

4. Suppose that the risk-free return is 5% and the expected return on the market portfolio is 15%. The capital structure of General Motors consists of equity and debt in equal amounts. There may or may not be some risk of default on the debt. The equity has a beta of 1. General Motors is considering an investment project with an expected return of 12%. The riskiness of this project is about the same as that on General Motors capital as a whole. You can ignore taxes.

Do you have enough information to determine whether GM should implement this investment project? If so, determine whether it should do so. If not, explain what additional information you need; also, supply the missing information (any way you want) and determine whether GM should implement the investment project.

- To determine whether GM should implement the project, you need to compare r_{WACC} with the 12% expected return on the project. r_{WACC} is the weighted average of \bar{r}_{equity} and \bar{r}_{debt} , which are calculated using the CAPM formula. We know the β for equity, however we DO NOT KNOW how risky the debt is, and so we don't know β_{DEBT} .
 \Rightarrow Thus, we don't have enough information to compute Bond β , since we don't know whether there is risk of default.
- Let's assume there is NO risk of default:
 Then debt is risk-free, which means $\beta_{DEBT} = 0$.
 In this case $\bar{r}_{debt} = 5\% + 0(15\% - 5\%) = 5\%$
 $\bar{r}_{equity} = 5\% + 1(15\% - 5\%) = 15\%$
 And r_{WACC} is then $r_{WACC} = \frac{1}{2} \times 5\% + \frac{1}{2} \times 15\% = 10\%$.
 In this case $r_{WACC} = 10\%$ is less than 12% expected return on the project, which implies a positive NPV, and so it's worthwhile undertaking it.
- If you assume that there is some risk of default on the debt and β_{DEBT} is, say, 1, then $\bar{r}_{debt} = \bar{r}_{equity} = 15\%$.
 $r_{WACC} = \frac{1}{2} 15\% + \frac{1}{2} 15\% = 15\%$. This is $> 12\%$. Not worthwhile undertaking the project.