COST OF CAPITAL

Levered and Unlevered Beta

In principle, the two components driving the Beta are the returns of the stock itself and those of the overall market. But stock returns are – among others – also driven by a firm´s capital structure. This is what levered and unlevered Betas deal with.

So far, Beta has been more generally defined as describing the volatility of the return of a specific investment vis-à-vis that of the overall market. However, in taking a closer look at the relative volatility of an individual stock vis-à-vis the market, one can easily observe that a major driver of Beta is leverage, or the indebtedness of a firm: Corporates with a higher leverage – or a higher debt burden – will have assigned a relatively higher Beta than those with a lower one or none at all.

A firm will increase its risk profile by assuming additional debt: This is despite the fact that assuming debt – up to a certain level - may actually be beneficial and optimize a firm´s overall cost of capital: This is simply because cost of equity (CoE) is more expensive than cost of debt (CoD). But with an ever more increasing debt burden both, CoE and CoD will increase. - In regards to CoD, this seems evident, as creditors may fear that, especially in an economic downturn, the debtor may fail more likely in meeting obligations: This is to pay interest and redeem (some of) the debt burden. - But actually also CoE will increase along a higher debt burden: Whilst CoE´s components of the risk free rate and the market risk premium are given by the market and therefore regarded as fixed input parameters, the only parameter which changes along a firm´s increasing leverage is the Beta factor. - Here it is why:

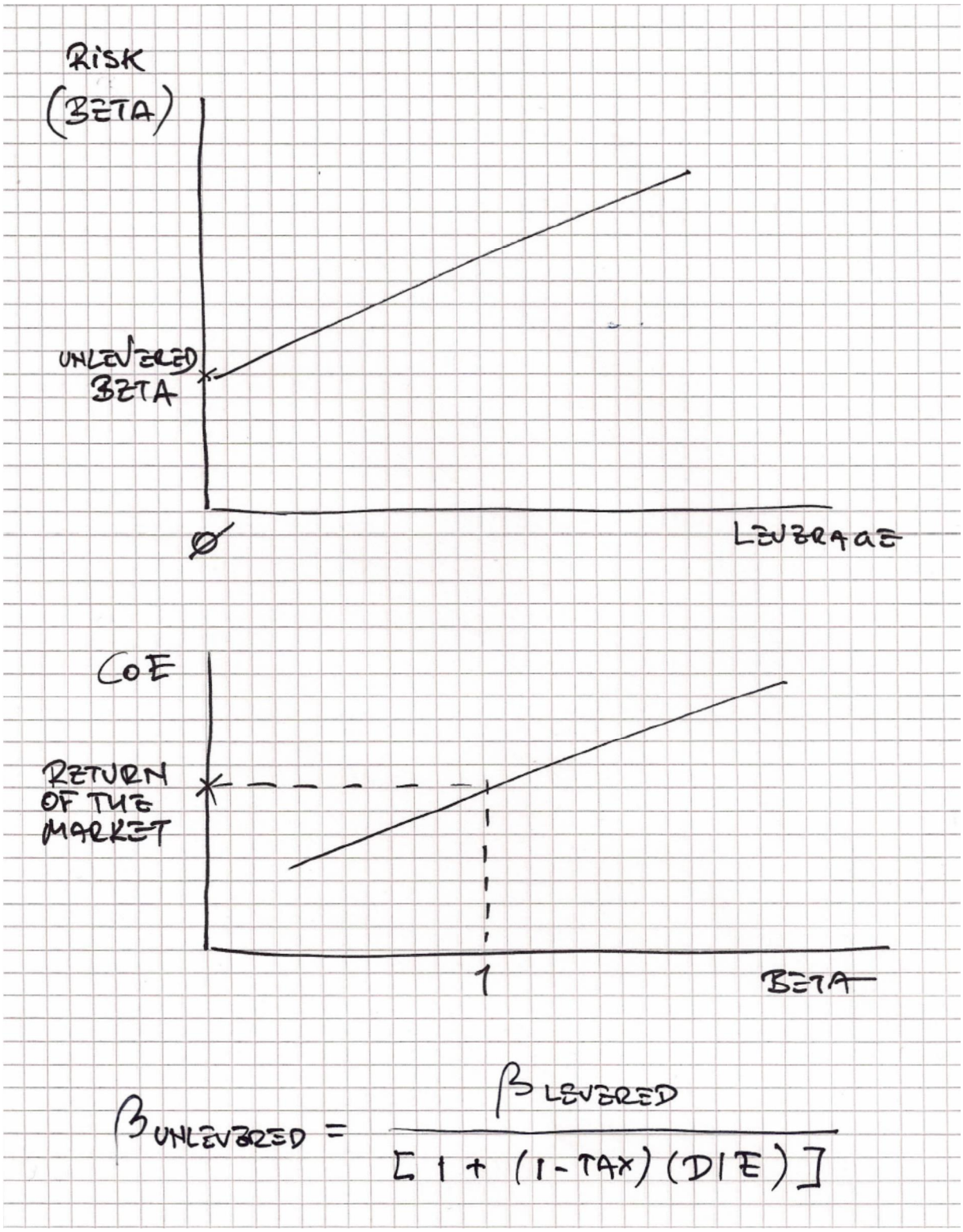
To start with, if one talked about Betas, then one commonly refers to levered Betas. Also, a Beta published or calculated for a certain stock is usually based on the firm´s current capital structure. And as most companies do have some debt on the balance sheet, the calculated Beta is the levered Beta. – Now, the unlevered Beta is a theoretical Beta assuming that the underlying company had no debt. - Of course, if a company actually does not have any debt at all, then the levered Beta would equal the unlevered Beta, but such is rarely the case.

To understand why leverage increases the Beta factor, we have to look into both, the firm´s balance sheet as well as its income statement: With a firm assuming additional debt, funds raised will most likely be used to make investments, increase capacity. This will increase the firm´s total assets or the length of its balance sheet. - In consequence, also the firm´s revenues are expected to increase. But because of the additional debt, interest expenses will now increase as well. If, as hopefully will be the case, interest expenses increase lesser than revenues, the net impact should be an increase in the firm´s net profit.

However, the actually really worrying impact of additional leverage can be vividly illustrated in the case of an economic downturn: For this purpose, we have to look at the various cost components in the income statement, with some of them being variable and others fixed. Now, in a downturn, revenues and variable costs will assumedly shrink in parallel, leaving the earnings spread approximately constant. Fixed costs, however, will – bingo! - stay fixed: Whilst in an upturn the earnings spread will increase, in a downturn such will be depressed or the firm may even generate losses, as the higher fixed costs stubbornly stay where they are. Now, as interest expenses are usually fixed costs, we can understand why higher leverage increases a firm´s earnings volatility.

Therefore, whilst adding some leverage to a firm´s balance sheet may contribute to lower overall cost of capital, a higher leverage will eventually increase both, CoD and CoE, whereby latter is driven by an increase in the firm´s levered Beta.

The unlevered Beta is commonly used either as an interim step in assessing the impact of a different leverage structure on a firm´s CoE, in first de-levering the beta in subsequently re-levering it. Or, it is also used, when comparing beta factors of different companies, to adjust for the firms´ different leverage structures to make any comparison fair.



$$\beta_{UNLEVERED} = \frac{\beta_{LEVERED}}{[1 + (1 - TAX)(D/E)]}$$