1. Consider the Amazon stock only.

- The fitted IGARCH(1,1) model for Amazon stock is essentially

\[ r_t = a_t, \quad a_t = \sigma_t \epsilon_t, \quad \epsilon_t \sim N(0, 1) \]
\[ \sigma_t^2 = 0.0000001 r_{t-1}^2 + 0.999999 \sigma_{t-1}^2. \]

The result indicates the RiskMetrics model is mis-specified. Based on the fitted model, \( \text{VaR} = \$ 1,000,000 \times 0.06178949 = \$61,789 \), and \( \text{ES} = \$70,790 \). The 10-day \( \text{VaR} \) is \$195,396.

- The fitted model is

\[ r_t = -0.001299 + a_t, \quad a_t = \sigma_t \epsilon_t, \quad \epsilon_t \sim N(0, 1) \]
\[ \sigma_t^2 = 6.185 \times 10^{-5} + 0.048 \sigma_{t-1}^2 + 0.865 \sigma_{t-1}^2. \]

The \( \text{VaR} \) is \$72,243 and ES is \$82,956.

- The fitted model is

\[ r_t = -6.39 \times 10^{-4} + a_t, \quad a_t = \sigma_t \epsilon_t, \quad \epsilon_t \sim t^{*}_{3.69} \]
\[ \sigma_t^2 = 3.097 \times 10^{-6} + 0.015 \sigma_{t-1}^2 + 0.979 \sigma_{t-1}^2. \]

The \( \text{VaR} \) is \$64,888 and ES is \$92,860.

2. Amazon stock with GEV method.

The parameter estimates (standard errors) are 0.314(0.073), 0.0165(0.0013), and 0.0308(0.0015), respectively, for \( \xi \), \( \sigma \), and \( \mu \). The \( \text{VaR} \) is \$63,816 and 10-day \( \text{VaR} \) is \$131,585.

3. The Amazon stock with GPD method.

(a) 3.5%: Parameter estimates (standard errors) are 0.343(0.114) and 0.0155(0.0021), respectively, for \( \xi \) and \( \beta \). The \( \text{VaR} \) is \$68,757 and \( \text{ES} = \$109,901 \).
(b) 4.5%: Parameter estimates (standard errors) are 0.368(0.183) and 0.0182(0.0038), respectively, for \( \xi \) and \( \beta \). The \( \text{VaR} \) is \$68,450 and \( \text{ES} = \$110,900 \).

Based on the results, the results are not sensitive to the choices of threshold.
4. Log returns of KO stock.

RiskMetrics for KO: VaR = $18,066. VaR of the combined portfolio is $
\sqrt{(61789)^2 + (18066)^2 + 2 \times 0.304 \times 61789 \times 18066}$

= $69,448.

For time-varying correlations, the correlation at the last data point is 0.027 so that the VaR is $
\sqrt{(61789)^2 + (18066)^2 + 2 \times 0.027 \times 61789 \times 18066}$

= $64,842.

5. For RiskMetrics, the VaR is $
\sqrt{(61789)^2 + (18066)^2 + 2 \times (-0.304) \times 61789 \times 18066}$

= $58,869.

For the GARCH(1,1) model with Student-\(t\) innovations, the VaR is $
\sqrt{(66166)^2 + (20803)^2 + 2 \times (-0.304) \times 66166 \times 20803}$

= $63,038.$