CH. 11 INVESTMENT PLANNING

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THE OBJECTIVES AND REWARDS OF INVESTING

- Investing: The process of placing money in some medium such as stocks or bonds in the expectation of receiving some future benefit.
- Speculating: A bet in which future value and expected returns are highly uncertain.
- The average investor is risk averse and requires higher expected returns as compensation for taking on greater risk. Before investing, you should have sufficient savings for emergencies and adequate insurance coverage.

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RATES OF RETURN

- Investment returns: The rate of return on an investment can be calculated as follows:

$$\text{Return} = \frac{(\text{Amount received} - \text{Amount invested})}{\text{Amount invested}}$$

For example, if $1,000 is invested and $1,100 is returned after one year, the rate of return for this investment is:

($1,100 - $1,000) / $1,000 = 10%

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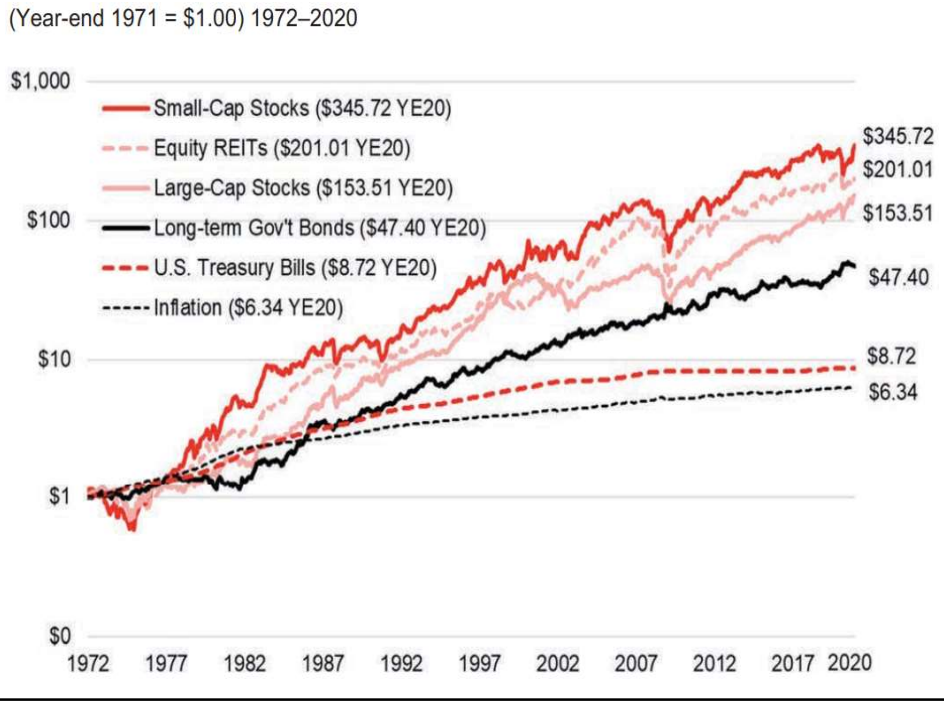
RATES OF RETURN 1972-2020



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RATES OF RETURN

- Dollar Return = cash received + change in value of the asset in dollars
- Percentage Return = (cash received + change in value of the asset)/original investment

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RETURNS: EXAMPLE

- Suppose you bought 100 shares of Timber Inc. one year ago today at $25. Over the last year, you received $20 in dividends (= 20 cents per share × 100 shares). At the end of the year, the stock sells for $30. How did you do?
- Dollar gain:
- Percentage gain for the year:

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RETURNS OVER MULTIPLE TIME PERIODS

- Arithmetic return: Average return

$$r_A = (r_1 + r_2 + r_3 \ldots + r_n)/n$$

- Holding period return: Return that an investor would get when holding an investment over a period of *n* years.

$$r_{HR} = (1 + r_1)\times(1 + r_2)\times (1 + r_3)\times \ldots \times(1 + r_n) - 1$$

- Geometric return:

$$r_G = \sqrt[n]{(r_1 + 1) \times (r_2 + 1) \times (r_3 + 1) \times \ldots \times (r_n + 1)} - 1$$

$$= [(r_1 + 1) \times (r_2 + 1) \times (r_3 + 1) \times \ldots \times (r_n + 1)]^{(1/n)} - 1$$

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RETURNS OVER MULTIPLE TIME PERIODS

- Suppose your investment provides the following returns over a four-year period:

Year	Return
1	10%
2	-5%
3	20%
4	15%

$$\text{Arithmetic average return} = \frac{r_1 + r_2 + r_3 + r_4}{4}$$

$$= \frac{10\% - 5\% + 20\% + 15\%}{4} = 10\%$$

Holding period return

$= (1+.1)\times(1-.05)\times(1+.2)\times(1+.15) - 1$

=

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RETURNS OVER MULTIPLE TIME PERIODS

- Suppose your investment provides the following returns over a four-year period:

Year	Return
1	10%
2	-5%
3	20%
4	15%

Geometric average return =

$$(1+r_g)^4 = (1+r_1)\times(1+r_2)\times(1+r_3)\times(1+r_4)$$

$$r_g = \sqrt[4]{(1.10)\times(.95)\times(1.20)\times(1.15)} - 1$$

$$= .095844 = 9.58\%$$

Hence, an investor who held this investment would have actually realized an annual return of 9.58%:

$(1 + .095844)^4 - 1 =$

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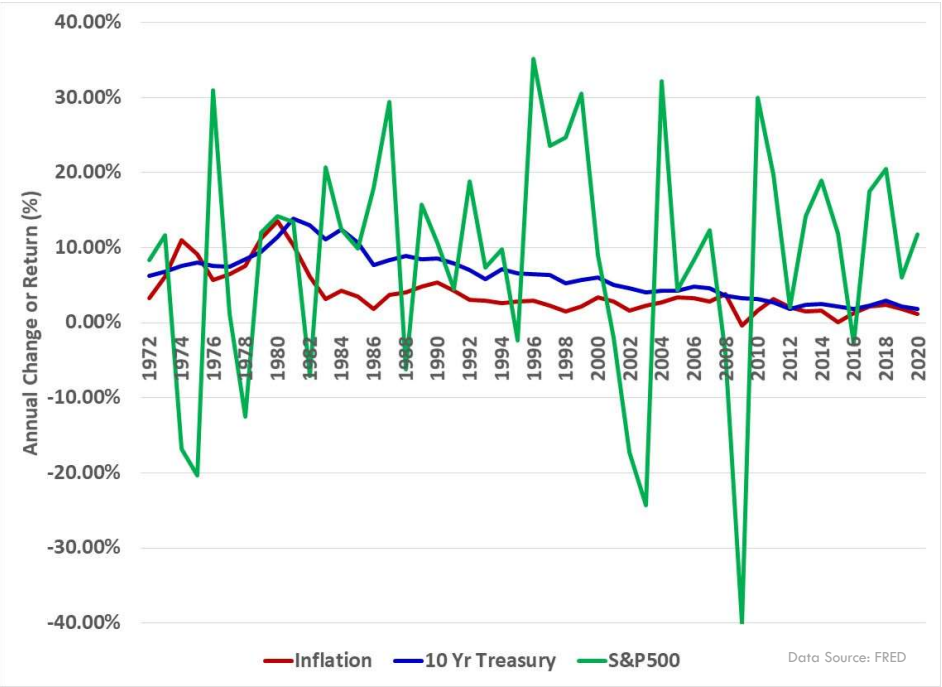
ANNUAL RATES OF RETURN 1972-2020



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RISK AND RETURN

- Stock returns are much more volatile than treasury bond returns and, therefore, they are considered as riskier investments.
- However, there is no universally agreed-upon definition of risk.
- Risk = Volatility?

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MEASURING RISK

- Variance: A measure of volatility. Variance is a measurement of the spread between numbers in a data set. It is calculated as average value of squared deviations from mean.
- Standard Deviation (SD): Square root of variance. A measure of volatility. Commonly represented by the lower-case Greek letter sigma, σ.

$$SD = \sqrt{VAR} = \sqrt{\frac{(R_1 - \bar{R})^2 + (R_2 - \bar{R})^2 + \cdots (R_T - \bar{R})^2}{T - 1}}$$

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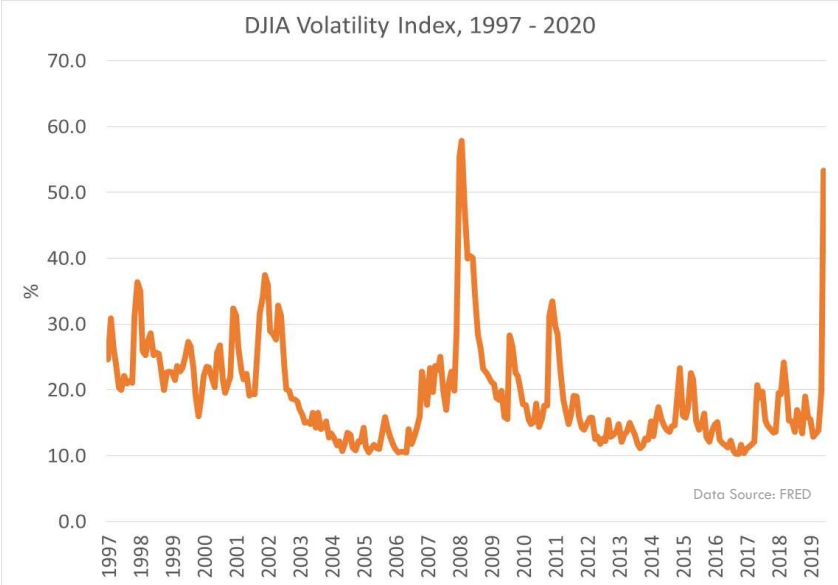
VOLATILITY AS RISK



The volatility of stocks is not constant every year.

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RISK AND RETURN

- The history of capital market returns can be summarized by describing:
  - ✓ Average return
  - ✓ The standard deviation of those returns
  - ✓ The frequency distribution of the returns

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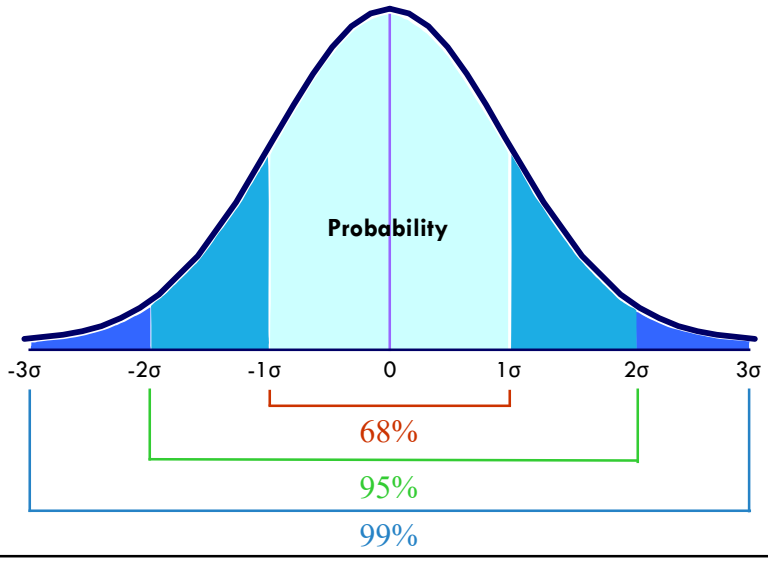
RETURN - NORMAL DISTRIBUTION



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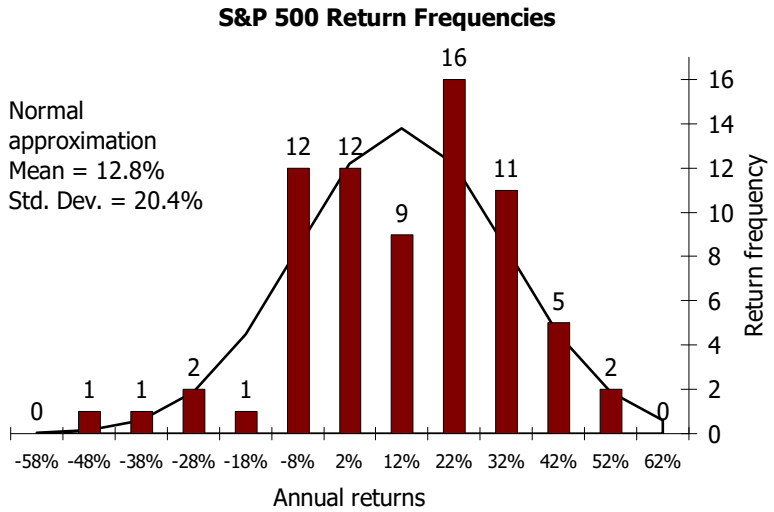
RETURN - NORMAL DISTRIBUTION



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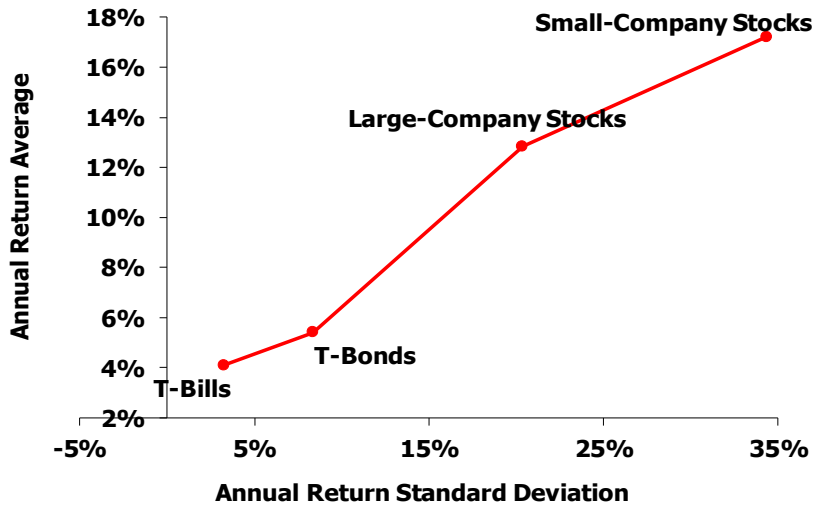
THE RISK-RETURN TRADEOFF



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