

THE ORIGIN OF 252

Properties of rates of return are compared on an annualized basis. Oftentimes, however, daily returns are used to compute annualized numbers. How do we transform daily statistical parameters like mean and standard deviation to their annualized counterparts? The accepted convention in the U.S. is to use a 252-day year. Why?

The answer is that it is approximately true and easy to use. First, recognize that there are, on average, 365.25 calendar days in a year. Saturday and Sunday are not considered business days so the number of business days is approximately

$$365.25 \text{ calendar days} \times \frac{5}{7} = 260.89 \approx 261 \text{ trading days.}$$

Second, there are holidays. The origin of the word “holidays” is “Holy Days.” On such days, no business is conducted. Since holy days vary by religion, and countries vary by religious influence, there is no common practice observed internationally. In the U.S., the definition of holidays has morphed into federal holidays, and there are 10. Their dates of observance in 2020 are as follows:

New Year’s Day	January 1	Wednesday
Martin Luther King, Jr. Day	January 20	Monday
George Washington’s Birthday	February 20	Monday
Memorial Day	May 25	Monday
Independence Day	July 3*	Friday
Labor Day	September 7	Monday
Columbus Day	October 12	Monday
Veterans Day	November 11	Wednesday
Thanksgiving Day	November 26	Thursday
Christmas Day	December 25	Friday

Hence, the usual number of U.S. business days in a calendar year is 251. Since 252 is easier to work with (e.g., each month has exactly 21 business days), 252 is the usual assumption.

$$\text{Compound annual growth rate (CAGR)} = e^{\mu_d \times 252} - 1$$

$$\text{Annualized volatility} = \sigma_d \times \sqrt{252}$$

where μ_d and σ_d are the mean and standard deviation of the daily natural log returns.

To illustrate the rule’s accuracy, I collected daily data for the S&P 500 index for the period 19871231 through 20191231. The number of calendar days during the 32-year period is 11,688, and the number of business days is 8,065. The average number of business days per year is $8,065 / 32 = 252.03$.