Instrumente des Finanzmanagements, Tutorium 2

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Aufgabe 2K279: Kapitalmarkt- und Portfoliotheorie

(a) Die Renditen sind

$$\begin{aligned} r_M &= 0.15 \cdot -0.1 + 0.25 \cdot 0.2 + 0.6 \cdot 0.15 = 0.125 \\ r_f &= 0.05 \\ r_{Win} &= 0.15 \cdot -0.05 + 0.25 \cdot 0.25 + 0.6 \cdot 0.1 = 0.115 \\ r_{Bear} &= 0.15 \cdot 0.3 + 0.25 \cdot -0.05 + 0.6 \cdot 0.15 = 0.1225 \end{aligned}$$

Die Standardabweichungen sind

$$\begin{aligned} \mathrm{SD}(r_M) &= \sqrt{0.15(-0.1 - 0.125)^2 + 0.25(0.2 - 0.125)^2 + 0.6(0.15 - 0.125)^2} = 0.0968 \\ \mathrm{SD}(r_f) &= 0 \\ \mathrm{SD}(r_{Win}) &= \sqrt{0.15(-0.05 - 0.115)^2 + 0.25(0.25 - 0.115)^2 + 0.6(0.1 - 0.115)^2} = 0.0937 \\ \mathrm{SD}(r_M) &= \sqrt{0.15(0.3 - 0.1225)^2 + 0.25(-0.05 - 0.1225)^2 + 0.6(0.15 - 0.1225)^2} = 0.1123 \end{aligned}$$

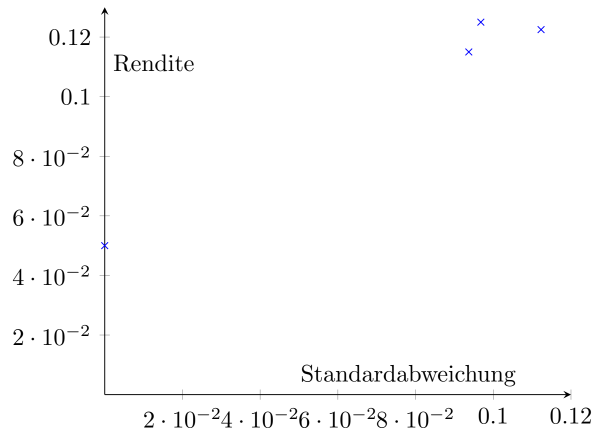
Die Covarianzen sind

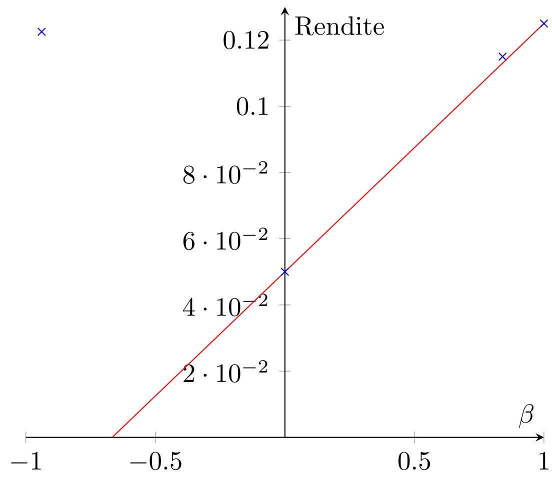
$$\begin{aligned} \mathrm{Cov}(r_M, r_M) &= \mathrm{SD}(r_M)^2 = 0.0968^2 = 0.00937024 \\ \mathrm{Cov}(r_f, r_M) &= 0 \\ \mathrm{Cov}(r_{Win}, r_M) &= 0.15(-0.05 - 0.115)(-0.1 - 0.125) + 0.25(0.25 - 0.115)(0.2 - 0.125) \\ &\quad + 0.6(0.1 - 0.115)(0.15 - 0.125) = \frac{63}{8000} \\ \mathrm{Cov}(r_{Bear}, r_M) &= 0.15(0.3 - 0.1225)(-0.1 - 0.125) + 0.25(-0.05 - 0.1225)(0.2 - 0.125) \\ &\quad + 0.6(0.15 - 0.1225)(0.15 - 0.125) = -\frac{141}{16000} \end{aligned}$$

Die Betas sind

$$\begin{aligned} \beta_M &= \frac{\mathrm{Cov}(r_M, r_M)}{\mathrm{SD}(r_M)^2} = \frac{0.00937024}{0.00937024} = 1 \\ \beta_f &= \frac{\mathrm{Cov}(r_f, r_M)}{\mathrm{SD}(r_M)^2} = \frac{0}{0.00937024} = 0 \\ \beta_{Win} &= \frac{\mathrm{Cov}(r_f, r_M)}{\mathrm{SD}(r_M)^2} = \frac{63}{8000 \cdot 0.00937024} = 0.8404 \\ \beta_{Bear} &= \frac{\mathrm{Cov}(r_f, r_M)}{\mathrm{SD}(r_M)^2} = -\frac{141}{16000 \cdot 0.00937024} = -0.9391 \end{aligned}$$

Kapitalmarktkennlinie und Wertpapierkennlinie:





(b) Marktpreis des Risikos:

$$\frac{r_M - r_f}{\mathrm{SD}(r_M)} = \frac{0.125 - 0.05}{0.0968} = 0.7748$$

(c) Beide Aktien liegen über der Wertpapierkennlinie, also sind sie unterbewertet, weil beide zu viel Rendite geben.

(d) Die Korrelationen sind

$$\begin{aligned}
\mathrm{Cor}(r_{Win}, r_{Bear}) &= \frac{\mathrm{Cov}(r_{Win}, r_{Bear})}{\mathrm{SD}(r_{Win}) \cdot \mathrm{SD}(r_{Bear})} = \frac{-\frac{837}{80000}}{0.0937 \cdot 0.1123} = -0.9943 \\
\mathrm{Cor}(r_{Win}, r_M) &= \frac{\mathrm{Cov}(r_{Win}, r_M)}{\mathrm{SD}(r_{Win}) \cdot \mathrm{SD}(r_M)} = \frac{\frac{63}{8000}}{0.0937 \cdot 0.0968} = 0.8682 \\
\mathrm{Cor}(r_{Bear}, r_M) &= \frac{\mathrm{Cov}(r_{Bear}, r_M)}{\mathrm{SD}(r_{Bear}) \cdot \mathrm{SD}(r_M)} = \frac{-\frac{141}{16000}}{0.1123 \cdot 0.0968} = -0.8107
\end{aligned}$$

(e) Die Anteile im Portfolio sind

$$\begin{aligned}
x_{Win} &= \frac{\mathrm{Var}(r_{Bear}) - \mathrm{Cov}(r_{Win}, r_{Bear})}{\mathrm{Var}(r_{Bear}) + \mathrm{Var}(r_{Win}) - 2 \cdot \mathrm{Cov}(r_{Win}, r_{Bear})} \\
&= \frac{0.1123^2 + \frac{837}{80000}}{0.1123^2 + 0.0937^2 + 2 \cdot \frac{837}{80000}} = 0.5453 \\
x_{Bear} &= 1 - x_{Win} = 0.4547
\end{aligned}$$

Damit ist die Rendite und die Standardabweichung des Portfolios

$$\begin{aligned}
r_P &= 0.5453 \cdot 0.115 + 0.4547 \cdot 0.125 = 0.1184 \\
\mathrm{SD}(r_P) &= 0.003\%
\end{aligned}$$

(f) CAPM liefert

$$\begin{aligned}
r^*_{Win} &= 0.05 + 0.8408(0.125 - 0.05) = 0.1130 \\
r^*_{Bear} &= 0.05 - 0.9391(0.125 - 0.05) = -0.0204
\end{aligned}$$

Aufgabe 11.15: Risiko versus Ertrag

(a) $r = 0.5 \cdot 0.07 + 0.5 \cdot 0.1 = 0.085$

(b) $\text{SD}(r) = \sqrt{0.5^2 \cdot 0.16^2 + 0.5^2 \cdot 0.2^2 + 2 \cdot 0.5^2 \cdot 0.22 \cdot 0.16 \cdot 0.2} = 0.1411$

Aufgabe 11.16: Risiko versus Ertrag

(a) keine Änderung

(b) steigen

Aufgabe 11.17: Risiko versus Ertrag

Anteile: Short $\frac{-2000}{10000} = -0.2$, Long $\frac{10000+2000}{10000} = 1.2$

(a) $r = 1.2 \cdot 0.07 - 0.2 \cdot 0.1 = 0.064$

(b) $\text{SD}(r) = \sqrt{1.2^2 \cdot 0.16^2 + (-0.2)^2 \cdot 0.2^2 + 2 \cdot 1.2 \cdot (-0.2) \cdot 0.22 \cdot 0.16 \cdot 0.2} = 0.1873$

Aufgabe 11.21: Risiko versus Ertrag

Anteile: Short $\frac{-10000}{10000} = -1$, Long $\frac{10000+10000}{10000} = 2$

(a) $r = 2 \cdot 0.15 - 1 \cdot 0.12 = 0.18$

(b) $\text{SD}(r) = \sqrt{2^2 \cdot 0.3^2 + (-1)^2 \cdot 0.25^2 + 2 \cdot 2 \cdot (-1) \cdot 0.9 \cdot 0.3 \cdot 0.25} = 0.3905$

Aufgabe 11.34: Die Bestimmung der Risikoprämie

(a) $\beta = \text{Cor}(r_{JJ}, r_M) \cdot \frac{\text{SD}(r_{JJ})}{\text{SD}(r_M)} = 0.06 \cdot \frac{0.2}{0.16} = 0.075$

(b) $r_f + \beta(r_M - r_f) = 0.04 + 0.075(0.1 - 0.04) = 0.0445$

Aufgabe 11.35: Die Bestimmung der Risikoprämie

$$\beta_P = 0.6 \cdot 2.16 + 0.4 \cdot 0.69 = 1.572$$
$$r_P = 0.04 + 1.572(0.1. - 0.04) = 0.1343$$