***Calculation Example: CAPM Equation***

**Question:** Find $μ\_{A}$, the expected return of stock A, given:

Stock A has a correlation with the market of 0.5.

The standard deviation of A’s returns is 0.3.

The market standard deviation of returns is 0.2.

The market return is 0.1 and

The risk free rate is 0.05.

**Answer**: There are 3 steps. First find $σ\_{A,M}$ also called $cov\left(r\_{A},r\_{M}\right)$, then $B\_{A}$, and finally $μ\_{A}$.

For the covariance between $r\_{A}$ and $r\_{M}$,

$σ\_{A,M}=ρ\_{A,M}.σ\_{A}.σ\_{M}$

$ =0.5×0.3×0.2$

$$σ\_{A,M}=0.03$$

For the beta of stock A:

$$β\_{A}= \frac{σ\_{A,M}}{σ\_{M}^{2}}$$

$$ = \frac{0.03}{0.2^{2}}$$

$$ = 0.75$$

For the expected return of stock A:

$$μ\_{A}=r\_{f}+β\_{A}\left(μ\_{M}-r\_{f}\right)$$

$$ =0.05+0.75×\left(0.1-0.05\right)$$

$$ =0.0875$$

In conclusion, stock A has a lower expected return than the market since it has lower systematic risk with a beta of only 0.75 compared to the market’s beta of 1.