**Get User Input Practice Opportunity Solution**

[00:00:00.00] [AUDIO LOGO]

[00:00:08.51] RYAN AHMED: Hello, everyone, and welcome to this practice opportunity solution lecture. I hope you have been able to solve the practice opportunity. Let me go ahead and walk you through the question and the solution.

[00:00:19.38] First, I ask you to assume that you work as a financial analyst. And you have been tasked to develop a Python application that analyzes securities using the CAPM or the capital asset pricing model. First, I ask you to review the concept of CAPM and write down the formula.

[00:00:38.19] Next, I ask you to write a Python code that will receive beta for the given stock, the risk free rate, and expected broad market return from the user. And the code will print out the expected return on the stock. And I also ask you to round your answer to two decimal points.

[00:00:59.24] And then finally, I ask you to perform a sanity check by comparing your answer to the online CAPM calculator. And you can use any calculator you would like online, and I've included a recommendation here for one of the links as an example. This is simply the expected code output.

[00:01:15.90] So for example, the code is going to ask the user to enter the name of the stock. It's going to be Apple, for example. Enter the stock beta, the user will insert 1.25, enter the risk free rate of return in percentage, could be four, and then enter the expected broad market rate of return, which is maybe the S&P 500 as an example. And that would be here the user will insert 5.6 as an example, and the code is going to simply calculate the expected return on Apple stock, and that would be 6%. And I also gave you a hint that you might need to change data types to perform math operations and we learned how to do that before using the type casting.

[00:01:59.93] So first, let me show you the first solution was going to be review the concept of CAPM. Let me walk you through it quickly. So CAPM describe the relationship between the expected return and risk of securities. CAPM simply indicates that the expected return on a security is equal to the risk free return plus a risk premium. This is simply the equation.

[00:02:27.92] The expected return on a given stock, this could be Apple, Nvidia, or any other stock you would like, would be equals two. You're going to put the RF, which is the risk free rate of return, plus beta of the stock, and I'm going to show you what beta is coming up next. And then you multiply that times the market risk premium. Market risk premium is simply the expected return from the market minus the RF or the risk free rate of return.

[00:03:00.69] So the question is, what is beta? Beta is a measure of the volatility of the security compared to the broad markets, the S&P 500 as an example. If a stock has a beta of one, that means the stock price activity is strongly correlated with the market. If beta of the stock is less than one, that mean the stock is less volatile compared to the market. This could be a utility and consumer goods, for example, Procter & Gamble, or P&G.

[00:03:30.94] If beta is greater than one, then the stock is more volatile than the market. This could be an Nvidia stock as an example. So all you need to do to calculate the expected return on a security, you need to know the risk free rate of return, you need to know the beta of the stock. You also need to know the expected return on the market, or RM, ERM. And once you know that, then you can substitute in this equation and you should get the expected return on a stock.

[00:04:01.12] Let me show you a quick example to illustrate as well CAPM formula. So the CAPM formula for Apple stock can be calculated as follows. Let's assume that the risk free rate of return is 4%, and this could be calculated based on the yield from a 10-year US government bond. And please note that this is an assumption, and numbers could vary here.

[00:04:25.12] I'm assuming that RF, like without risk, we are getting 4% from the US government bond, specifically, for the 10-years one. And then I'm going to assume that the expected return from the broad market is around 5.6%, and that would be the S&P 500 as an example. And then the beta for Apple is 1.25.

[00:04:49.52] So simply to calculate the expected return from Apple stock, all you need to do is to substitute in the CAPM formula. You say expected return of Apple stock equals to the risk free rate of return plus beta for Apple times the market risk premium. So it's going to be expected return of the market minus the risk free rate of return.

[00:05:13.51] You substitute, you put 4% plus 1.2 five times 5.6 minus 4%, you will end up with 6%. So simply, in just plain, simple English, if an investor invests in Apple stock, they should expect 6% return in order to be compensated for the risk they are taking. That's simply CAPM in a nutshell.

[00:05:39.77] So let's go ahead and show you how we can implement that in code. So what I'm going to do here is I'm going to go up to our code cells here, and then I'm going to simply write the code together. So first, I'm going to define the stock name. So I'm going to say stock equals two. I need to get that from the user.

[00:05:58.37] So I'm going to say input. And then I'm going to say please enter the name of the stock. And then I'm going to add space in here so we use it insert for example, the name of the stock, it won't be kind of concatenated or stuck next to the colon. I'm just going to add the space in. So the user is going to insert, let's say Apple, and that will be stored in the stock here variable.

[00:06:24.34] Next, I need to get beta from the user. So I can say beta equals two. Here, I need to cast the input into a float data type. So I'm going to say please input, add quotation marks. And then I'm going to say, enter the stock beta. I'm going to add colon and then I'm going to add space.

[00:06:44.11] The user is going to insert beta. I'm going to convert it into a float data type. And then I'm going to place it in beta variable. To get the risk free rate of return, so I'm going to say risk free rate equals to, I'm going to cast it as a float with parentheses, and then I'm going to say input, get data from the user. And that is going to be entered the risk free rate of return.

[00:07:13.40] And I'm going to say in percentage to avoid any confusion. And again, I'm going to add this space as well. Afterwards, I need to get the broad market return. So I'm going to say markets, market return, return equals two. Again, I need to cast it as a float data type. Then I'm going to say inputs, open parentheses, add quotations, and then I'm going to say enter the broad market rate of return.

[00:07:47.88] And this is, of course, an expected value. I'm going to say in percentage plus one. And I'm going to add colon and the space afterwards. The user is going to insert the value. I'm going to store that in the market return variable.

[00:08:00.51] OK. Next, all I need to do is to just apply the CAPM formula. So if you recall CAPM formula, if you scroll down here, this is simply the formula. I need to get expected return on Apple stock, or whatever stock that I'm calculating for, is going to be equals to, RF plus data of the stock, times the market risk premium, or expected return of the market minus RF.

[00:08:25.35] So to do that, I'm going to go up and simply calculate that here. So I'm going to say the expected underscore return is going to be equal to. And then I'm going to grab the risk free tab that is going to-- actually, I need to understand first. So if you're on this cell, please enter the name of the stock.

[00:08:46.79] So for example here, I'm going to say Apple as an example. You press Enter, enter the beta of the stock. So beta is going to be 1.25 as it is, press Enter. Enter the risk free rate of return. I'm going to say let's say 4%.

[00:09:02.15] Enter the expected broad market rate of return. I'm going to say, let's say 5.6%. And I got the data. Now, I can simply take all these values and just calculate the expected return using the CAPM formula.

[00:09:15.27] So now if I say I need the risk free, and then you press Tab, that is going to autocomplete for you. So RF plus I need to get beta times open parentheses, I need to get the market return. Again, Tab, it should autocomplete for you, minus the risk free, again, tab, that is going to autocomplete for you. And that's pretty much it.

[00:09:38.91] Now, we have been able to calculate the expected return. Now I can simply say print for me using CAPM. Let me zoom in a little bit. So I'm going to say using CAPM formula the expected return on-- and I'm interested in Apple stock, I'm going to display that as well-- going to be equal to. And then I'm going to add another placeholder. We learned how to do that before.

[00:10:13.12] I'm going to add a percentage sign. And then I'm going to say .formats. And then I need to pass along the stock, and I need to pass along as well my expected return. So I'm going to pass along the name of the stock. It's going to be placed in the first placeholder here. And then the expected return is going to be placed in the second one.

[00:10:32.44] Let's go ahead run it, Shift, Enter, here we go. The using CAPM formula, the expected return on Apple stock is equal to 6%. So the last part of the question simply here, I ask you to round your answers to two decimal points. So you can just simply add here. You can take the expected return, round it, so you can see around, your open parentheses. Here, I'm going to round the expected return.

[00:10:56.17] And then I'm going to say-- I'm going to round it two decimal points. And I need to add a parenthesis and additional one at the end. So if press Shift, Enter, here, you will see pretty much the same answer. But essentially, that's how you can round your answer to two decimal points.

[00:11:14.56] Finally, I ask you to use one of the CAPM online calculators to perform a sanity check. So I included one of the links in here, but you can feel free to essentially select any CAPM formula calculator. So here, you need to insert the expected market return. And the expected market return was 5.6% in our example. So I'm going to say 5.6.

[00:11:41.56] So if I say here 5.6, and then I need to calculate the risk free rate of return, or RF, and that was 4%. And then I asked you to calculate or input the beta for the stock, and the beta here was 1.25. And if you just say calculate, here we go, you will simply get the expected return on the capital, on capital assets expected return on security, which is Apple here in this example is 6%. And that simply matches what we've got here in our exam, OK?

[00:12:14.83] All right, so that's it. That's simply all I have for this practice opportunity. I hope you enjoyed it, and see you in the next lesson.

[00:12:21.25] [AUDIO LOGO]