

The Returns and Risks From Investing

Chapter 6

Charles P. Jones, *Investments: Analysis and Management*,

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Asset Valuation

- Function of both return and risk
 - At the center of security analysis
- How should realized return and risk be measured?
 - The realized risk-return tradeoff is based on the past
 - The expected risk-return tradeoff is uncertain and may not occur

Return Components

- Returns consist of two elements:
 - Periodic cash flows such as interest or dividends (income return)
 - “Yield” measures relate income return to a price for the security
 - Price appreciation or depreciation (capital gain or loss)
 - The change in price of the asset
- Total Return = Yield + Price Change

Risk Sources

- Interest Rate Risk
 - Affects income return
- Market Risk
 - Overall market effects
- Inflation Risk
 - Purchasing power variability
- Business Risk
- Financial Risk
 - Tied to debt financing
- Liquidity Risk
 - Marketability with-out sale prices
- Exchange Rate Risk
- Country Risk
 - Political stability

Risk Types

- Two general types:
 - Systematic (general) risk
 - Pervasive, affecting all securities, cannot be avoided
 - Interest rate or market or inflation risks
 - Nonsystematic (specific) risk
 - Unique characteristics specific to issuer
- Total Risk = General Risk + Specific Risk

Measuring Returns

- For comparing performance over time or across different securities
- Total Return is a percentage relating all cash flows received during a given time period, denoted $CF_t + (P_E - P_B)$, to the start of period price, P_B

$$TR = \frac{CF_t + (P_E - P_B)}{P_B}$$

Measuring Returns

- Total Return can be either positive or negative
 - When cumulating or compounding, negative returns are problem
- A Return Relative solves the problem because it is always positive

$$RR = \frac{CF_t + P_E}{P_B} = 1 + TR$$

Measuring Returns

- To measure the level of wealth created by an investment rather than the change in wealth, need to cumulate returns over time
- Cumulative Wealth Index, CWI_n , over n periods =

$$WI_0(1 + TR_1)(1 + TR_2)\dots(1 + TR_n)$$

Measuring International Returns

- International returns include any realized exchange rate changes
 - If foreign currency depreciates, returns lower in domestic currency terms
- Total Return in domestic currency =

$$\left[RR \times \frac{\text{End Val. of For.Curr.}}{\text{Begin Val. of For.Curr.}} \right] - 1$$

Measures Describing a Return Series

- TR, RR, and CWI are useful for a given, single time period
- What about summarizing returns over several time periods?
- Arithmetic mean, or simply mean,

$$\bar{X} = \frac{\sum X}{n}$$

Arithmetic Versus Geometric

- Arithmetic mean does not measure the compound growth rate over time
 - Does not capture the realized change in wealth over multiple periods
 - Does capture typical return in a single period
- Geometric mean reflects compound, cumulative returns over more than one period

Geometric Mean

- Defined as the n-th root of the product of n return relatives minus one or $G =$

$$\left[(1 + TR_1)(1 + TR_2) \dots (1 + TR_n) \right]^{1/n} - 1$$

- Difference between Geometric mean and Arithmetic mean depends on the variability of returns, s

$$(1 + G)^2 \approx (1 + \bar{X})^2 - s^2$$

Adjusting Returns for Inflation

- Returns measures are not adjusted for inflation
 - Purchasing power of investment may change over time
 - Consumer Price Index (CPI) is possible measure of inflation

$$TR_{IA} = \frac{(1 + TR)}{(1 + CPI)} - 1$$

Measuring Risk

- Risk is the chance that the actual outcome is different than the expected outcome
- Standard Deviation measures the deviation of returns from the mean

$$s = \left(\frac{\sum (X - \bar{X})^2}{n - 1} \right)^{1/2}$$

Risk Premiums

- Premium is additional return earned or expected for additional risk
 - Calculated for any two asset classes
- Equity risk premium is the difference between stock and risk-free returns
- Bond horizon premium is the difference between long- and short-term government securities

Risk Premiums

- Equity Risk Premium, ERP, =

$$\left[\frac{(1 + TR_{CS})}{(1 + RF)} \right]^{-1}$$

- Bond Horizon Premium, BHP, =

$$\left[\frac{(1 + TR_{GB})}{(1 + TR_{TB})} \right]^{-1}$$

The Risk-Return Record

- Since 1920, cumulative wealth indexes show stock returns dominate bond returns
 - Stock standard deviations also exceed bond standard deviations
- Annual geometric mean return for the S&P 500 is 10.3% with standard deviation of 19.7%

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