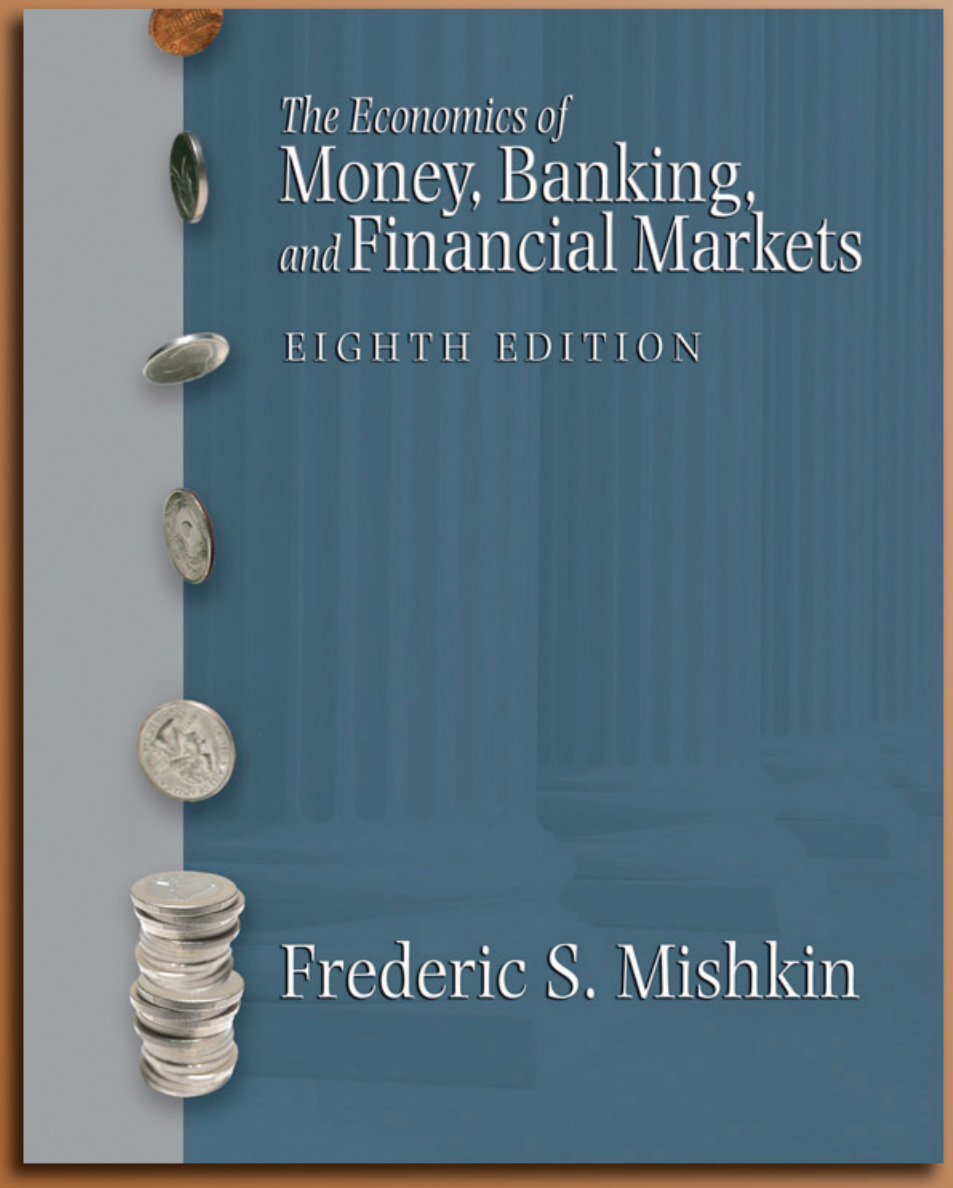

Chapter 7

The Stock Market, the Theory of Rational Expectations, and the Efficient Market Hypothesis

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One-Period Valuation Model

$$P_0 = \frac{Div_1}{(1+k_e)} + \frac{P_1}{(1+k_e)}$$

P_0 = the current price of the stock

Div_1 = the dividend paid at the end of year 1

k_e = the required return on investment in equity

P_1 = the sale price of the stock at the end of the first period

Generalized Dividend Valuation Model

The value of stock today is the present value of all future cash flows

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

If P_n is far in the future, it will not affect P_0

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+k_e)^t}$$

The price of the stock is determined only by the present value of the future dividend stream

Gordon Growth Model

$$P_0 = \frac{D_0(1+g)}{(k_e - g)} = \frac{D_1}{(k_e - g)}$$

D_0 = the most recent dividend paid

g = the expected constant growth rate in dividends

k_e = the required return on an investment in equity

Dividends are assumed to continue growing at a constant rate forever

The growth rate is assumed to be less than the required return on equity

How the Market Sets Prices

- The price is set by the buyer willing to pay the highest price
- The market price will be set by the buyer who can take best advantage of the asset
- Superior information about an asset can increase its value by reducing its risk

Theory of Rational Expectations

- Expectations will be identical to optimal forecasts using all available information
- Even though a rational expectation equals the optimal forecast using all available information, a prediction based on it may not always be perfectly accurate
  - It takes too much effort to make the expectation the best guess possible
  - Best guess will not be accurate because predictor is unaware of some relevant information

Formal Statement of the Theory

$$X^e = X^{of}$$

$X^e =$ expectation of the variable that is being forecast

$X^{of} =$ optimal forecast using all available information

Implications

- If there is a change in the way a variable moves, the way in which expectations of the variable are formed will change as well
- The forecast errors of expectations will, on average, be zero and cannot be predicted ahead of time

Efficient Markets—
Application of Rational Expectations

Recall

The rate of return from holding a security equals the sum of the capital gain on the security, plus any cash payments divided by the initial purchase price of the security.

$$R = \frac{P_{t+1} - P_t + C}{P_t}$$

R = the rate of return on the security

P_{t+1} = price of the security at time $t + 1$, the end of the holding period

P_t = price of the security at time t, the beginning of the holding period

C = cash payment (coupon or dividend) made during the holding period

Efficient Markets (cont'd)

At the beginning of the holding period, we know P_t and C.

P_{t+1} is unknown and we must form an expectation of it.

The expected return then is

$$R^e = \frac{P^e_{t+1} + P_t + C}{P_t}$$

Expectations of future prices are equal to optimal forecasts using all currently available information so

$$P^e_{t+1} = P^{of}_{t+1} \Rightarrow R^e = R^{of}$$

Supply & demand analysis states R^e will equal the equilibrium return R^* so

$$R^{of} = R^*$$

Efficient Markets

- Current prices in a financial market will be set so that the optimal forecast of a security's return using all available information equals the security's equilibrium return
- In an efficient market, a security's price fully reflects all available information

Rationale

$$R^{of} > R^{*} \Rightarrow P_t \uparrow \Rightarrow R^{of} \downarrow$$

$$R^{of} < R^{*} \Rightarrow P_t \downarrow \Rightarrow R^{of} \uparrow$$

until

$$R^{of} = R^{*}$$

In an efficient market, all unexploited profit opportunities will be eliminated

Evidence in Favor of Market Efficiency

- Having performed well in the past does not indicate that an investment advisor or a mutual fund will perform well in the future
- If information is already publicly available, a positive announcement does not, on average, cause stock prices to rise
- Stock prices follow a random walk
- Technical analysis cannot successfully predict changes in stock prices

Evidence Against Market Efficiency

- Small-firm effect
- January Effect
- Market Overreaction
- Excessive Volatility
- Mean Reversion
- New information is not always immediately incorporated into stock prices

Application Investing in the Stock Market

- Recommendations from investment advisors cannot help us outperform the market
- A hot tip is probably information already contained in the price of the stock
- Stock prices respond to announcements only when the information is new and unexpected
- A “buy and hold” strategy is the most sensible strategy for the small investor

Behavioral Finance

- The lack of short selling (causing over-priced stocks) may be explained by loss aversion
- The large trading volume may be explained by investor overconfidence
- Stock market bubbles may be explained by overconfidence and social contagion