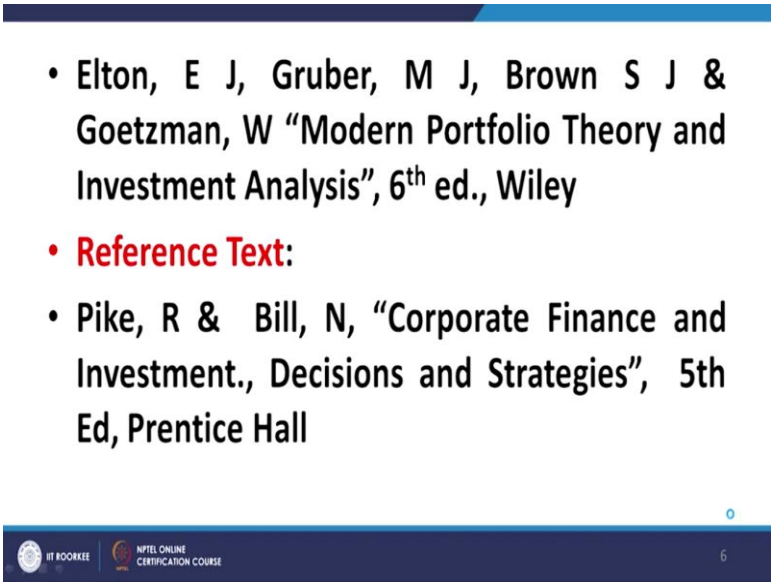

I use it for my teaching at the IIT Roorkee business school. It is titled as "Modern portfolio theory and investment analysis". It is very, very well written in terms of providing a sound mathematical backup to most of the results that we use in portfolio theory. That is the USP or the hallmark of this text. As reference text, we have Pike's book on corporate finance and investment, which we shall be occasionally referring to.

The USP of this course: Well, my target is to bring to the learners a consolidated, holistic package of material, which will comprise not only of video lectures (video lectures will of course be there), but also exhaustive PPTs and supplementary notes, together with the assignment material and the work through problems that will be provided periodically to the students who enroll for this course. So, the attempt is to bring to you a comprehensive package of knowledge in this particular subject.

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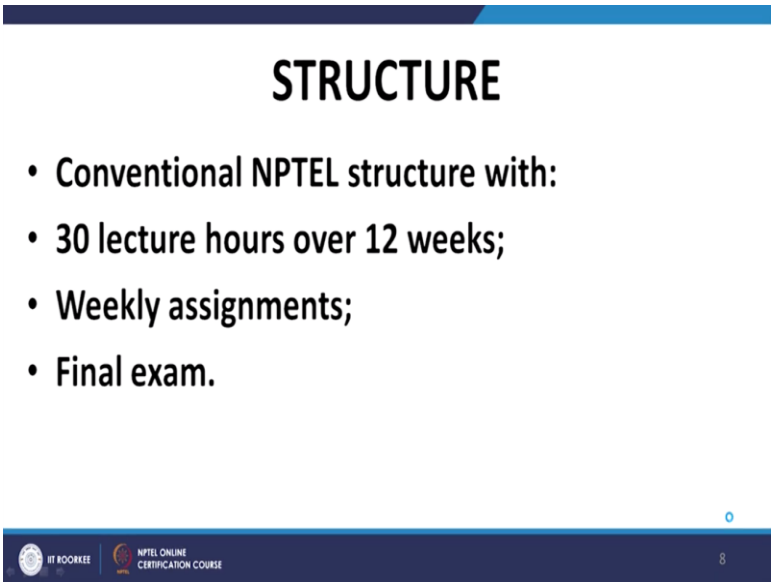

As far as the structure of this course is concerned, it is a conventional NPTEL program of 12 weeks. We will have 30 lecture hours at the rate of 5 lectures or two and a half lecture hours per week spread over 12 weeks, as I mentioned just now. You will have weekly assignments which you have to work out and submit in the following week, and they would form a part of the evaluation process and then you will also have a final exam at the end of this course.

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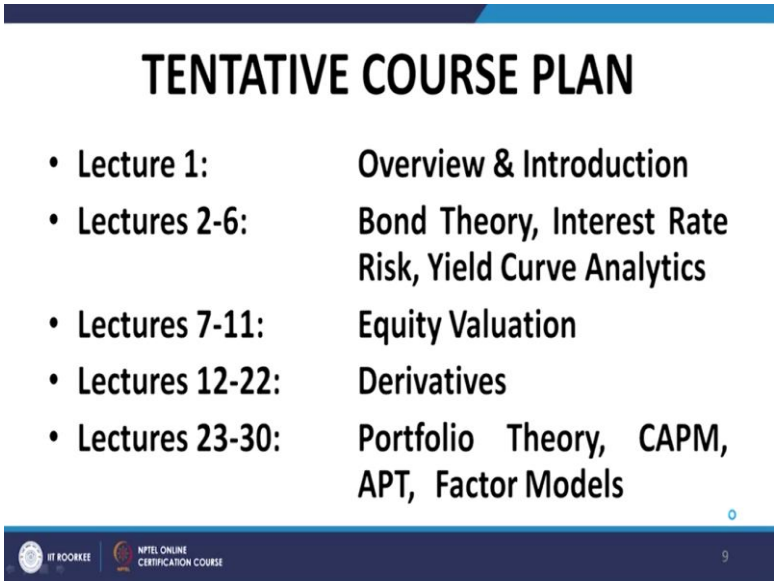

The tentative course plan that I have in mind at this point in time is as follows. In the first lecture, I propose to give an overview of the subject and provide a lucid introduction. In lectures 2 to 6, I plan to discuss bond theory, that is, the medium and long term investments in fixed income securities, the pricing of bonds and the various measures of returns in relation to bond investments. Then I plan to move on to interest rate risk and the dynamics and the analytics in relation to yield curves.

In lectures 7 to 11, I propose to cover equity valuation, the various models that are used for the valuation of equity that include dividend discounting, free cash flow discounting, income based valuations, asset based valuations and relative valuation. I propose to cover each of them in this segment of this course, that will relate to equity valuation. A peek into the concepts of fundamental analysis and technical analysis will also be a part of this segment. However, detailed notes on these two topics would be circulated to the enrolled students.

Derivatives would be covered thereafter in lectures 12 to 22. Starting with the features of derivative contracts in general and then moving on to specifics of forwards, futures, options and swaps, and following up with the valuation and the pricing of forward contracts and options, to the extent that we can cover in this allotted time.

And finally, I propose to move on to portfolio theory, start with the mean variance portfolio optimization model and then develop it into the William Sharpe's CAPM and the multi factor odels of Fama and French. So, that is the tentative course structure that I have in mind.

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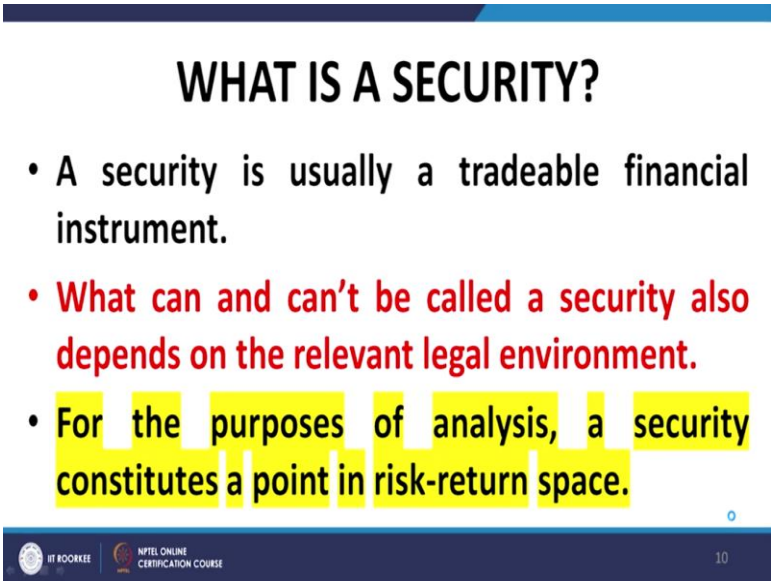

What is a Security

So, let us get started, let us start talking about securities. What we understand by security. In finance parlance, security is generally termed as a tradable financial instrument. A tradable financial instrument is generally named as a security. However, there is an important catch to this and the exact definition of security would depend on the legal environment, superincumbent legal environment that prevails in that particular area.

For example, in India securities are defined in the Securities Contracts Regulations Act of 1956. We will come to it in a minute but as far as analytics is concerned, a security simply is a point in risk return space. **You see, when we talk about analysis of an investment, we are primarily concerned, with two features, the expected return from the security and the risk which is attached to the obtaining of that expected return. Therefore, it is a two-dimensional framework that is normally used for the analysis of investment and we typically refer to this as the risk return framework. For the purposes of analysis a security has definitive**

characteristics in terms of risk and expected returns and therefore, constitutes a point in risk return space, that is how we go about analyzing securities in this two-dimensional framework.

Then, as I mentioned, the definition of security depends on the legal framework that is prevalent in that particular country, in that particular domain.

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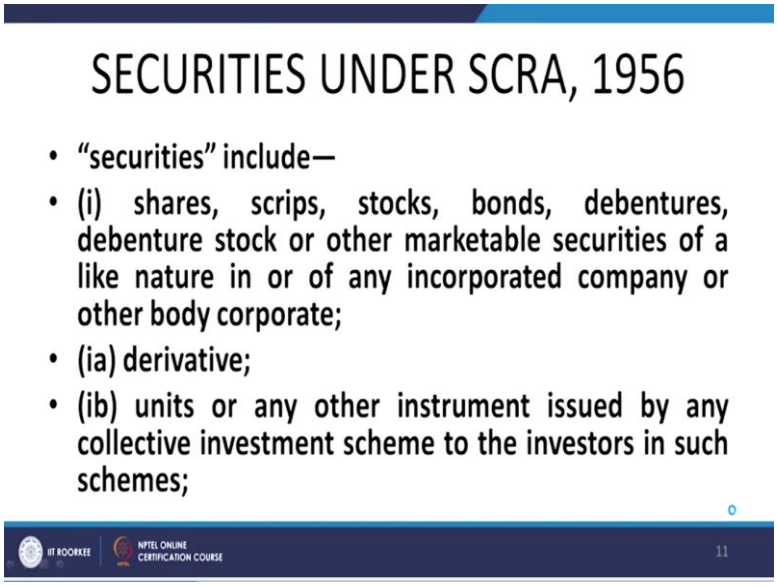

For example, as I mentioned just now, we define the term 'security' under section 2(h) of the Securities Contract Regulation Act, 1956 to mean the following:

(i) shares, scripts, stocks, bonds, debentures, debenture stock or other marketable securities of a like nature in or of any incorporated company or other body corporate.

(ii) clause (ia) says that derivatives are also part of securities i.e. that derivatives are also encompassed within the definition of securities.

(iii) Units of investment schemes or units of any other investment, instrument issued by collective investment scheme to the investors also comes within the ambit of securities.

(iv) Units of mutual fund schemes also come within the ambit of securities.

(v) Government securities like T-bills, T-bonds and so on.

(vi) such other instruments as may be declared by the Central Government to be securities as well as rights or interest in securities.

So, this is quite a broad-spectrum definition of securities and all the instruments which come within the ambit of this definition would be considered securities, at least as far as the law is concerned. **But for our purpose, we shall confine ourselves to the rather simplistic definition of a security being a tradable financial instrument.**

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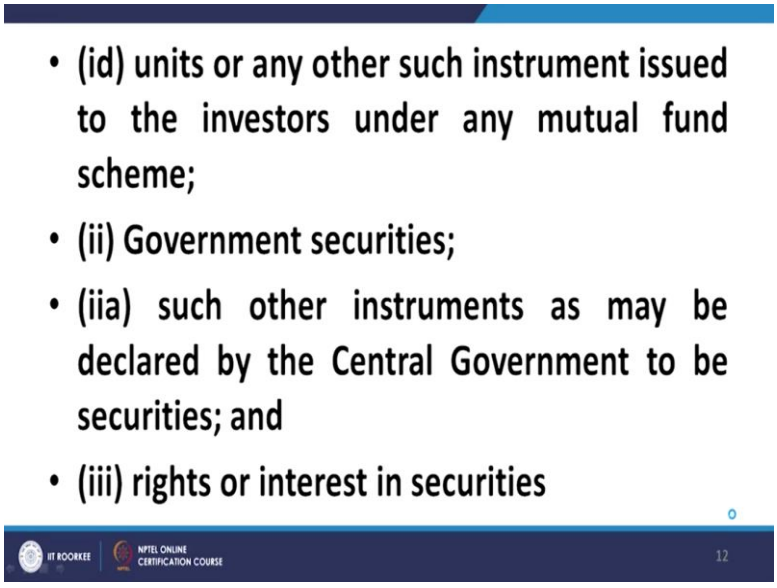

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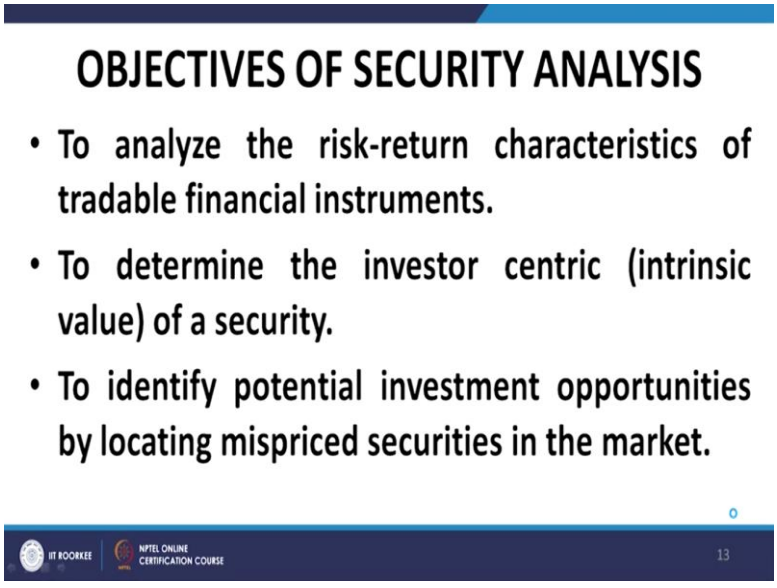

Objectives of Security Analysis

Now, objectives of security analysis. The objectives as security analysis are multifold although, the fundamental objective of security analysis is to arrive at an investor centric valuation, which is sometimes known as the intrinsic value. It is investor centric and it enables the investor to gauge or to place a value or to place a worth as per his perception of the risk return characteristics to a particular security and thereby, compare it with the then prevailing market price and take investment decisions i.e. whether to get in or out of that particular security.

So, that is the bottom line of what security analysis essentially is. We try to ascribe a value to a security on a rational basis, a value that depends on the perceptions of the investor about the risk return characteristics of the security and thereby, by comparing that particular value with the then prevailing market price, enable the investor to identify underpriced or overpriced securities and take investment decisions accordingly. So, that is the bottom line of what security analysis tries to do.

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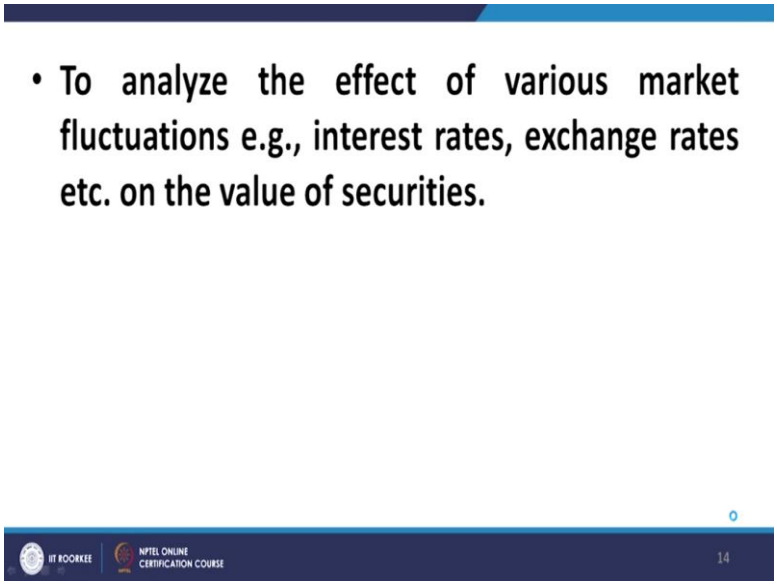

Of course, as a side light, the security analysis process also attempts to analyze the effect of various market fluctuations like interest rates, exchange rates and so on, on the value of securities. So, that is, in essence, what security analysis means, and that is what we will be trying to do at least for the first half of this course.

Classification of Securities

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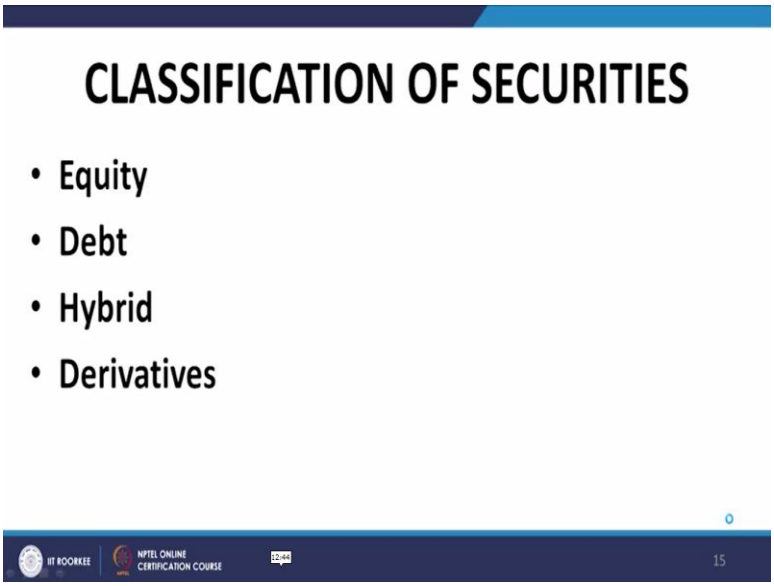

Now, classification of securities. Well, the securities are broadly classified as

(i) equity securities,

(ii) debt securities,

(iii) derivatives and

(iv) hybrids.

So, these are the four types of securities. This is a very broad classification, but this has a lot of sense attached to it as we shall see very soon. Equity securities, debt securities, hybrids and derivatives or you can put derivatives at number 3 and hybrids at number 4.

Equity Securities

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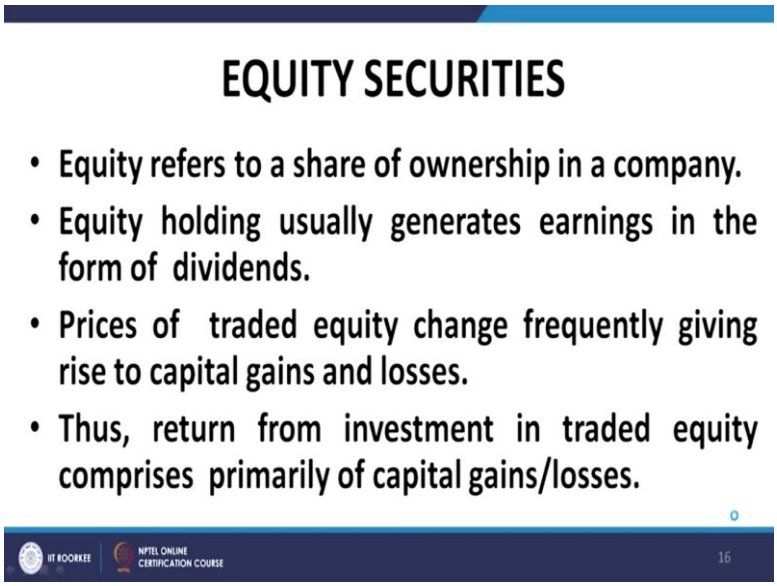

So, what are Equity securities? Most of you who are taking up this course, would be familiar with the meaning of equity. Equity, in essence, means the ownership of the company. So, this implies that if you are holding even one equity share of a company say Reliance Industries Ltd, you are in part ownership of that particular company. Equity reflects ownership. So, equity refers to a share in ownership of the company.

The returns from equity comprised of two parts:

(i) The distribution of profits by the company to its shareholders. This part is called dividend. Now, please note that the distribution of dividends is discretionary, I shall talk more about it in some detail at a later point in time, but essentially the distribution of dividend is discretionary whereas, when we talk about interest rate is not discretionary, it is mandatory, but come we will come back to it.

So, equity holdings generate income to the investor by way of dividends if the company in which you have invested in equity shares turns out to be profitable and the profits or a part thereof are distributed by the shareholders of the company. The shareholders may decide to distribute a part of the profits or the whole of the profits to the shareholders as owners of the company and that part, that distribution, is termed as dividend.

(ii) Furthermore, if the equity shares are listed on an exchange, that is, they are tradable on an exchange, like we have the National Stock Exchange in India, Bombay Stock Exchange,

the NSE and BSE in India. then the prices of those shares will fluctuate in reference to a multitude of factors that could be economy factors, that could be factors that effect, the particular industry, or company specific factors e.g. if a company does very well in a particular year the share price or the stock price could jump up significantly. And if your company falls on bad days, the prices could fall. But I would like to emphasize at this point that the performance of the company is the not sole factor that influences the prices of shares, there are broad spectrum factors like the economy of the nation, the GNP, the GDP and the so on and the growth rates in these particular parameters.

Then, we have the industry specific factors like the government policies in relation to a particular industry, whether certain concessions or allowances or certain additional levies are introduced that may influence the future growth rate of industries or the companies belonging to that particular industry. So, these are all factors which would contribute to influencing the stock price.

The net outcome is that once you are invested in a stock, the future price of the stock is uncertain. If it increases you are, of course, getting an income if you decide to liquidate your investment in the equity. You will get what is termed as a capital gain. In other words, let us take an example if you are invested in an equity share at INR 1,000 and you sell the share at the end of one month at say INR 1,200, then this 200 constitutes the capital gains for you.

So, the bottom line of what I am trying to say is that the income that arises from an equity investment comprises of two parts (i) the dividend that is distributed by the company and (ii) capital gain or loss as the case may be if the price at which you liquidate the investment is more or less as the case may be compared to the price at which you have taken the shares i.e. at the price at which you have invested in the shares

Debt Securities

Debt securities have significantly different characteristics from equity. The fundamental difference is that equity represents ownership, debt represents borrowings. In other words, the holder of debt securities has lent money to the company, the company has borrowed and in

exchange of that borrowing of money, the company issued certain securities to the lender, this is called debt securities.

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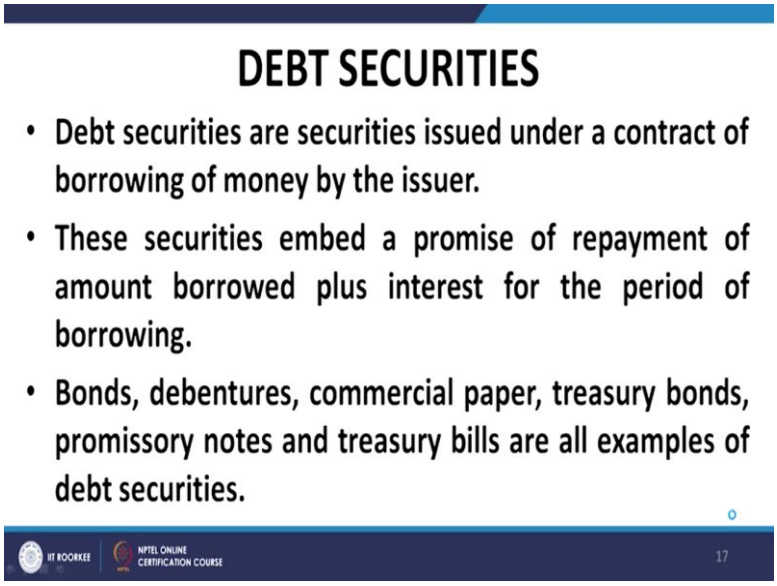

The debt securities are securities issued under a contract of borrowing of money by the issuer. the issuer has borrowed money and in exchange of that borrowing, it has issued certain securities to the lenders of money, one or more. Securities that are issued in relation to the lending borrowing agreement are called debt. So, these securities embed a promise. When you borrow money from a lender, it is quite natural that you undertake to return the money to the lender together with the interest thereon.

So, these securities embed a promise of repayment of the amount borrowed and interest for the period of borrowing. So, when you borrow money against the issue of debt securities, it is understood that you will repay the money that you have borrowed together with interest thereon. Bonds, debentures, commercial paper, treasury bonds, promissory notes, treasury bills are examples of securities, which are debt securities in their nature.

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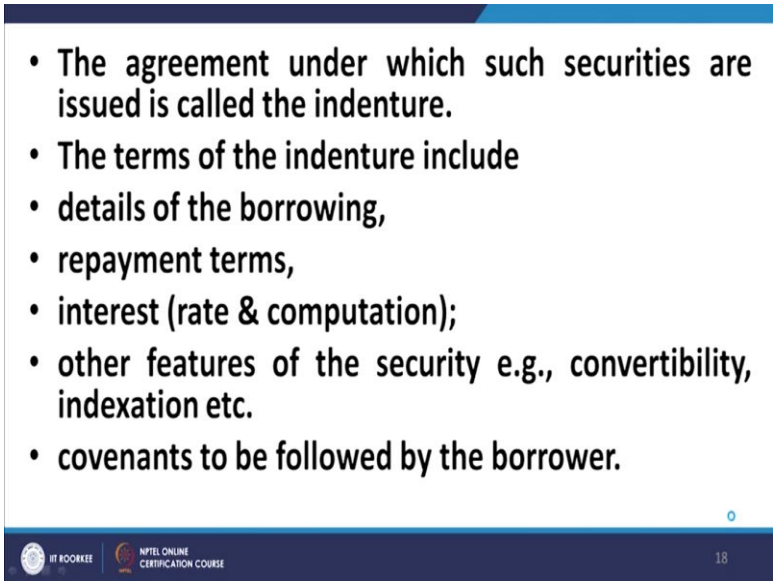

The agreement under which these debt securities are issued is usually called an indenture. An indenture usually contains the following provisions:

(i) details of the borrowing repayment terms,

(ii) interest rate and computation i.e. the manner in which the interest is to be computed and compounded. Whether it has to be compounded half yearly or annually, whether interest is to be paid half yearly, or annually as the case may be.

All these terms form part of the indenture of issue of the debt securities.

Then other features and covenants that the borrower may be mandated to observe in relation to the borrowing that he has taken up against the issue of debt securities. Covenants essentially mean that there are certain restrictions on what the borrower can do, which are imposed by the lenders. For example, the lenders may have the right to appoint nominee directors on the board of directors.

The lenders may have the right that the dividends that may be paid on equity or preference shares be paid subject to the approval of the lenders, disposal of a significant part of the undertaking of the borrowers may only be made with the consent of the lenders. So, these are some traditional covenants that are embedded in the indenture or the loan agreement, which is the underlying document of the issue of debt securities.

Debt vs Equity

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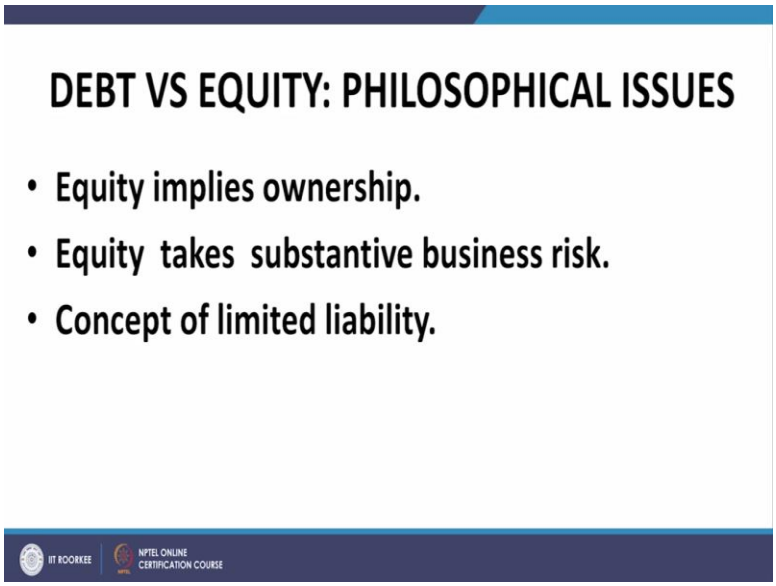

Before we move forward, this issue of debt versus equity needs to be analyzed in greater detail. We need to look at it philosophically as well. We have talked about it in terms of the technicalities so far. Let us look at it on the basis of certain philosophical issues. As I mentioned, equity implies ownership, equity takes the substantive business risk. Nevertheless, although equity takes the substantive business risk, there is some protection afforded to equity in terms of the concept of limited liability. What exactly is limited liability, I will come back to it later on in this lecture. For the moment, it is a sort of protection that is allowed to shareholders who have invested in a company that is limited by shares. So, we will come back to it, but these are some special features of corporate equity.

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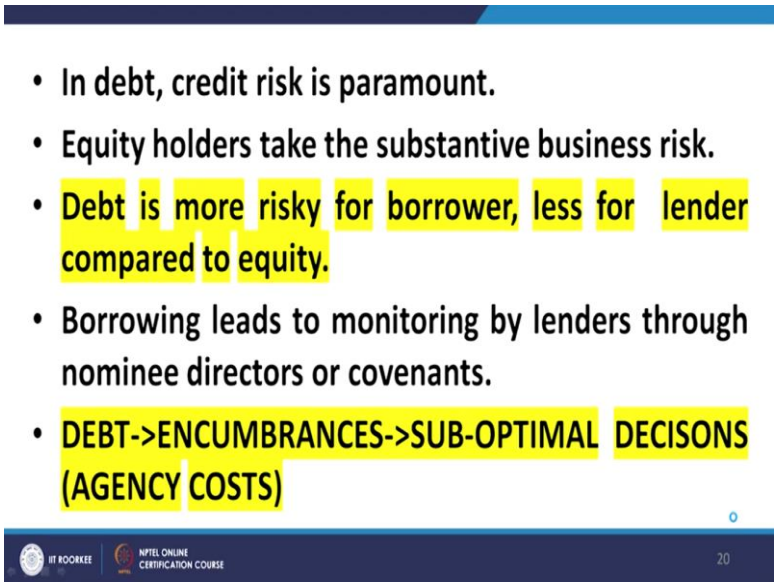

Now, equity shareholders take the business risk, and because they are the owners they take the business risk. However, lenders are not the owners of the company, lenders do not own the company, they have simply lent money under a contract of lending, and they shall receive back their principal together with interest and their interest in the company is confined to this particular limit.

So, lenders are not really taking the substantive business risk, although this statement needs qualification and again, I will come back to it. Although, they do not take the substantive business risk, the operations of the company may have an influence on their interests. However, their interest or their involvement in the company is subject primarily to credit risk.

In other words, they are worried and they should be worried about getting back their interest and the principal that they have lent to the company. That is called credit risk. They are and should be worried about getting back their principal and interest amounts, that is the risk of default on the part of the borrower. If the borrower commits default in repayment, this possibility generates a certain amount of uncertainty for the lenders and that is what is called credit risk or default risk.

Now, the interest of the lenders is confined to the amount that they have lent money and interest thereon. However, they also have a pre-emptive right to be paid interest and repaid the principal before any payment to equity shareholders. Thus, the lending is less risky, as far as the lenders are concerned compared to equity shareholders. Remember, equity shareholders are taking the

substantive business risk and the risk of lenders is substantively less, because it is confined to the possibility of default on their lending, which will occur if the equity capital is completely wiped off, I will come back to it with an example. Now, there is another important point, a very important point which is usually missed out.

Borrowings & sub-optimal business decisions

As I mentioned just now, the lenders can impose certain covenants on the borrowing company and these covenants could be part of the indenture i.e. the loan agreement. One of the common constituents or provisions that is contained in the loan agreement is to regulate to some extent the activities of the borrower.

Whether it be by nominee directors or some other means, this regulation of operations (like restrictions on disposal of undertaking or taking up new projects or paying of dividend etc) creates a certain conflict of interest in some cases, which leads to sub-optimal decision. So, that is one drawback that the borrowers need to face, in terms of monitoring by parties having limited interest in the business, which may result to sub-optimal decisions. To justify my point, let us look at an example:

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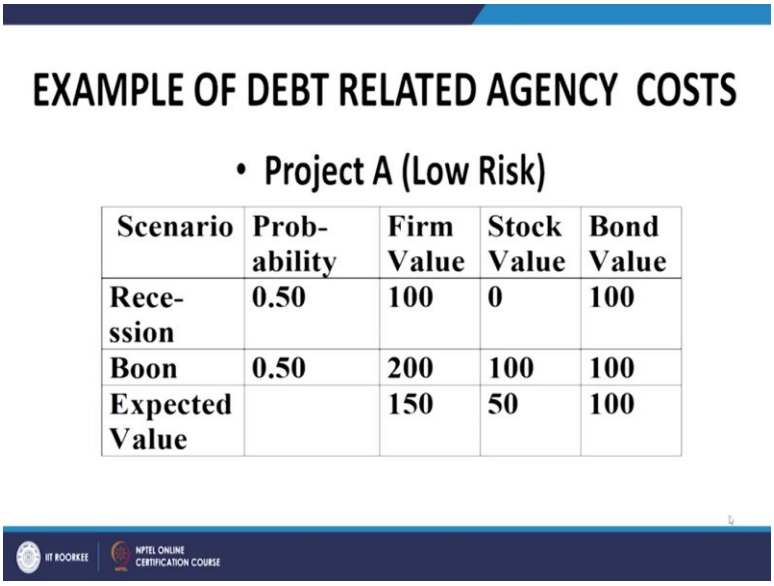

Scenario	Prob-ability	Firm Value	Stock Value	Bond Value
Rece-ssion	0.50	100	0	100
Boon	0.50	200	100	100
Expected Value		150	50	100

The objective of this example is to bring to you the message that in companies that have a substantial amount of debt together with restrictions (covenants) imposed by the lenders, there can be situations where the interest of lenders and those of shareholders conflict with each other. In such situations, if the lenders are able to impose their viewpoint on account of debt covenants, then decisions may be taken that are sub-optimal from the context of the firm (shareholders).

The monetary implications of this conflict of interest is essentially known as an agency costs. The conflict of interest between the owners of the company and the lenders is sometimes manifest in business situations and the corresponding costs that are associated with these possibly sub-optimal decisions are termed as agency costs.

Let us assume that XYZ Ltd has capital consisting of 100 units of equity and an equal amount of borrowings. The company is faced with the choice of taking up either of the two projects A or B with almost equal value to the firm.

We have two possible states of nature:

(i) the economy goes into a recession and

(ii) the economy goes into a boon state.

We assume that the probability of a recession and the probability of boon are equal and the value of the firm if it takes up project A will be 100 units of money, whatever that unit of money may be in the event of a recession in the economy and 200 units of money in the event the economy goes into a boon.

The company has borrowed 100 units of money as debt and the rest of it is equity. It has a debt equity ratio of 1:1. So, 100 units of money is borrowed and 100 units of money is financed as equity to make the capital of the firm as 200.

Now, if the firm's value is 100, then naturally because of the pre-emptive, right of the lenders, they would be paid out the entire amount, and the amount that would remain for the equity shareholders would be 0.

In other words, the bond value would remain at 100, because they will be repaid the entire amount because the company has sufficient funds to repay the stake of the lenders and therefore it will repay the entire stake of the lenders. The stock value will remain at 0.

If there is a boon and the firm's value is 200, then the bondholders will get the amount of 100. They will be repaid the entire amount, of course. The remaining 100 will be available to the equity shareholders. So, in that case, the value of the equity shareholding would be 100 and the value of the bond bondholders would also be 100.

If we work out the expected value, then the firm's expected value turns out to be 150, the stock's expected value turns out to be 50 and the bonds expected value turns out to be 100.

In other words, the expected value of the bonds is equal to what they would normally have received. So, they are not at a loss under project A, however, the equity shareholders have a value of only 50.

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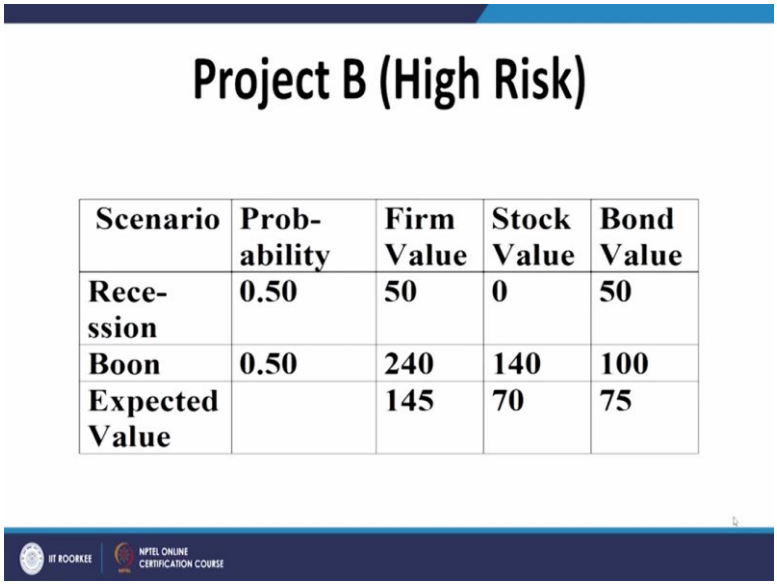

Now we look at project B, project B is a high risk project. Again, the economy can either go into a recession with probability of 0.50 or the economy could go into a boon with again a probability of 0.50. If the economy goes into a recession, with the project B, the firm's value turns out to be 50 and if the economy goes into a boon, then the firm's value turns out to be 240.

What are the implications for the bondholders and equity holders?

Let us say investigate this point now. If the firm values at 50, naturally the entire 50 amount will go to the bondholders and the stockholders will get nothing at all. Even the bondholders are suffering in this case, because against their claims of 100, they are getting only 50 but there is no choice because the firm has assets worth only 50.

Here the issue of limited liability creeps up, so we will talk about it.

If the economy goes into a boon and the firm's value turns out to be 240, then the bondholders will naturally get the full amount of 100 and the equity shareholders get an amount of 140. Now, if we look at the expected values, they make very interesting reading.

The expected value of the firm is 145. The stock value here is 70 and the bond value turns out to be 75. Now, let us recall, what are the corresponding figures of project A. In the case of project A the firm's value was 150, the stock value was 50, the bond value was 100.

Now, from the perspective of equity shareholders, because the expected value for stock is going to be the deciding criterion, then naturally, equity shareholders or the owners of the company would advocate the project B, because the expected value under the project B for equity shareholders, turns out to be 70 compared to 50 for project A.

However, from the perspective of lenders, the expected value of the bond holders in project A turns out to be 100, which has gone down to 75 if the high-risk project B is undertaken.

So, here is a conflict of interest, here is the issue of agency costs which arises when companies borrow and that debt is monitored by the lenders as is usually the case..

Clearly, if the lenders interest prevails then A would be selected and if the shareholders take the call it would be B.

Though the important takeaway here is that if the debt involves a creation of encumbrances, creation of covenants as part of the loan agreement, then we could end up in situations where the lenders and the owners of the company have conflict of interest and that could lead to sub-optimal decisions in the future prospects of the company. We shall continue from here after the break. Thank you.