***WACC before tax***

The WACC before tax is also called the opportunity cost of capital or the required return on assets ($r\_{V}$).

There are two ways of finding the WACC before tax: using the ordinary weighted cost of capital formula, or using the CAPM.

$$r\_{WACC before-tax}=r\_{D}.\frac{D}{V}+r\_{E}.\frac{E}{V} = r\_{V}=r\_{f}+B\_{V}\left(r\_{m}-r\_{f}\right)$$

The CAPM equation is very useful since it says that the WACC before tax will increase when the beta (systematic risk measure, $Β\_{V}$) of the firm's assets increases.

***WACC after tax***

The WACC after tax is very similar to the WACC before tax, but it takes tax shields into account as well.

$$r\_{WACC after-tax}=r\_{D}.\left(1-t\_{c}\right).\frac{D}{V}+r\_{E}.\frac{E}{V}$$

$$ =r\_{D}.\frac{D}{V}+r\_{E}.\frac{E}{V} -r\_{D}.t\_{c}.\frac{D}{V}$$

$$ =r\_{WACC before-tax}-r\_{D}.t\_{c}.\frac{D}{V}$$

$$ =r\_{f}+B\_{V}\left(r\_{m}-r\_{f}\right)-r\_{D}.t\_{c}.\frac{D}{V}$$

The WACC after tax increases when the beta (systematic risk measure) of the firm's assets increases, $B\_{V}$, or when interest tax shields decrease, $\left(r\_{D}.t\_{c}.\frac{D}{V}\right)$.