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Video Transcription: Net Present Value



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Hi, I am Carlos Correia. So, what do you think is the most important concept in finance? It is probably NPV or Net Present Value. And why is NPV so important? Companies use NPV or Net Present Value for financial decision-making. So, if they are making a decision about whether or not they should buy another company, whether or not to invest in plant and equipment, introduce a new product line, or open a mine or buy a building, make any investment, they will use Net Present Value to assist them to make that decision.

So what is Net Present Value, and how do we calculate Net Present Value?

Assume there is company ABC Limited, which has the option to invest in a project with future cash flows of R100 million each year for the next three years. What is the value of this project?

Well, we can add the cash flows of R100 million each year and we will get to a total of R300 million. Should the company be prepared to pay R300 million today for this future stream of cash flows over the next 3 years?

No. Why not? Well, you can invest R300 million today and earn a return over the whole three years and you are going to be better off at the end of three years by doing that, rather than investing in the project.

So, how much should you pay for this project that generates R100 million per year for the next three years? If you have an alternative investment, which generates a return of 10% per year and is of equal risk, we can use Net Present Value to answer this question. We can value the project by discounting the future cash flows at the required return, which is the return you can earn on an alternative investment of equal risk.

So, what do we mean by discounting future cash flows?

Discounting means that we can determine the present value of these future cash flows by multiplying each year's cash flow by a present value factor. What is a present value factor? A present value factor converts a future cash flow by taking into account the time value of money and the ability for us to invest an amount today to grow to a larger amount in the future. So, if you have R1 000 today and you can invest it at 10% for one year, the future value will be R1 100 in a year's time. If you know that an investment has a future value of R1 100, we can determine the present value by dividing by 1.1 or multiplying it by a factor of 1 divided by 1.1. In this case, if we divide 1 by 1.1, we get to a factor of 0.90901. This is what we call the present value of 10% for one year.

Now, let us go back to our project, which is going to generate a cash flow of R100 million each year for the three years. If we convert these future cash flows by their present value factors, we get to the present value of each year's cash flows. If we add that up, we get to a total present value of R248.685199 million. Now what does this mean? It means that if the project had a cost of R248.685199 million, it does not matter whether you invest in the project or you invest in the alternative investment, which generates a return of 10% per year for the next three years.



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If you pay more than this amount, you are making the wrong decision. Rather invest in the alternative investment. If you pay less than this amount, you are making the right decision, by investing in the project. What happens if you can actually buy this project for R230 million today? Buy it now. We hope that you will go out and act quickly and purchase this investment or this project for R230 million.

Now, calculating the difference between the present value – the total present value – and the cost today of the project is what we call NPV or Net Present Value. In this case, the project has a positive NPV of R18.685199 million. This means we are better off today by this amount – we have increased our wealth by this amount.

Companies will often work with Net Present Value or present values to make investment decisions. We can do it another way; we can determine the future value of the project if we reinvest all the cash flows. This means that we are simply determining what we will accumulate – that means earning total – by the end of year three, if we invest in the project. We are assuming that we are investing the cash flows at 10% per year. So the first R100 million, we are going to reinvest for two years, which means that the R100 million will grow to R121 million, which is $R100 \times 1.1$ to the power of 2 (100×1.1^2). The second R100 million will grow to R110 million because we are going to invest that for one year. The value of the third year's cash flow is equal to R100 million because we are evaluating that project at that point in time. Add it up and you get to an accumulated amount of R331 million by investing in the project.

So, what do we compare this to? We take the cost of the project, which in this case is R230 million, and instead of investing it in the project; we are going to invest it in the alternative investment, which is going to give us a return of 10% per year for the next three years. If we do this then we will have accumulated R306.1 million by the end of year three. Now, as we can see previously, the Net Present Value was R18.685199 million, which indicated that we should invest in the project. On the basis of future values, we are better off by R24.9 million by investing in the project. One project has the future value of R331 million; the alternative investment has an accumulated amount of R306.1 million. So both methods give us the right answer, as they should.

So how is the net future value of R24.9 million related to the Net Present Value of R18.685199 million? Well, if we invest R18.685199 million for three years this will grow to R24.9 million at the end of year three. So everything works out.

You can use Net Present Value to make the right decision. For any investment, you need to determine its future cash flows. Discount each cash flow at its required return, which is the return you can earn on the alternative investment of equal risk. Once you have determined the present value of each cash flow you add them up to get the total present value of the project. You then deduct today's price or cost to determine Net Present Value. If it is positive, then invest. Of course, the devil is in the details, but the concept of NPV remains true, so use it.