HW 5
MFE 400: Investment
Professor Chernov
Group 6
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Arithmetic Means

Using the data provided, we first calculated monthly returns and annual return from 1/3/1972 to 12/30/2017 and the 5-year return from 1/3/1972 to 12/30/2016. The returns were calculated as follows,

- Daily Returns (R_d) are given in column *vwretd*
- Monthly Returns (R_m) = sum of the return values (from column *vwretd*) that are from the same year and same month
- Annual returns (R_a) = sum of the return values (from column *vwretd*) that are from the same year
- 5-year returns (R_{5yr}) = take the sum of the return values (from column *vwretd*) every five years

The Arithmetic means were calculated as follows,

Annualized $\bar{R}_{Daily} = \frac{Sum\ of\ all\ daily\ returns}{Total\ number\ of\ days} \times 252 = 0.1149613$

Annualized $\bar{R}_{Monthly} = \frac{Sum\ of\ all\ monthy\ returns}{Total\ number\ of\ months} \times 12 = 0.1150704$

Annualized $\bar{R}_{annual} = \frac{Sum\ of\ all\ annual\ returns}{Total\ number\ of\ years} = 0.1150704$

Annualized $\bar{R}_{5-year} = \frac{Sum\ of\ all\ 5-year\ returns}{Total\ number\ of\ 5-years} \times \frac{1}{5} = 0.1131569$

Geometric Means

Annualized $\bar{R}^G_{Daily} = \{[(1+\mathrm{R}_1)(1+\mathrm{R}_2)\dots(1+\mathrm{R}_{11603})]^{\frac{1}{11603}}\}^{252} - 1 = 0.1059692$

Annualized $\bar{R}^G_{Monthly} = \{[(1+\mathrm{R}_1)(1+\mathrm{R}_2)\dots(1+\mathrm{R}_{11603})]^{\frac{1}{552}}\}^{12} - 1 = 0.1060749$

Annualized $\bar{R}^G_{annual}$ = $[(1+\mathrm{R}_1)(1+\mathrm{R}_2)\ldots(1+\mathrm{R}_{11603})]^{\frac{1}{46}}-1$ = 0.1060749

Annualized $\bar{R}^G_{5-year}$ = $\{[(1+\mathrm{R}_1)(1+\mathrm{R}_2)\ldots(1+\mathrm{R}_{11603})]^{\frac{1}{9}}\}^{\frac{1}{5}}-1$ = 0.1036667