Engineering Economic Analysis
Professor Dr. Pradeep K Jha
Department of Mechanical and Industrial Engineering
Indian Institute of Technology Roorkee
Lecture37
Income Taxes: Principles and Calculation of Effective Income Tax Rates

Welcome to the lecture on income tax analysis. So in this lecture be going to do the tax analysis, after-tax cash flows, effect of income tax on after-tax cash flows and other things which are basically the result of the income tax you pay all the income tax which is paid by the corporation and resultant effect of that on the cash flow of the organization.

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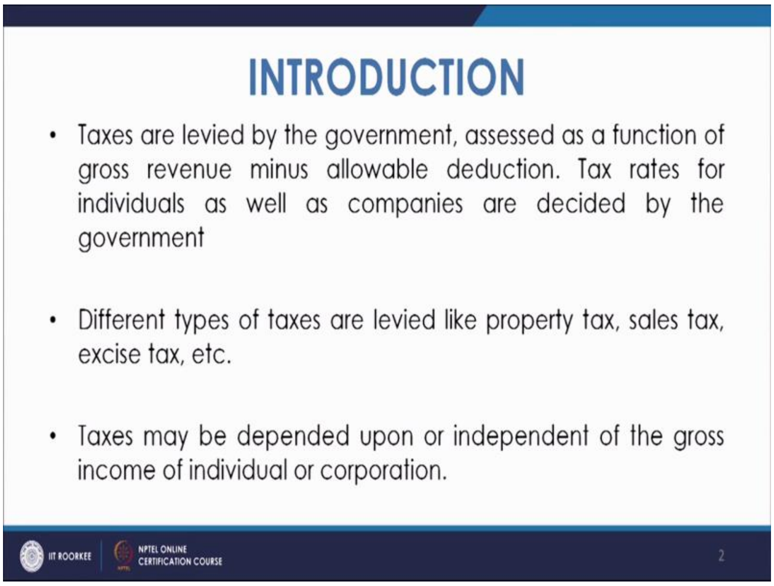

Now as we know that taxes are basically levied by the government, assessed as a function of gross revenue minus allowable deductions. So basically the gross revenue is there or gross income is there for any organization or for an individual on that we have to pay the tax but then there are certain allowable deductions and also personal exemptions for individuals for many causes.

So once you subtract these deductions and exemptions from the gross revenue, then you get a part which need to be taxed. Now on that the tax rates will be there and depending upon the amount you earn, you will have to pay certain percentage of that known as the tax rate. So for individuals or for the companies, these tax rates are decided by the government.

The tax rates may be governed by the rules of the Centre or by the State as far as the country tax is concerned for our own country like India. Different type of taxes are there like property tax, sales tax, excise tax, all these taxes, so once we have the income, on that we have to give the income tax. So income tax basically will be dependent upon the gross income of individual or the net income of the organisation.

But the these taxes like property tax, sales tax or excise tax, they are not dependent upon the gross income, they are basically related to certain type of transactions in that sales or if you have any property, if he and this is excise tax for some non-necessary items. So you have different type of taxes and these taxes are basically not dependent on the gross income whereas the income tax is dependent upon the gross income.

Wide this tax study is important? So far we have studied about the effect of interest, the cash flows, replacements and other things but in that basically we study before tax studies. Now once you pay the tax, the cash flows are changing. Now this change is not very large, not very significant, that is why we do the studies before tax but we cannot ignore the effect of tax.

Once you pay the tax once the tax is levied, it affects the cash flow and anyway it has certain effect on the cash flow. So this is important to study the after-tax cash flows because once the company pays the tax, how the cash flow are changed, we need to see it how much you the company gains or how much the company loses this has to be studied. Now after-tax cash flow will be based on MARR.

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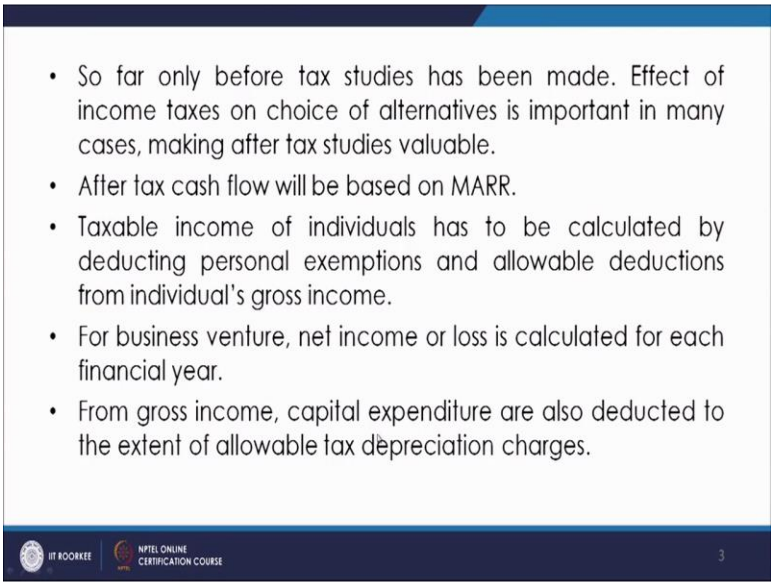

Basically after-tax there will be MARR, attractive rate of return minimum value and there will be basically the before tax MARR. So basically the amount which you pay or the effective interest rate on which you pay, basically that governs what will be the after-tax

Marr. Taxable income of individuals has to be calculated by deducting personal exemptions and allowable deductions from individuals gross income.

So as we discussed if the person has a gross income then there are personal exemptions and also the allowable deductions. So these are basically from the gross income and then you get the taxable income. On that taxable income basically you have to pay the taxes. For business venture net income or loss is calculated for each financial year.

So basically in the case of business venture, you have the income on that basically the deductions or the expenditure in carrying out operations, all these are the deductions. They are to be deducted and then you get the net income and on that basically you are once you deduct these expenditures, then you get the taxable income and corporates or business ventures are also taxed at certain rates. So let us see how the income tax calculation is done.

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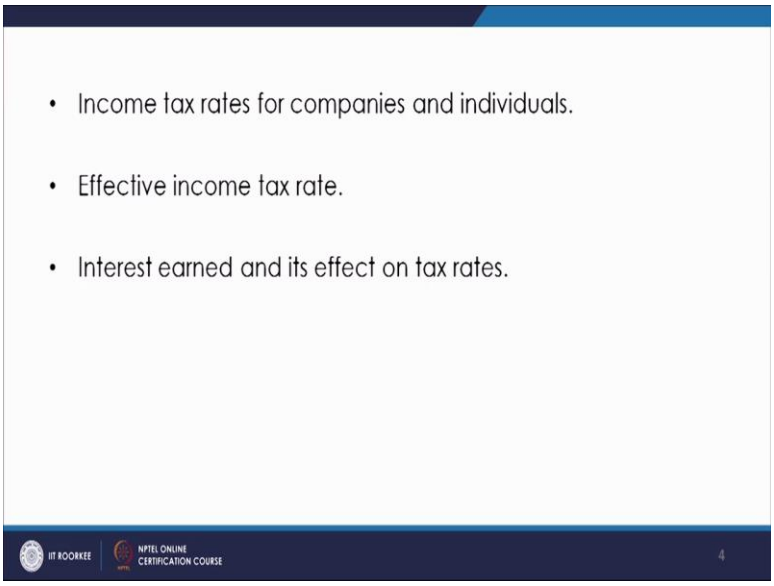

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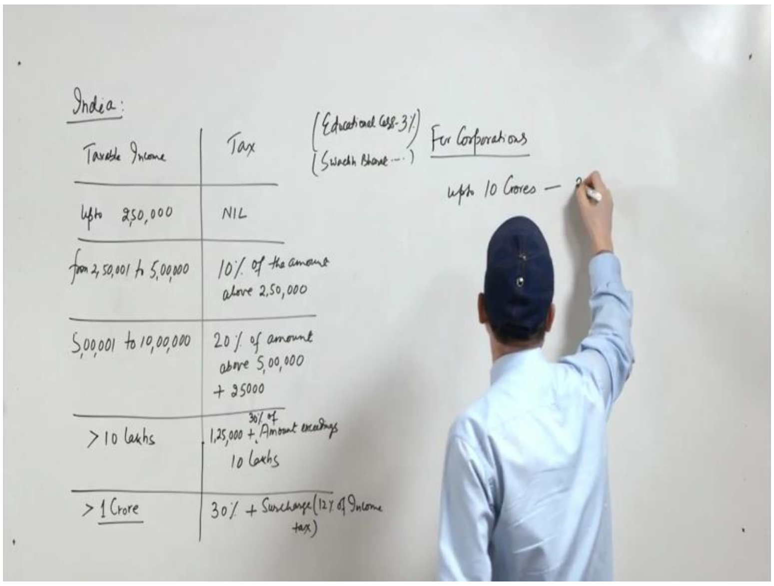

So we have to deal to see how these income tax calculation done for companies and for individuals. So let us see, if we talk about our own country, then in the year 2015-16 let us suppose the rule is like this, if we have taxable income, so what we see is for the normal group of persons, I mean excluded are the categories of either female members or the senior citizens but in normal case suppose it is written that up to 2,50,000, there is no tax.

Then from 2,50,001 to 5,00,000 there will be 10% of the amount above 2,50,000. Then from 5,00,001 so more than 5,00,000 to 10,00,000 you have 20% of amount above 5,00,000. So what comes here is basically you get 25,000 here, so you will 25,000 plus and in that you will be adding 25,000 because this 25,000 comes from here.

So upto 5,00,000 if you take 10% of that, it will be 25,000 plus the exceeding amount from 5,00,000 to 10,00,000, whatever is exceeded, its 20% is there as the tax amount. If the income is more than 10,00,000, in that case the amount will be up to 5,00,000 you have 25,000 plus you have in this 5,00,000 20% that is 1,00,000, so it will be 1,25,000 plus you get amount exceeding 10,00,000.

So this is how you compute the income tax amount and if you go this is upto 1,00,00,000 and then if it is more then 1,00,00,000, in that case it is 30%. So 10,00,000, so this is basically 30% of this amount, 30% of amount exceeding 10,00,000. Here if it is more than one crore, you get 30% plus surcharge is there, surcharge is basically 12% of income tax amount paid.

Now on all that basically by the government regulations you also paid other tax like in our case we also pay educational cess of 3%. Then there are other kind of taxes, so there are taxes which are included in this, so they are known as different taxes. They all come to finally the total amount is paid as taxes.

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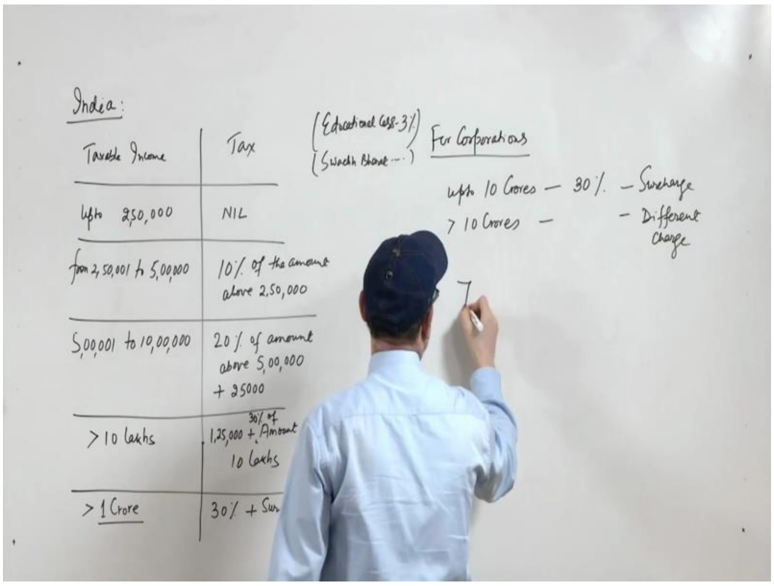

Now for corporations, for corporations basically, we have in India we have upto 10,00,00,000 you have 30% and then more than 10,00,00,000 you have and also surcharge is there. Similarly here also you have different surcharge is there. So basically these rates vary from time to time.

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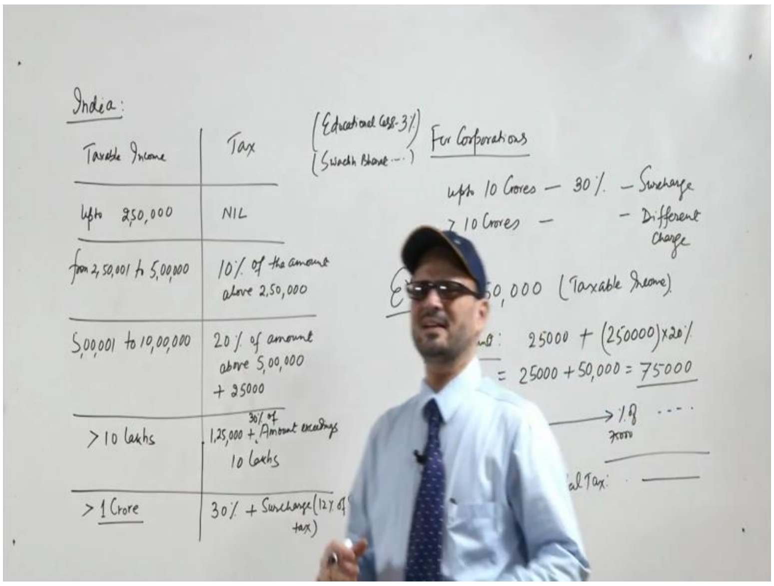

It is not that it is fixed but what we need to know is that we should be aware of certain terminologies, how the income tax is calculated and how it has bearing on the economic analysis. Example let us see that you have an income of suppose 7,50,000, this is your taxable income. In that case your tax amount will be, so you are in this category, so in that case you will be 2,50,000 to 25,000 plus it is amount exceeding 5,00,000 is 2,50,000 and its 20%.

So it will be something like 25,000 plus 50,000, so it is 75,000. So this is how you calculate the taxes. Now this amount further you have to add certain cess, so that may come to some percentage of 75,000 and then you get the values and total tax is computed. So this is how the tax amount is computed.

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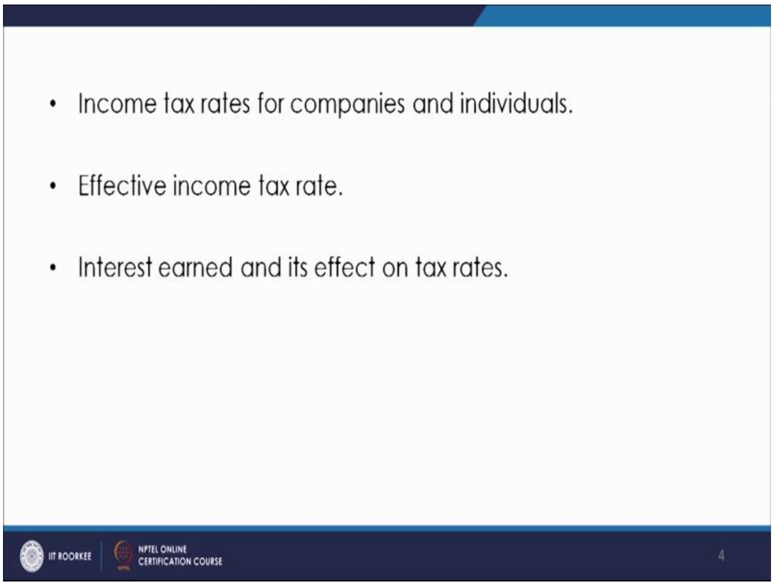

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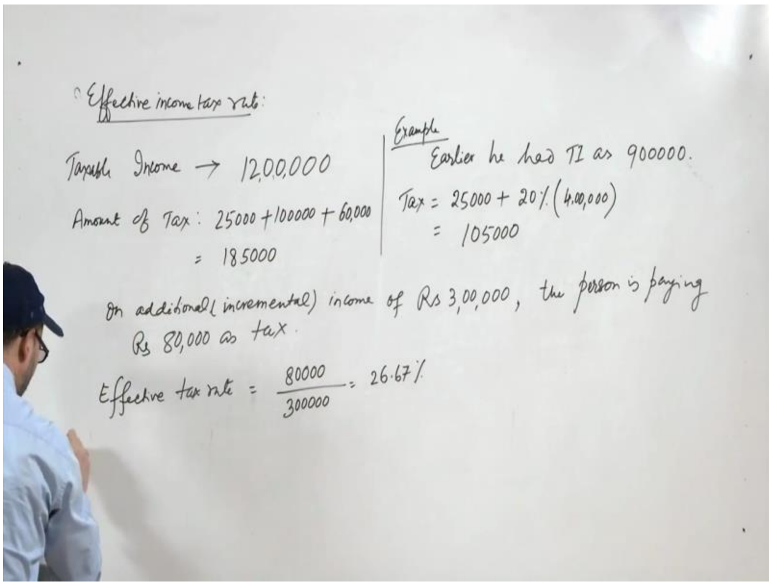

Now let us see we will try to know something about the effective income tax rate. So what is effective income tax rate? This effective income tax rate it is one particular percentage of the tax rate which when multiplied with the income it basically directly gives the amount paid by the individual or by the organisation. So in that case let us see a person is having the income of taxable income of let us say 12,00,000.

Now in that case, the amount which he will be paying will be it will be up to 2,50,000 nil, from up to 5,00,000 he is paying 25,000 then up to 10,00,000 he is paying 1,00,000 plus for the extra 2,00,000, he is paying 30% so 60,000. So all together he is paying 1,85,000. Now **sss** let us take the example, his earlier salary was suppose 9,00,000, earlier he had taxable income as 9,00,000.

Now in the 9,00,000 basically he was paying the tax as 25,000 for up to 5,00,000 plus 20% of the amount exceedin5,00,000 that is 9,00,000 minus 5,00,000 so 4,00,000. So he is basically giving 1,05,000. So what we see is on additional or incremental income of Rs. 3,00,000, the person is paying we see that he is paying 80,000 extra, Rs. 80,000 as tax. So what we see is, for the incremental income of 3,00,000, he is paying Rs. 80,000.

So basically that is known as effective tax rate, in that case for the income of 3,00,000 from his present base of income of 9,00,000, for the another 3,00,000 income, he has to pay 80,000, so effective tax rate will be 80,000 divided by 3,00,000. So basically it will be 26.67%, so this 26.67% it is known as the effective tax rate. So in fact this is not the actual amount of the tax what he is paying, he will further be paying some cess, some educational cess and other things.

But ignoring that if we calculate the taxes for knowing the effective interest rate concept we can come to this conclusion that the effective interest rate, effective tax rate paid by the person for this 3,00,000 additional income will be 26.67%.

So basically in future whenever we will talk about the tax rates, we will talk in terms of effective tax rates because we will assume that he comes into a particular category and for any additional income he has to pay that many percentage of the tax.

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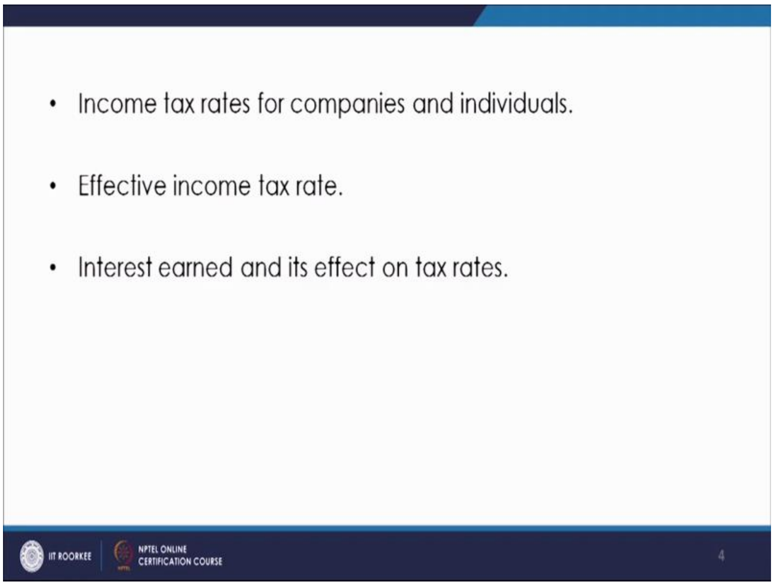

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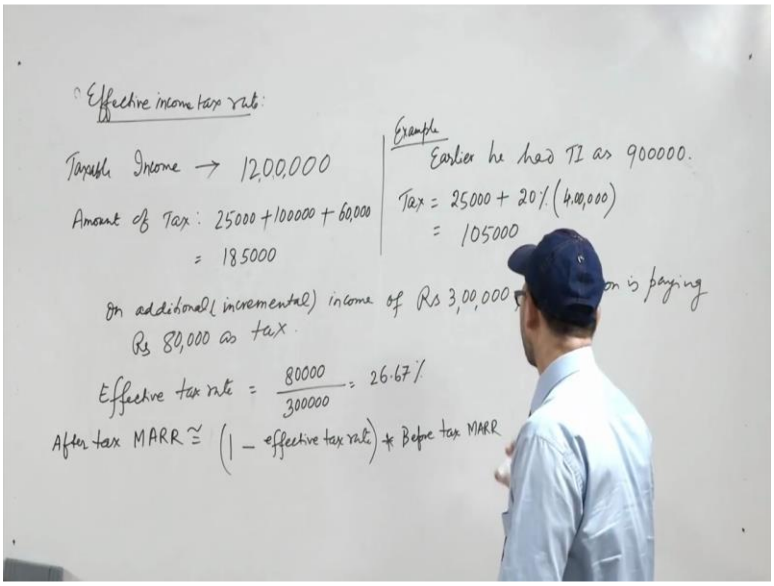

Now this effective tax it basically is important also to get the after-tax MARR in the way that after-tax minimum attractive rate of return that is MARR you can take it as 1 minus effective tax rate into before tax MARR. So basically before tax Marr is there and this effective tax rate this will be basically subtracted from 1 multiplied it will be some approximately giving the after-tax MARR.

Now we have to study something about the effect of interest earned and its effect on tax rates. What happens that many a times we used to invest the money in the bonds. Now in that case when we invest them in bonds, some of them pay us the interest annually and we have to pay the tax on those interest. Whereas in some of the **corpo** I mean corporation bonds or municipal bonds may be we are exempted from paying the taxes.

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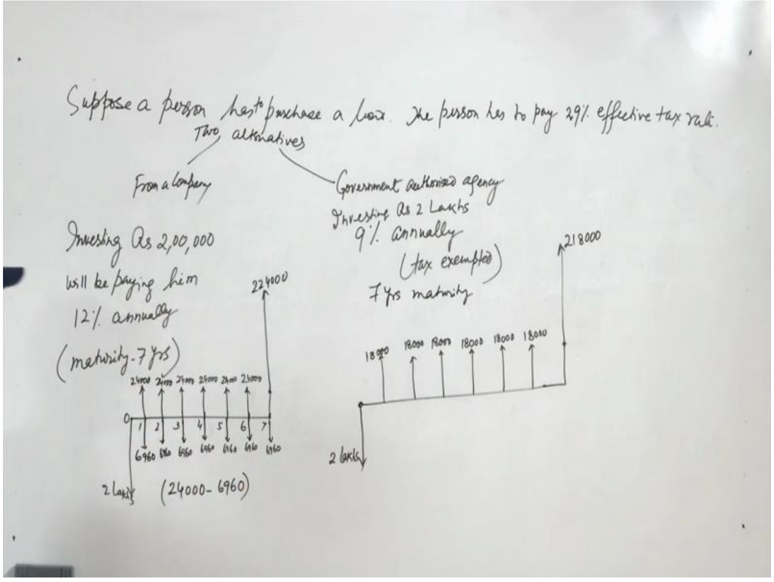

And in that case basically you are getting the return somewhat lesser. So we have to see that how these interest affects the after-tax cash flow. So let us see can have an example where suppose a person has purchaseda bond. Now he two alternatives, has to purchase a bond, so he has two alternatives that he can purchase from a company and he can purchase from the government, government authorised agency.

So what happens that the condition is that he if he is investing Rs. 2,00,000 on the bond and this company will be paying him 12% annually and maturity 7 years. In this case the thing is that it is paying 9% annually and tax exempted. So in this case now this in this case, it is his income. So here also it is investing 2,00,000, now if you look at the cash flow diagram for these cases what you see is that in this case, the cash flow diagram goes like this.

It has paid 2,00,000 now and every year it is getting 12% of this so 12% is 24,000 but at the end of seventh year basically it will get 2,00,000 plus 24,000. Now in every year it is being paid 24,000. Now the person is coming has to pay 29% effective tax rate, so he is coming under that category where the effective tax rate to be paid is 29% on any additional income. So basically what happens if he is earning 24,000, he has to pay 29% of this as tax.

So it will be basically 29% of this amount and that will be basically 6960. So 6960 every year it has to pay as taxes. Now what we see is although he has the income of 24,000 but he is paying 6960 because he this is an income to him, he has got this bond from the company and ultimately effectively what he is getting is 24,000 minus 6960 that we will see later.

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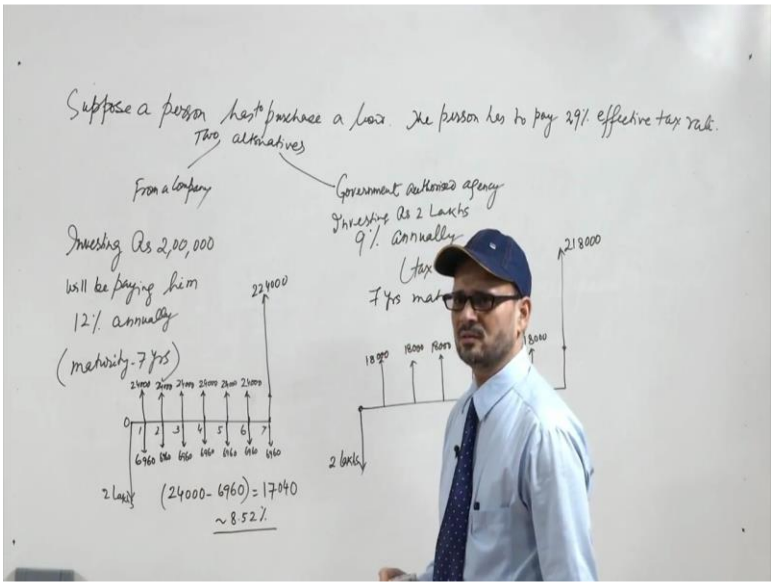

Now let us see for the government authorised agency, here again it has the 7 years maturity same. So in this case the cash flow diagram will be like this 2,00,000 on the negative side and 18,000 it will be getting. It is getting only 1,2, 3, 4, 5, 6 and 7, so in the seventh year it will get 2,18,000 but during other years it will be getting 18,000 here. Now what you see is that here basically the company is earning the interest rate if you look at how much it is paying.

The actual amount which the company is getting is 24,000 minus 6960, so this will be 17040. And here it is getting 18,000, so basically it will be 8.52% and this is on 9%. So effectively if you look at the interest or the benefit which is the company is earning, in this case it is coming as 8.52%, it is coming as 9%. So this is how the purchasing of the bond from the two agencies having different conditions they affect the cash flow and they affect the effective tax rate.

I mean earned by the person or the company and this must be taken into account while calculating or while deciding which of the option is better. Thank you.