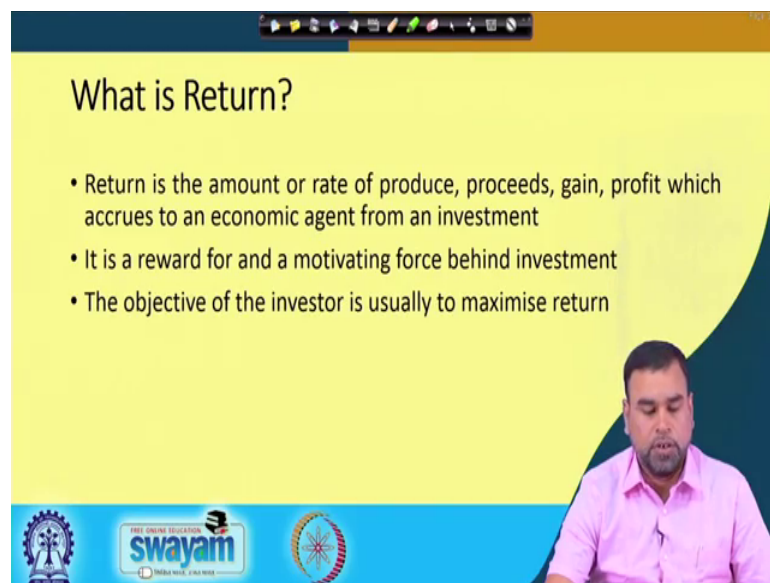


Financial Institutions and Markets
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Lecture – 08
Return Concepts in Financial System

So, after discussion on the different type of risk what we face in the financial system, today we are going to discuss about the different type of return concepts or different type of returns which are always popularly used in the system or we try to calculate different type of concepts whenever we go to the financial markets for our investments. So, today we will be discussing about the different type of returns, what we are always use in the system or financial system as a whole.

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What is Return?

- Return is the amount or rate of produce, proceeds, gain, profit which accrues to an economic agent from an investment
- It is a reward for and a motivating force behind investment
- The objective of the investor is usually to maximise return

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So, before going to analyze the different types of return or different type of concepts associated with a return, let us first understand what do mean by the return. In a Lemon prospective, always we talk about the return. Whenever you talk about the return, always we expect that we are going to get something else, something better.

That means whenever we are putting some money or we are putting our effort for certain things, we are respecting that we are putting our time, we are putting the wealth we are putting the money into that because we are going to get certain benefits out of this, we are going to gain something from that. So, whenever we are going to gain something

from that; that is basically we call it the return. In (Refer Time: 01:31) prospective, the return is nothing but the reward of investment, whenever we are investing something in the market we are expecting that that particular investment will give some extra return to us or extra benefit to us in terms of the monetary term or non monetary term. There are some investments are done to get some return in terms of real addition and there are some kind of investments are done to get some additions which are basically in terms of the monetary part.

So, therefore, return is nothing but that a gain or a profit what we always try to get by putting certain extra amount of the money into the market or into the system as a whole. So, in a clear cut way, we are defining the return is the amount or the rate of produce or the proceeds or the gain or the profit which accure to an economic agent from an investment. We spent certain money, whenever we spread certain money we may not get any return out of this but whenever we are investing certain money, we are expecting that that particular investment will give us some kind of extra return to us or some extra benefit we can withdraw from this.

So, therefore, it is a reward for an motivating force behind the investment. People invest because they want to get some extra benefit out of this, that is why they put some money on the different type of investments in the financial market or the financial system as a whole. So, the basic objective of the investor is usually to maximize the return. Already again and again we are using it that whenever we are putting some money; obviously, we are taking some risk because we may get return, we may not get the return that is the uncertainty or the probability of not getting the return that basically always we face but still we put the money where we invest in the market because we are expecting that there is a probability that we can get some extra benefit out of this or extra kind of return out of this. So, that is why the basic objective of the investor is always to maximize the return with a minimum amount of investment what they can take.

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Return Components

- Return on a typical investment has two components: the basic one which is the periodic cash or income receipts, either interest or dividend; and the other which is the appreciation or depreciation in the price or value of the asset, called the capital gain or the capital loss
- The income component is usually but not necessarily received in cash viz., stock dividend
- The capital gain (or loss) is the difference between the purchase price of the asset and the price at which it can be or is sold
- The total return on an investment thus can be defined as income plus/minus price appreciation/depreciation

Handwritten notes:
Stock - A
Dividends
↓ 500
periodic
Rs 500 →
Rs 750
 $\frac{250 \times 100}{500}$

So, whenever you talk about the return in the financial market particularly, the return has different components, the return has different components, but mostly if you observe the return has two components, what are those two components? One is your periodic gas or the income what you get and second one is basically the capital gain or the capital loss depending upon the value of that particular asset at the time of redemption or at the rhyme of selling that particular asset in the market. If you see, for example, you are talking about we are basically talking late, let us take the example of a stock, whenever we are investing in a stock.

So, let you have bought the stock of a company A. So, then what has happened any quarter after one quarter or after one up to six months or one year the company can give some dividend to you. So, on the basis of the amount of stocks what you are holding you get some dividend out of this stocks. Then, for example, you have that is basically your periodic or every period you can get it or that is basically income what you can get in between; then, another thing if you see for example, you have bought that particular stock at rupees 500 then after a certain period you want to sell that particular stock at a price of 750.

So, basically this is your buying price of that particular stock, this is your selling price from that particular stock. So, in this particular period that is the appreciation of 250 rupees. So, if you are going to calculate the return, in terms of the capital gain the capital

gain is 250, but in terms of the percentage if you can calculate that is basically 250 divided by 500 into 100 that is basically nothing but how much around 50 percent. So, the 50 percent basically is our capital gain or the capital gain from that particular stock. If the stock value has gone down let you have bought it at 500, then the price has gone down to 400 then; obviously, there will be a loss for this then accordingly you can calculate that particular kind of capital gain or the capital loss what you are going to get from this.

But the periodic cash if you are receiving out of that particular stock that is always positive. The periodic cash or the income what you are receiving that is basically or the positive, if it is a stock then it is dividend or if it is a bond then it is basically the interest. And another one is depends upon the appreciation or depreciation in the price of the value of the asset that is basically called the capital gain or the loss that already have explained to you. So, this is way the particular return has two components, one is your income or the periodic income of the gas what you are getting and another; one in the capital appreciation or the depreciation on the basis of the price of the stocks in the market which is determined by the demand and supply forces in the market.

But one thing remember, that income you may get you may not get because some companies pay dividend some company do not pay the dividend. So, the periodic income may be possible may not be possible in terms of the bond it is mandatory but because the coupon has to be paid periodically but in some in terms of the stock if you talk about the stock dividend may not be paid or the company may not pay the dividend politically; some companies pay the dividend, some companies do not pay the dividend. So, although in general term there are two components but not necessarily that income component exists with all type of assets or even if that income component exists with some type of assets that may be paid or may not be paid. So, that is what basically always we observe whenever we talk about the rate components of the financial assets. Already, I have explained the third one the capital gain or the loss the difference between the purchase price of the asset and the price at which it is bought or sold.

So, the total return on an investment thus can be defined as income plus or minus price depreciation or depreciation or appreciation. So, the question here is that if there is no income component, then the total return depends upon the appreciation of that particular asset. If the return component may be depending upon the both the components return

component may depend upon the income component mostly, if there is a loss in terms of if there is a particular asset is depreciated. So, therefore, in general what basically we have seen we have to consider both the part into our analysis or both the components into our analysis because these two things are important for calculation of the exert return from the stock or exert return from any financial asset.

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Types of Return Concepts

- **Expected return** is an anticipated, predicted, desired, ex-ante return which is subject to uncertainty.
- **Realised return**, on the other hand, is actually earned; it is an ex-post return
- **Holding period return (HPR)** measures the total return from an investment during a given or designated time period in which the asset is held by the investor. $HPR = HPY + 1$

$$HPY = \frac{\text{Any cash payments received} + \text{Price change over the holding period}}{\text{Price at which the asset is purchased (beginning price)}}$$

Handwritten calculations in red ink:

- $0.5 \times 10\% + 0.5 \times 15\%$
- $5\% + 7.5\%$
- $= 12.5\%$
- Return $\rightarrow 50\% \rightarrow 10\%$
- 8.0m $\rightarrow 50\%$
- 15%

So, if you see the finance literature, the different ways the returns are defined. Whenever we discuss about the specific instruments throughout this particular scores it will be more elaborate will discuss more concepts related to different type of instruments like the different kind of return concepts related to bond, different type of return concepts related to stock, different kind of relate return concepts related to derivatives instruments, etcetera, etcetera, but here I will just give you the brief idea about the overall idea about what kind of general return concepts are used in the market. So, whenever you talk about the return concepts what basically we have seen one of the most popular use term in the financial system as a whole always we use that the expected return. Expected return means it is anticipated, predicted, desired and it is subject to certain kind of uncertainty or the risky. Expected means we are telling that whenever there is a probability you may get, there is a probability you may not get.

So, in this context for example, if I will give you a very small example in this case, let you see that let there are two conditions in the market, there is a condition is let there is

recession and there is boom. So, there is 50 percent chance you will have recession, there is 50 percent chance you will you can have the boom or the recovery. If there is a boom, there is a 50 percent sun there is a boom you may get a return of 10 percent. If there is a boom, then may you may get a return of 15 percent. So, effectively the average return expected return what you can get that 0.5 multiplied by your 10 percent plus 0.5 multiplied by the 15 percent.

If 0.5 is the 50 percent, 50 percent chance suns. So; that means, on an average this is 5 percent plus 7.5 percent, then you can have the 12.5 percent, your expected return in that particular point of time is 12.5 percent. But the question here is there are certain factors which are basically playing the role for the expected return or for a calculation of expected return. The expected return whenever you calculate already that is why you can note down here it is subject to uncertainty. There is a probability, there is some uncertainty that particular thing may be realized it may not be realized. So, whenever you talk about the expected part expected thing or expected return always that is subject to certain kind of risk and there is a probability distribution involved in that particular process.

So, here another thing if you see, but another concept we have that is called the realized return. Realized return means what exactly we got. Let we are expecting 12.5 percent in this example we may get 12.5. We are expecting we may not get 12.5, we may get 10 percent, we may get also 15 percent we may get also 13 percent. So, here the 12.5 percent is expected, but actual how much we are going to get that is not basically clearly we can predict or we can estimate from the beginning. So, whatever estimation we are making, whatever prediction we are making that is related to the only some kind of probabilistic distributions. And another concept in the market we use that is called the holding period return the holding period return is nothing but it is the total return from an investment during a given or designated time period in which the asset is held by the investor.

So, if you talk about this, there are two things; one is holding period yield and another one is holding period return and the holding period return is nothing but the holding period yield plus 1. So, holding period yield is basically what any cash payment received plus price sense over the holding period divided by the price at which the asset is purchased or the beginning price. So, any cash or any kind of appreciation which or

depreciation which has taken place that is basically the price sense, then what basically we are talking about you see any cash payment any kind of appreciation depreciation that is nothing but the price sense.

Then total value how much you got then at what price you have first basically bought that particular asset in the beginning, then that if you take the ratio between these two, you can find out the holding period return sorry holding period yield. Then if you add one into that then that will give you the holding period return. So, that is another concept always we also use in the financial market and other most important concept or important issue always we always discuss that the nominal versus real return.

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Nominal and Real Return

- Nominal return is the return in nominal rupees (terms).
- Real return is equal to the nominal return adjusted for changes in prices i.e., the rate of inflation
- The relation between nominal and real return:
- $(1 + \text{Nominal Return}) = (1 + \text{Real Return}) (1 + \text{Inflation Rate})$

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Nominal return means what; the nominal return is the return what exactly we are getting; for example, if you see that the let the return you have bought the particular stock at a price of 500.

And whenever you are selling the price was late 700, then the actual return percentage is 700 minus 500 divided by 500 is equal to 200 divided by 500 is equal to 2 by 5; that means, 0.4 that is 40 percent, but the question here is that this 40 percent is nothing but the nominal return, this is basically the nominal return and how we can calculate the real return there is another concept real return. The real return is basically the return adjusted for changes in the price level and change in the price level all of you know that is called

the inflation; that means, the nominal return has to be adjusted with respect to the price level or inflation rate in the market.

So, for example, in that particular period of time, the inflation rate is 7 percent, then your real return will be 40 percent minus 7 percent is equal to 33 percent, the actual real return from that particular investment what do you got that is basically your 33 percent. But one thing you remember this is basically the approximate way we calculate, but according to the resource equation, the nominal return in real return relationship is explained here; that means, it is basically your 1 plus nominal return is equal to 1 plus real return into 1 plus inflation that is already I have written here. You can see that one.

So, from this we have derived that one which is approximated way we can calculate. So, that is why in general we call it the real return is equal to your nominal return minus inflation rate, your real return is equal to your nominal return minus inflation rate that will give you the real return; that means, the real return should be adjusted to the inflation rate. This is the way the nominal and real return is calculated, then we have another concept we use that is called the required rate of return.

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Required Rate of Return (RRR)

- The RRR for a security is defined as the minimum expected rate of return needed to induce or persuade an investor to purchase the security, given its risk
- The RRR has two components. First, the risk-free rate of return and second is the risk premium
- $RRR = \text{Risk-free rate of return} + \text{Risk premium}$
- Risk premium = $f(\text{macroeconomic fundamentals, industry specific variables and company specific variables})$

Handwritten notes:
 $r = f()$
Treasury bills Gov. bonds → Risk-free return
Default risk

So, the required rate of return is more or less the similar with the expected return. So, here the required rate of return means the required rate of return of a particular security is defined as the minimum expected rate of return needed to induce or persuade at the investor to purchase the security given it is risk. Whenever any investor or any individual

come to the market, what is the minimum return they are expecting to take the risk in the market or to put their money in the system. So, that is basically the required rate of return. The required rate of return is a concept which basically motivates the investor to participate in the financial system or to invest in the financial system. So, therefore, whenever you talk about the required rate of return, so required rate of return has two components; one is the risk free rate of return and another one is the risk premium. The risk premium means the premium what they are expecting because they are going to take some risk and another one is the risk free rate.

Here the risk free rate is nothing but that particular instrument which give certain kind of return without any risk and here the risk free rate is what for example, if you say that the risk free rate is the treasury bills, government treasury bills, you have the government bonds. So, whatever returns you are going to get because those kind of instruments are free from default risk and obviously, the default risk is 0 and therefore, those kind of instrument whatever return they give, we call it the risk free return we call them the risk free return and risk premium is basically what the risk premium means the extra risk or return what you are get we are going to expect from this because we were taking certain kind of risk in the market.

And why that risk because the risk can arise there is a change in the macroeconomic fundamentals like inflation like growth of zdp like change in the monetary policy, I can take example if the much change in the monetary policy, let this reserve bank of India has gone for a change in the interest, rate the repo rate has increased. If the repo rate has increased, then what will happen? The repo rate will basically affect the call money rate. If the call money rate will change, then the banks are lending rate will change. If the banks lending rate will change, then obviously, in the market interest rate is will be changed. If the market interest rate will be will be changed, then obviously, the money supply in the system will be changed; then obviously, what will happen it will have the impact of on the total investment then finally, the output.

So, it will have the impact upon the price of the security and as well as the other instruments. So, therefore, what we are trying to say that any kind of change in the macroeconomic system macroeconomic measures will have the impact upon the risk it may increase the risk, it may decrease the risk depending upon the policy, then accordingly what will happen that we are expecting the premium accordingly.

That extracting that there is a change in the macroeconomic fundamentals, we are expecting that the rate this particular return also should be compensated for that because we are going to take more risk problem risk for this. Industry variables because you see the price of a stock or the return of a stock is a function of three sets of the variables, your macroeconomic fundamentals, you have the industry specific variables and company specific variables. So, any change in the industry fundamentals, there is some industry or cyclical some industries are seasonal industries, some industries are in the boom, some industries the probability of growth is less, some industries probability of growth is more. So, like that there are different ways basically the industries behave whenever that is an change in the macroeconomic fundamentals.

So, in this particular context also, we are prone to certain risk in which industry while choosing for the investment. So, because of that we have to ensure that how the industry variables are going to be changed and mine and because of that I make I am going to exposed towards more risk and that particular rate should be compensated by that. And company specific variables which we call it the idiosyncratic risk always we face if there is a change in the company fundamentals, the sales figure maybe change ourselves may be affected largely may be there are some other factors some non financial factors also may change, there are some organism changes may happen. So, all those things will have the impact upon the risk and therefore, my return also should be compensated by that. So, combining all, the investor always expect that this would get some risk premium whenever they invest in a particular financial asset or a particular instrument.

So, therefore, we call it the premium that that extra return what we are going to get because they are going to exposed or they are going to be exposed towards more risk in the future. So, that is basically we call it the required rate of return and now we are coming back to there are how to calculate this required rate of return.

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The slide is titled "Calculation of RRR (Capital Asset Pricing Model)". It contains the following text and equations:

- The Capital Asset Pricing Model (CAPM) is used in finance to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk
- The model takes into account the asset's sensitivity to non-diversifiable risk (also known as systematic risk or market risk), often represented by beta (β)

The CAPM can be represented in equation as follows:

$$E(R_i) = R_f + \beta(R_m - R_f)$$

where $E(R_i)$ = Expected return of individual security, R_f = Risk-free rate of return, β = Market risk of individual security, R_m = market return.

Handwritten notes in red ink include:

- $\beta = \frac{Cov(i, m)}{\sigma_m^2}$
- $R_f > R_m$ (circled)
- $E(R) = R_f + \beta(R_m - R_f)$
- Small text: "By Swayam" and "15.02.2020"

The slide also features the Swayam logo and a video feed of a presenter in a pink shirt.

So, if you see there are different type of models in the system are existing. If you will see that there are so many models but the most popular model is for models like capital asset pricing model, then you have arbitrary pricing model, you have 3 factor model, you have 4 factor model, there are different type of models we have seen that which is used to calculate the required rate of return from the asset particularly from the stock or from anything. But the question here is that you see that all those things are little bit more complex in nature that is basically you can study more on whenever you go for the portfolio management and other things which are popularly called as the alternative asset pricing models but I can give you idea that most popular model which is used since 1960s that is basically the capital asset pricing model.

So, here what basically capital asset pricing model tells that whenever, we are going to calculate the required rate of return we are holding basically a portfolio and what when we are holding a portfolio, the basic objective of the holding portfolio each minute to minimize the idiosyncratic risk. Instead of investing in one stock or a one asset if you are investing in many stocks or many asset what basically happens that you can diversify the risk individual risk what particular stock is facing and once you are diversifying that risk, then whatever remaining risk is there that is basically a systematic risk already we have explained that because systematic risks cannot be diversified.

So, a capital asset pricing model therefore, tells that how the systematic risk is basically going to be compensated by the return that we are going to expect from that particular portfolio. So, therefore, this model takes into account the asset sensitivity to non-diversifiable risk; that means, here what we were telling is if your market risk or beta which is called in our language, we call it the beta. If a beta is increasing then your return from that particular stock or from the portfolio also should increase. So, more the beta, more the return.

So, that is what the basic notion of this and overall if you conclude that the capital asset pricing model or the capital asset pricing model tells what should be the required rate of return or expected return from that particular stock and by calculating that expected return maybe an investor will be inclined to invest in that particular stock that is number 1. And number 2, it also says that the beta is the sole factor or market risk is the sole factor which is affecting or which is determining the expected return from that stock. So, other than that means, it assumes that other risks which are diversifiable or which are called the idiosyncratic risk that can be eliminated and only beta is a factor which cannot be diversified. So, therefore, those betas can be considered should be always considered for calculation of the required rate of return or expected rate of return from that particular asset.

So, how it is basically calculated that that is why the equation basically talks about this that your expected return from that particular asset or from that particular portfolio is a risk-free rate of return already I told you that beta into R_m minus R_f which is the market risk premium. So, here the R_m is basically return from the market. The return from the market means any market portfolio in Indian context we have the return from the BSE Sensex, there is return from the NSE Nifty. These are the market portfolios and here we are basically saying that the beta is the factor which is determining that how much return how much will expect if he or she will invest in that particular stock or on that particular portfolio.

And the beta can be calculated already I told you the beta is nothing, but the covariance between the individual stock or the portfolio with the market divided by the variance of the market or if you run a regression with R_i is a function of R_m R_i is equal to βR_m , then if you in one column you take a market return, in one column you take the historical data from your individual stock or individual portfolio. Then run the regression whatever

coefficient you will find that coefficient is basically the beta, that coefficient is basically the data values in this particular case. So, beta can be calculated in both ways. You can calculate the beta in this way; beta also can be calculated in this way. So, this is the way, the required rate of return can be calculated using the capital asset pricing model.

Then, if you see that the next one is if you want to test whether capital asset pricing model what is in your system or not then you can see, then what you can do first run the regression takes the data.

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Testing CAPM

According to Capital Asset Pricing Model (CAPM) the market risk (β) is the sole factor which determine the expected return of the stock, which is used as the cost of equity of the company. For testing the validity of CAPM, generally we follow a two step procedure.

Step-1: Run the time series regression to estimate the market risk (β) following the equation

$$R_i = \beta R_m$$

Where, R_i = Individual Stock Return, R_m = Market Return

Step-2: After getting the (β) for each company/portfolio we run a cross sectional regression to examine whether (β) is statistically significant and for this, we have used the function

$$\bar{R}_i = \alpha + \lambda(\beta)$$

λ = premium: if the β will be statistically significant, then we can conclude that β gives the premium and the CAPM holds good.

Handwritten notes on the slide: "1 - 200 months", "50 - Comp -> 200 months", "1 -> beta", "20 -> beta".

Let fifty companies, let you are the 50 companies, let you have the 50 companies data for let 200 months then what you can run for a first company, take the data for 200 months find out the beta beta, 1 like that up to 250 companies, you can calculate the beta 50. The 50 betas you have, then next step what you can do for first company you would average out the data for this 200 months return data, then you take 50 return data points for 50 companies, then you have the 50 beta, then you again regression first regression you run to calculate the beta which is called the time series regression.

In this equation then you got this thing in the average return that \bar{R}_i means the average return throughout the period plus alpha plus lambda beta, then the lambda is the premium if a beta is statistically significant, then what we can conclude beta gives the premium and the capital asset pricing model can be used for that particular market to calculate the required rate of return from the stocks. So, this is the way basically the

CAPM can be tested and this is the way the required rate of return can be calculated. So, this is what basically the different type of broad return concepts which are used in the financial system and now we have covered off the different type of broader this concept, different kind of return concept which will which will be regularly using throughout this particular subject in the different kind of instrument what we will be discussing. So, next will be discussing that, what are those common factors which affect or which basically always look upon whenever we participate in the financial system or we try to invest in the financial market as a whole.

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Please go through this particular references for this particular session.

Thank you.