Lecture 6: Risk/Return in Financial Markets

ECON435: Financial Markets and the Macroeconomy

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Interest Rates

Interest Rate = promised rate of return

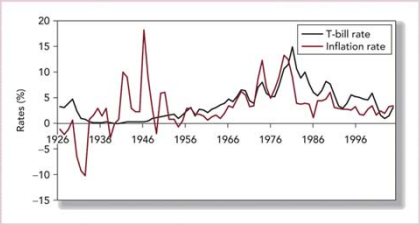
R … nominal interest rate: in dollar terms
r … real interest rate: in terms of purchasing power
= adjusted for inflation rate i

relationship: $r \approx R - i$ (Fisher equation)

[more precisely: $1+r = (1+R)/(1+i)$]

measurement of inflation:
increase in consumer price index (CPI)

Interest and Inflation Rates



Risk-free Interest Rates

"Risk-free" interest rates: no default risk

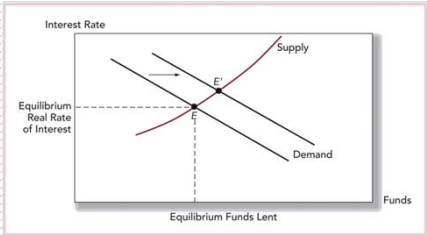
Caveats:

- no investment is truly risk-free
- guaranteed nominal return does not protect against fluctuations in purchasing power

Determinants of Real Interest Rates

- Demand
- Supply
- Fed Policy
- Inflation Expectations

Determinants of Real Interest Rates



Comparing Rates of Return

Effective Annual Rate (EAR):
- incorporates compounding effect
- $FV = (1 + EAR)^n PV$

Annual Percentage Rate (APR):
- for subannual periods
- ignores compounding effect:
  $APR = nr_n$ where r_n is return in each of n subperiods
- e.g. credit card that charge 3% monthly:
  $APR = 12*3\% = 36\%$
  $EAR = (1 + 3\%)^{12} - 1 = 42.6\%$

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Comparing Rates of Return

For risky investments:

Holding-period return (HPR) =

$$= \frac{\text{Price increase + dividends}}{\text{Initial price}}$$

Expected return = E[HPR]

Standard deviation = σ

Risk premium = E[HPR] – Risk-free rate

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Sharpe Ratio

Sharpe ratio =

$$= \frac{\text{Risk premium}}{\text{Std. dev.}}$$

- first proposed by William Sharpe
- measures the "risk-weighted" excess return

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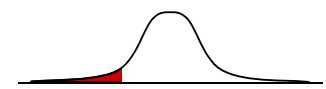
Value at Risk (VaR)

- Value-at-Risk = quantile of the return distribution = measure of loss under extreme market conditions
- typically 5% quantile (or 5th percentile) is used



- **Interpretation:** the loss on an investment will be larger than the 5% VaR with 5% probability

→ important in risk management systems to limit the maximum loss

- **Example:** VaR at Goldman Sachs for daily trading losses was $250m in 2010 (up from $125m in 2007)

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