LECTURE 7: ARE FINANCIAL MARKETS EFFICIENT?
Definition

• The **efficient market hypothesis (EMH)** is the theory supporting the notion that market prices are in fact fair
  – Under the EMH, security prices fully and fairly (i.e., without bias) reflect all available information about the security
  – Since the 1960’s, the EMH has been perhaps the most important paradigm in finance
  – There are mixed findings about the efficiency of the financial markets.
• In EMT we generally focus on shares of common stocks.

• A financial security represents a claim on future cash flows, and thus the intrinsic value is the **PRESENT VALUE** of the cash flows the owner of the security expects to receive.
• Theoretically, the profit opportunities represented by the existence of “undervalued” and “overvalued” stocks motivate investors to trade, and their trading moves the prices of stocks toward the present value of future cash flows.
• As **EUGENE FAMA** (1991) notes, market **EFFICIENCY** is a continuum.

• The lower the transaction costs in a market, including the costs of obtaining information and trading, the more efficient the market.
• In the United States, reliable information about firms is relatively cheap to obtain (partly due to mandated disclosure and partly due to technology of information provision) and trading securities is cheap.

• For those reasons, U.S. security markets are thought to be relatively efficient.
The informational efficiency of stock prices matters in two main ways.

First, investors care about whether various trading strategies can earn excess returns (i.e., “beat the market”).

Second, if stock prices accurately reflect all information, new investment capital goes to its highest-valued use.
• John Burr Williams (1938) in his work on intrinsic value argues that stock prices are based on economic fundamentals.

• The alternative view is explained by Keynes.

• In Keynes’s view, stock prices are based more on speculation than on economic fundamentals.
Chapter Preview

• How information in the market affects securities prices?

• Expectations are very important in our financial system.
  – Expectations of returns, risk, and liquidity impact asset demand
  – Inflationary expectations impact bond prices
  – Expectations not only affect our understanding of markets, but also how financial institutions operate.
Chapter Preview

• To better understand expectations, we examine the *efficient markets hypothesis*.
  – Framework for understanding what information is useful and what is not
  – However, we need to validate the hypothesis with real market data. The results are mixed.
• In sum, we will look at the basic reasoning behind the efficient market hypothesis. We also examine empirical evidence examining this idea. Topics include:
  – The Efficient Market Hypothesis
  – Evidence on the Efficient Market Hypothesis
  – Behavioral Finance
Efficient Market Hypothesis

\[ R = \frac{P_{t+1} - P_t + C}{P_t} \quad (7) \quad R^e = \frac{P^e_{t+1} - P_t + C}{P_t} \]

- Expectations equal to optimal forecasts (we form rational forecast based on all available information) implies

\[ P^e_{t+1} = P^{of}_{t+1} \Rightarrow R^e = R^{of} \quad (8) \]

Market equilibrium

\[ R^e = R^* \quad (9) \]

Put (8) and (9) together: efficient market hypothesis

\[ R^{of} = R^* \quad (10) \]
Efficient Market Hypothesis

\[ R_{of} = R^* \]

- This equation tells us that 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.

- Financial economists state it more simply: A security’s price fully reflects all available information in an efficient market.
Efficient Market Hypothesis

• Why efficient market hypothesis makes sense

\[ \text{If } R^\text{of} > R^* \rightarrow P_t \uparrow \rightarrow R^\text{of} \downarrow \]
\[ \text{If } R^\text{of} < R^* \rightarrow P_t \downarrow \rightarrow R^\text{of} \uparrow \]

until \( R^\text{of} = R^* \)

All unexploited profit opportunities eliminated
Efficient market condition holds even if there are uninformed, irrational participants in market
Rationale Behind the Hypothesis

• In an efficient market, all unexploited profit opportunities will be eliminated
  – In the situation of unexploited profit opportunity, people will be earning more than they should
  – Knowing that, people would buy more securities, which would in turn drive up its current price and lowering the profit
  – When the current price had risen sufficiently and optimal forecast of the return will be same as equilibrium return
  – The efficient market condition is satisfied, the buying of the securities will stop and the unexploited profit opportunity will have disappeared
Rationale Behind the Hypothesis

- An extremely important factor in this reasoning is that
  - Not everyone in a financial market must be well informed about a security or have rational expectations for its price to be driven to the point at which the efficient market condition holds
Rationale Behind the Hypothesis

- Financial markets are structured so that many participants can play.
- As long as a few Smart money (money bet or invested by people with expert knowledge) is invested with open eyes, unexploited profit opportunities will eliminate the profit opportunities that appear because in so doing.
THREE VARIANTS OF THE HYPOTHESIS

• Weak form Efficiency
• Semi Strong Efficiency
• Strong Efficiency
THREE VARIANTS OF THE HYPOTHESIS

• Weak form: The weak form of the EMH claims that trading information (levels and changes of prices and volumes) of traded assets (e.g., stocks, bonds, or property) are already incorporated in prices.

• If weak form efficiency holds then technical analysis cannot be used to generate superior returns.
“Semi-Strong” Form

- The semi-strong form of the EMH claims both that prices incorporate all publicly available information (which also includes information present in financial statements, other SEC filings etc.).
- If semi-strong form efficiency holds then neither technical analysis nor fundamental analysis can be used to generate superior returns.
Stronger Version of the Efficient Market Hypothesis

- The strong form of the EMH additionally claims that prices incorporate all public and non-public (insider) information, and therefore even insiders cannot expect to earn superior returns (compared to the uninformed public) when they trade assets of which they have inside information.
- Thus in an efficient market, all prices are always correct and reflect market fundamentals.
Implications of Stronger form efficiency

- First, it implies that in an efficient capital market, one investment is good as any other because the security prices are correct.
- Second, it implies that a security price reflects all available information about the intrinsic value of the security.
- Third, security can be used by managers of both financial and nonfinancial firms to assess their cost of capital.
- Accurately and hence that security prices can be used help them make the correct decisions about whether a specific investment is worth making or not.
Evidence in Favor of Market Efficiency

- According to EMH when you purchase a security, you cannot expect to earn an abnormally high return, a return greater than the equilibrium return.
- This implies that it is impossible to beat the market.
Evidence in Favor of Market Efficiency

- Whether investment advisers and mutual funds beat the market
  - To test this we can buy and sell recommendations from a group of advisers or mutual funds and compare the performance of the resulting selection of stocks with the market as a whole.
  - Other test is that advisers choices have been compared to a group of stocks chosen by putting the copy of the financial page of the newspaper on a dartboard and throwing darts
    - The wall Street Journal, for example, has a regular feature called “Investment Dartboard” that compares how well stocks picked by investment advisers do relative to stocks picked by throwing darts
Evidence in Favor of Market Efficiency

- To advisors embarrassment, the dartboard beats them as often as they beat the dartboard.
- Even when the comparison includes only advisors who have been successful in the past in predicting the stock market, the advisors still do not regularly beat the dartboard.
Evidence in Favor of Market Efficiency

- Consistent with the EMH, mutual funds are also not found to beat the market
- The conclusion from the study of investment advisers and mutual fund performance is this:
  - Having performed well in the past does not indicate that an investment adviser or a mutual fund will perform well in the future
Do Stock Prices Reflect Publicly Available Information?

• The EMH predicts that stock prices will reflect all publicly available information.
• Any announcement about a company will not raise the price of its stock.
• Early empirical evidence confirm this.
Random-Walk Behavior of Stock Prices

• The movements of a variable can’t be predicted.
• Stock prices should follow a random walk, that is future changes in stock prices should, for all practical purposes, be unpredictable.
Evidence on Efficient Market Hypothesis

• Unfavorable Evidence
  1. Small-firm effect: small firms have abnormally high returns
  2. January effect: high returns in January
  3. Market overreaction
  4. Excessive volatility
  5. Mean reversion
  6. New information is not always immediately incorporated into stock prices

• Overview
  1. Reasonable starting point but not whole story
Evidence Against Market Efficiency

• Investors have an incentive to sell stocks before the end of the year in December because they can then take capital losses on their tax return and reduce their tax liability.

• Then when the new year starts in January, they can repurchase the stocks, driving up their prices and producing abnormally high returns.
Evidence Against Market Efficiency

• **Markets Overreact to news announcements.**
  
  – When corporations announce a major change in earnings, say, a large decline, the stock price may overshoot.
  
  – Buying a stock immediately after a poor earnings announcement and then selling it after a couple of weeks when it has risen back to normal levels may cause abnormal returns.
Evidence Against Market Efficiency

- **Excessive Volatility:** the stock market appears to display excessive volatility
  - Researchers have found that fluctuations in the S&P 500 stock index could not be justified by the subsequent fluctuations in the dividends of the stocks making up this index.
  - Other research finds that there are smaller fluctuations in stock prices when stock markets are closed, which has produced a consensus that stock market prices appear to be driven by factors other than fundamentals.
Evidence Against Market Efficiency

- **Mean Reversion:** Some researchers have found that stocks with low returns today tend to have high returns in the future, and vice versa.
  - Hence stocks that have done poorly in the past are more likely to do well in the future because mean reversion indicates that there will be a predictable positive change in the future price, suggesting that stock prices are not a random walk.
  - Newer data is less conclusive; nevertheless, mean reversion remains controversial.
Evidence Against Market Efficiency

• New Information Is Not Always Immediately Incorporated into Stock Prices
  – Although generally true, recent evidence suggests that, inconsistent with the efficient market hypothesis, stock prices do not instantaneously adjust to profit announcements.
  – Instead, on average stock prices continue to rise for some time after the announcement of unexpectedly high profits, and they continue to fall after surprisingly low profit announcements.
1. How valuable are published reports by investment advisors?
2. Should you be skeptical of hot tips?
3. Do stock prices always rise when there is good news?
4. Efficient Markets prescription for investor
Implications for Investing

1. How valuable are published reports by investment advisors?
   • Not very much if EMH holds true
2. Should you be skeptical of hot tips?

- YES. The EMH indicates that you should be skeptical of hot tips since, if the stock market is efficient, it has already priced the hot tip stock so that its expected return will equal the equilibrium return.

- Thus, the hot tip is not particularly valuable and will not enable you to earn an abnormally high return.
Implications for Investing

2. Should you be skeptical of hot tips?
   - As soon as the information hits the street, the unexploited profit opportunity it creates will be quickly eliminated.
   - The stock’s price will already reflect the information, and you should expect to realize only the equilibrium return.
3. Do stock prices always rise when there is good news?

- NO. In an efficient market, stock prices will respond to announcements only when the information being announced is new and unexpected.

- So, if good news was expected (or as good as expected), there will be no stock price response.

- And, if good news was unexpected (or not as good as expected), there will be a stock price response.
Implications for Investing

4. Efficient Markets prescription for investor

- Investors should not try to outguess the market by constantly buying and selling securities. This process does nothing but incur commissions costs on each trade.
Implications for Investing

4. Efficient Markets prescription for investor
   - Instead, the investor should pursue a “buy and hold” strategy—purchase stocks and hold them for long periods of time. This will lead to the same returns, on average, but the investor’s net profits will be higher because fewer brokerage commissions will have to be paid.
4. Efficient Markets prescription for investor

- It is frequently a sensible strategy for a small investor, whose costs of managing a portfolio may be high relative to its size, to buy into a mutual fund rather than individual stocks. Because the EMH indicates that no mutual fund can consistently outperform the market, an investor should not buy into one that has high management fees or that pays sales commissions to brokers but rather should purchase a no-load (commission-free) mutual fund that has low management fees.
Case: Any Efficient Markets Lessons from Black Monday of 1987, 1997-98 Asian Financial Crisis, the Tech Crash of 2000 and most recent market crash?

- Does any version of Efficient Markets Hypothesis (EMH) hold in light of sudden or dramatic market declines?
- Strong version EMH?
- Weaker version EMH?
- A **bubble** is a situation in which the price of an asset differs from its fundamental market value?
- Can bubbles be rational?
- Role of **behavioral finance**