

ORGANIZATION AND FUNCTIONING OF SECURITIES MARKETS

Study Session 13

EXAM FOCUS

This review covers securities markets, explains how and where securities are traded, and introduces much of the terminology of securities trading. It's all testable material and you should pay special attention to the calculations dealing with margin accounts. The other important topic areas here include the difference

between primary and secondary markets, the mechanics of short sales, the difference between a dealer market and an exchange market, types of orders, and the different arrangements with investment bankers that can be made when issuing new securities.

LOS 55.a: Describe the characteristics of a well-functioning securities market.

A well-functioning securities market will offer the following characteristics:

- Timely and accurate information on the price and volume of past transactions and on current supply and demand conditions.
- Liquidity (the ability to buy or sell quickly at a known price), which requires *marketability* (the ability to sell the security quickly) and *price continuity* (prices don't change much from one transaction to the next in the absence of news because numerous buyers and sellers are willing to trade at prices above and below the current price).
- Internal efficiency refers to low transaction costs.
- Informational (external) efficiency, which means that prices adjust rapidly to new information so the prevailing market price reflects all available information regarding the value of the asset.

LOS 55.b: Distinguish between competitive bids, negotiated sales, and private placements for issuing bonds.

A new issue of bonds is usually sold with the help of an investment banker who may or may not *underwrite* the issue (guarantee the sale of the whole issue at an agreed-upon price). The cost of the underwriting and any additional legal and advisory services provided by the investment banker can be determined by negotiation with a single underwriter or by soliciting bids for the services that will be provided.

A *negotiated sale* (most common with corporate bond issues) is one in which the price of the underwriting and advisory services is agreed upon through negotiations between the issuer and an investment banker, usually one with whom the issuing firm has a relationship. The investment banker may suggest types of securities to issue and markets where they should be sold in addition to the normal issuance functions.

A *competitive bid process* is used more in the issuance of municipal bonds, where the securities to be issued have been determined and the issuer solicits bids for the underwriting/sales function from a number of different investment banks.

In a *private placement*, the issue is not registered with the SEC for public sale, but is sold by the investment banker to a small number of buyers or a single buyer. The buyers are typically large institutions, and this method allows for customization of the features of the issue to suit both the buyer's and issuer's needs. There is no underwriting function here. The investment banker facilitates the sale to a third party or parties.

LOS 55.c: Distinguish between primary and secondary capital markets, and explain how secondary markets support primary markets.

Primary capital markets refers to the sale of *new* issues of securities. Most issues are distributed with the aid of an underwriter. The underwriter provides three services to the issuer:

1. *Origination*, which involves the design, planning, and registration of the issue.
2. *Risk bearing*, which means the underwriter insures or guarantees the price by purchasing the securities.
3. *Distribution*, which is the sale of the issue.

Corporate stock or bond issues are almost always sold with the assistance of an investment banking firm.

New equity issues involve either:

- New shares issued by firms whose shares are already trading in the marketplace. These issues are called *seasoned* or *secondary issues*.
- First time issues by firms whose shares are not currently trading in the marketplace. These are called *initial public offerings* (IPOs).

The relationship between the firm and the investment banker underwriting the issue can take one of three forms: competitive bids, negotiation, or best efforts. A *best efforts* underwriting indicates that the investment banker does not take the price risk. That is, the underwriter sells the issue for the best available price with no price guarantees to the issuing firm.

Secondary financial markets are where securities trade after their initial offerings. Secondary markets are important because they provide liquidity. The greater liquidity the securities have, the more willing investors are to buy the securities. Liquid secondary markets also provide investors with continuous information about the market price of their securities. The better the secondary market, the easier it is for firms to raise external capital in the primary market.

LOS 55.d: Distinguish between call and continuous markets.

Securities exchanges are places where buyers and sellers conduct the trade of securities. They may be structured as call markets or continuous markets:

- In *call markets*, the stock is only traded at specific times. All trades, bids, and asks are declared, and then one negotiated price is set that clears the market for the stock. This method is used in smaller markets and to set the opening price in major markets.
- In *continuous markets*, trades occur at any time the market is open. The price is set by either the auction process or by dealer bid-ask quotes.

LOS 55.e: Compare and contrast the structural differences among national stock exchanges, regional stock exchanges, and the over-the-counter (OTC) markets.

National stock exchanges. The major national exchanges trade shares for a large number of prestigious firms that are geographically dispersed to a diverse clientele. The major exchanges are:

- The New York Stock Exchange (NYSE) lists approximately 2,700 firms and has an average daily volume of 1.5 billion shares. The NYSE is a price-driven market.
- The American Stock Exchange (AMEX) lists firms that are not listed on the NYSE, along with foreign shares, warrants, and options. The AMEX is a price-driven market.
- Other national exchanges include the Tokyo, London, and Frankfurt Stock Exchanges and the Paris Bourse.

- The *global 24-hour market* refers to the passing of trading from New York to Tokyo to London and back to New York as the clock rotates.

Over-the-counter market. The over-the-counter (OTC) market includes the trading in all securities not listed on one of the registered exchanges. If any registered dealer is willing to make a market in a security, it can trade in the OTC market.

In the U.S., dealers and market makers list their bid and ask quotes over the National Association of Securities Dealers Automated Quotation (NASDAQ) National Market System (NMS).

The OTC market is the largest market in the U.S. in terms of the number of issues traded. However, in terms of value, the OTC market is about 60% of the size of the NYSE.

The NMS is a negotiated market in which investors negotiate directly with the dealers. In contrast, the registered exchanges are continuous auction markets in which the broker acts as an intermediary between the buyer and seller.

NMS listing requirements are less stringent than those of the registered exchanges. The listing requirements are shown in Figure 1.

Figure 1: NYSE and NMS Listing Requirements

	NYSE	NMS
Pretax income (millions)	\$2.5	\$1.0
Public shares (millions)	1.1	1.1
Minimum stockholders	2,000	400

Regional exchanges. Regional exchanges serve smaller local firms within various countries. The listing requirements for regional exchanges are usually much less stringent than large national exchanges. U.S. regional exchanges include the Chicago and Pacific exchanges. Japan has seven regional stock exchanges. Although regional exchanges list smaller firms, the exchanges often have the same operating procedures as the large national exchanges.

Third market. Stocks listed on a registered exchange may also be traded in the OTC market. Nonmember investment firms can make markets in and trade registered securities without going through the exchange. This segment of the OTC market is called the *third market*.

Fourth market. The *fourth market* describes the direct exchange of securities between investors without using the services of a broker as an intermediary. Directly negotiated sales are done by investors to save transactions costs.

LOS 55.f: Compare and contrast major characteristics of exchange markets, including exchange membership, types of orders, and market makers.

A *pure auction market* is an exchange system where buyers and sellers submit their bid and ask prices to a central location, and transactions are matched by brokers who do not have a position in the stock. An auction market is a *price-driven market*.

An *order-driven system* is one in which buyers and sellers submit their orders to dealers, who either buy the stock for their own inventory or sell the stock from their own inventory. An order-driven system is called a *dealer market*.

Professor's Note: The New York Stock Exchange and many other national and regional exchanges are auction markets. The U.S. over-the-counter market and other "exchanges" throughout the world are dealer markets.

Exchange membership. Membership on the U.S. exchanges falls into one of four categories:

- The *specialist* controls the limit order books, posts bid and ask prices, and trades for his own account.
- The *commission broker* executes customer trades for a brokerage firm.
- *Floor brokers* act as freelance brokers for other commission brokers.
- *Registered traders* trade for their own accounts.

Types of orders. There are four types of orders: market orders, limit orders, short sale orders, and stop loss orders.

- *Market orders* are orders to buy or sell at the best price available.
- *Limit orders* are orders to buy or sell away from the current market price. A *limit buy order* is placed below the current price. A *limit sell order* is placed above the current price. Limit orders have a time limit, such as instantaneous, one day, one week, one month, or good till canceled (GTC). Limit orders are turned over to the specialist by the commission broker.
- *Short sale orders* are orders where a trader borrows stock, sells it, and then purchases the stock later to return the stock back to the original owner. Short sales are discussed in greater detail later in this review.
- *Stop loss orders* are used to prevent losses or to protect profits. Suppose you own a stock currently selling for \$40. You are afraid that it may drop in price, and if it does, you want your broker to sell it, thereby limiting your losses. You would place a *stop loss sell order* at a specific price (e.g., \$35); if the stock price drops to this level, your broker will place a sell market order. A *stop loss buy order* is usually combined with a short sale to limit losses. If the stock price rises to the "stop" price, the broker enters a market order to buy the stock.

Market makers. Specialists are the *exchange market makers* on the U.S. exchanges. Specialists provide two basic functions to the exchange:

- They act as brokers handling the *limit order book*, where limit and stop orders are maintained.
- They act as dealers by buying and selling stocks for their own accounts to maintain an orderly market and provide liquidity to the market if there is an inadequate order flow.

The specialist has sole access to the information in the limit order book and is expected to use this information to add liquidity and help stabilize the market. The specialist provides *bridge liquidity* to the market by acting as a seller in an up market and as a buyer in a down market. This will tend to narrow the bid-ask spread and improve market continuity. The specialist's income comes from broker commissions on the limit order book trades and from the dealer bid-ask spread on the liquidity trades.

The Tokyo Stock Exchange (TSE) has 124 regular members (100 Japanese and 24 foreigners) and one *Saitori* member. The regular members act as brokers, and the *Saitori* member acts as an intermediary broker between regular members and maintains the limit order book. *Saitori* members are similar to U.S. specialists, but they do not have to maintain an orderly market.

London Stock Exchange members include brokers and jobbers. The brokers trade shares for the public and make markets in listed securities. The jobbers trade for themselves or the public and institutions.

LOS 55.g: Describe the process of selling a stock short and discuss an investor's likely motivation for selling short.

Short sales are orders to sell securities that the seller does not own. For a short sale, the short seller (1) simultaneously borrows and sells securities through a broker, (2) must return the securities at the request of the lender or when the short sale is closed out, and (3) must keep a portion of the proceeds of the short sale on deposit with the broker.

Why would anyone ever want to sell securities short? The seller thinks the current price is too high and that it will fall in the future, so the short seller hopes to sell high and then buy low. If a short sale is made at \$30 per share and the price falls to \$20 per share, the short seller can buy shares at \$20 to replace the shares borrowed and keep \$10 per share as profit.

Three rules apply to short selling:

- The uptick rule states that stocks can only be shorted in an up market. Thus, a short sale can only trade at a price higher than the previous trade. Zero ticks, where there is no price change, keep the sign change of the previous order.
- The short seller must pay all dividends due to the lender of the security.
- The short seller must deposit collateral to guarantee the eventual repurchase of the security.

LOS 55.h: Describe the process of buying a stock on margin, compute the rate of return on a margin transaction, define maintenance margin and determine the stock price at which the investor would receive a margin call.

Margin transactions involve buying securities with borrowed money. Brokerage firms can lend their customers money and keep the securities as collateral. The margin lending rate is about 1.5 percentage points above the bank *call money rate* (which is about 1 percentage point below the prime rate). In the U.S., margin lending limits are set by the Federal Reserve Board under Regulations T and U. The required equity position is called the *margin requirement*. The *initial margin* requirement is currently 50%. This means the borrower must provide 50% of the funds in the trade. An initial margin requirement of 40% would mean that the investor must put up 40% of the funds, and the brokerage firm may lend the 60% balance.

After the trade, the price of the stock will change, causing the balance of the margin account to fluctuate. Should the stock price go up, the customer's profits accumulate at a faster pace than a 100% equity position. This leverage is the benefit of margin trading. It is also the risk. Just as leverage may enhance returns, it can also magnify losses.

Example: Return on margin trade

Assume that an investor purchases 100 shares of a stock for \$75 per share (total cost of \$7,500). Compute the investor's return if the stock is sold for \$150 per share (total value of \$15,000) and the transaction was:

- 100% cash.
- A margin purchase with an initial margin requirement of 60%.

Answer:

- As a 100% cash (equity) transaction, the investor would have had a return equal to:

$$\frac{\$15,000}{\$7,500} - 1 = 100\%$$

- With an initial margin of 60%, the cost of the investment (equity in the position) would be only \$4,500 = $0.6 \times (\$75 \times 100)$. The other \$3,000 of the purchase will be borrowed from the brokerage firm. If the shares were then sold at \$150 per share, the position would be worth \$12,000 (i.e., $\$15,000 - \$3,000$). In this situation, the investor would have a return equal to:

$$\frac{\$12,000}{\$4,500} - 1 = 167\%$$

Professor's Note: The calculated return in this example is artificially high because we ignored commissions and interest paid on the margin loan. Nevertheless, the potential gains from leverage for a margined investment remain substantial.

The **maintenance margin** for an investment account is the investor's required equity position in the account. It is applicable to both margin purchases and short sales. The Federal Reserve sets maintenance margins in the U.S., but brokerage firms can increase them. For stock transactions, the maintenance margin is currently 25%. If an investor's margin account balance falls below the maintenance margin, the investor will receive a *margin call* and will be required to either liquidate the position or bring the account back to its maintenance (minimum) margin requirement. The following formulas indicate the stock price at which a margin account is just at the maintenance margin. A price below this price, P_0 , will trigger a margin call for margin purchases, and a price above P_0 will trigger a margin call for short sales.

$$\text{trigger price (margin purchases)} = P_0 \left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}} \right)$$

$$\text{trigger price (short sales)} = P_0 \left(\frac{1 + \text{initial margin}}{1 + \text{maintenance margin}} \right)$$

where:

P_0 = initial purchase price

Example: Margin call price for a long position

Assume you bought a stock for \$40 per share. If the initial margin requirement is 50% and the maintenance margin requirement is 25%, at what price will you get a margin call?

Answer:

$$\frac{\$40(1 - 0.5)}{1 - 0.25} = \$26.67$$

Since this is a margin purchase, a margin call is triggered at a price below \$26.67.

Example: Margin call price for a short sale

Assume you short a \$40 stock. If the initial margin requirement is 50% and the maintenance margin requirement is 30%, at what price will you get a margin call?

Answer:

$$\frac{\$40(1 + 0.5)}{1 + 0.30} = \$46.15$$

Since this is a short sale, a margin call is triggered at a price above \$46.15.

LOS 55.i: Discuss major effects of the institutionalization of securities markets.

The main cause of change in the markets has been the increasing number of participating financial institutions. The effects of institutionalization have been:

Commissions. The old fixed commission system fostered many of the problems in the market today. One is the practice where one brokerage house gives up some of its commissions to another firm for research and sales services (this is also referred to as *soft dollar* transfers). The fixed commission system also promoted the growth of the third and fourth markets. Negotiated commission rates started in 1975 by mandate of the SEC and have caused a significant decrease in commission rates.

Block trading. Institutions frequently deal in large trades called block trades. Since Rule 113 prevents specialists from contacting institutions directly to sell any blocks they acquire, specialists prefer not to buy large blocks from institutions. Because of this, large-block trading houses have developed to handle these trades. *Block houses* are also called *upstairs traders*. For example, Institution A wants to sell 100,000 shares of XYZ. Institution A calls Block Co. and arranges for Block Co. to buy the shares. After buying the shares, Block Co. contacts Institutions B and C and sells them the shares. Block Co. gets a negotiated fee from Institution A and potentially some price appreciation on the sale to B and C. If Block Co. is a member of the exchange, the trade will be listed (crossed) as a trade on the exchange floor.

Stock price volatility. Empirical evidence does *not* support the hypothesis that the presence of institutions has increased price volatility in the markets.

National market system. A national market system has been proposed. If developed, it will provide for the centralization of trade reporting, quotations, limit order book, and enhanced competition among all qualified market members.

New trading systems. NYSE average daily trading volume, now exceeds 1 billion shares. Some of the new technologies developed to handle this volume are:

- The *super dot* system, which allows electronic market orders (for up to 2,099 shares) and limit orders (for up to 30,099 shares) to be transmitted directly to the specialist trading post or the exchange's order management system.
- The opening *automated report service*, which matches opening orders for the specialist.
- The *display book*, which keeps track of all limit orders and incoming market orders for the specialist.

KEY CONCEPTS

1. Four characteristics of a well-functioning market are timely and accurate information, liquidity, low transactions costs (internal efficiency), and rapid price adjustment to new information (external efficiency).
2. A new issue may be sold through an underwriter chosen by competitive bidding (underwriters bid for the business), a negotiated sale (the cost of issuance is negotiated with the underwriter), or through a private placement where the issue is not registered for public sale but sold directly to a small number of buyers.
3. The secondary market is largely a dealer market (over-the-counter market). Secondary trading also takes place on exchanges (e.g., NYSE and AMEX).
4. Primary markets refer to the sale of newly issued securities, and secondary markets refer to the markets for previously issued securities (e.g., the New York Stock Exchange). These markets provide investors with liquidity and continuous price information, increasing the attractiveness of security ownership.
5. In call markets, securities are traded at specific times at a single price after bids and offers have accumulated, while in continuous markets trading takes place at various prices and times as bids and offers for the securities arrive.
6. Stock exchanges are physical places where traders and dealers gather to trade with each other. The over-the-counter market is a network of dealers (called market makers) in various locations who stand ready to purchase or sell securities at posted prices.
7. Exchange markets have members with different roles (specialists, commission brokers, floor brokers and traders), and the types of orders are market orders, limit orders, stop (loss) orders, and short sales.
8. Selling short refers to borrowing securities and selling them at the market price in an attempt to profit by buying (and returning) the securities at a lower price in the future.
9. A short seller may only sell on an "uptick," must pay any dividends to the lender of the securities as they are due, and must deposit collateral to provide funds for any losses on the short position if share price goes up.
10. In a margin transaction, investors can borrow against securities to purchase them, leaving the securities at the brokerage house as collateral for the loan.
11. The rate of return on a margin transaction is calculated as the profit or loss on the security position divided by the equity or margin deposited to make the trade (the cost of the position minus the margin loan).
12. The maintenance margin percentage (typically 25%) is the minimum that the equity in a margin account can reach before the deposit of more funds is required.
13. The stock price at which an investor who purchases a stock on margin will receive a margin call can be calculated as:

$$\text{trigger price (margin purchases)} = P_0 \left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}} \right)$$

14. The price at which a short seller will receive a margin call can be calculated as:

$$\text{trigger price (short sales)} = P_0 \left(\frac{1 + \text{initial margin}}{1 + \text{maintenance margin}} \right)$$

15. The institutionalization of securities markets has led to lower negotiated commissions on trades, an increase in the number and overall importance of block trades, and movement toward a national market system, but it has not increased the volatility of stock prices as some have claimed.

CONCEPT CHECKERS: ORGANIZATION AND FUNCTIONING OF SECURITIES MARKETS

1. A well-functioning market will:
 - A. provide liquidity.
 - B. provide timely and accurate information.
 - C. have good internal and external efficiency.
 - D. all of the above.
2. An underwriter provides:
 - A. origination.
 - B. risk bearing.
 - C. distribution.
 - D. all of these.
3. New shares of firms already trading on the exchange are called:
 - A. liquidity trades.
 - B. seasoned issues.
 - C. continuous trades.
 - D. competitive trades.
4. Which of the following is NOT a characteristic of a well-functioning market?
 - A. Liquidity.
 - B. Seasoned issues.
 - C. Continuous information.
 - D. Lowest possible transaction costs.
5. To be traded on the over-the-counter markets, a stock must have:
 - A. a market maker.
 - B. 1,000 shareholders.
 - C. net assets of \$20 million.
 - D. 1 million publicly held shares.
6. The sale of shares between two investors is called:
 - A. block trade.
 - B. the third market.
 - C. the fourth market.
 - D. the over-the-counter market.
7. The requirement that a short sale can only occur at a higher price than the last previously changed price is known as:
 - A. rule 415.
 - B. limit trading.
 - C. the uptick rule.
 - D. the stop loss rule.
8. The current market price of the XYZ Company stock is \$40. An order to sell at \$45 would be a:
 - A. buy order.
 - B. stop order.
 - C. limit order.
 - D. market order.

9. A stock is selling at \$50. An investor's valuation model predicts that it should be selling at \$40. If she believes her model, she would *most likely* place a:
- A. short sale order.
 - B. stop order to buy.
 - C. limit order to sell.
 - D. market order to buy.

Use the following data to answer Questions 10 through 13.

- An investor buys 100 shares of XYZ.
 - The market price is \$50 on full margin.
 - The initial margin requirement is 40%.
 - The maintenance margin requirement is 25%.
10. How much equity must the investor have in the account?
- A. \$2,000.
 - B. \$3,000.
 - C. \$4,000.
 - D. \$5,000.
11. At what price will the investor get a margin call?
- A. \$26.67.
 - B. \$37.50.
 - C. \$40.00.
 - D. \$62.50.
12. If the price of the stock falls to \$45, what is the equity balance in the margin account?
- A. \$1,000.
 - B. \$1,500.
 - C. \$2,000.
 - D. \$2,500.
13. If the stock is sold one year later for \$60, what is the investor's rate of return?
- A. 20%.
 - B. 33%.
 - C. 50%.
 - D. 100%.

Use the following data to answer Questions 14 and 15.

An investor sells 100 shares of a \$50 stock short. The initial margin requirement is 40%, and the maintenance margin requirement is 30%.

14. How much money must the investor have in the margin account for this trade?
- A. \$2,000.
 - B. \$3,000.
 - C. \$4,000.
 - D. \$5,000.

15. At what price will the investor get a margin call?
 - A. \$35.71.
 - B. \$53.85.
 - C. \$57.69.
 - D. \$69.33.
16. In the U.S., who sets the initial margin requirements?
 - A. The Justice Department.
 - B. The Federal Reserve Board.
 - C. The New York Stock Exchange.
 - D. The Securities Exchange Commission.
17. At U.S. stock exchanges, the limit order book is controlled by:
 - A. specialists.
 - B. floor brokers.
 - C. registered traders.
 - D. commission brokers.
18. In which of the following market types can stocks trade anytime the market is open?
 - A. Rule 415.
 - B. Call markets.
 - C. Market orders.
 - D. Continuous markets.

ANSWERS – CONCEPT CHECKERS: ORGANIZATION AND FUNCTIONING OF SECURITIES MARKETS

1. D Providing liquidity, providing timely and accurate information, and having good internal and external efficiency are all characteristics of a well-functioning market.
2. D Providing origination, risk bearing, and distribution are all functions of an underwriter for an initial offering of a security.
3. B Issues of new shares of firms whose shares are already trading in the marketplace are called seasoned issues.
4. B Seasoned issues are new issues of shares of firms whose shares are already trading in the market and have nothing to do with a well-functioning market. A well-functioning market should provide liquidity and continuous information. A market is internally efficient if it provides the lowest possible transaction costs.
5. A As long as a security has a market maker, it can trade in the OTC market. The OTC market is not subject to the rules of large exchanges.
6. C In the fourth market, where no broker/dealer is present to serve as an intermediary, securities are exchanged directly between investors.
7. C The uptick rule states that stocks can only be shorted in an up market. Thus, a short sale can only trade at a price higher than the previous trade.
8. C Limit orders are timed orders placed away from the market price. Note the difference between a limit order and stop order limit: limit buys are placed below the current price while a limit sell is placed above the current price; stop sells are placed below the market price and stop buys are placed above the market price. Because the order is to sell XYZ at \$45 when the current price is \$40, the order would be a limit sell order.
9. A If the investor believes the stock is overvalued, the investor should place a short sale order, which would benefit the investor if the stock declined to its equilibrium value.
10. A Initial margin requirement (\$) = (initial margin %)(number of shares × price per share) = $0.4 \times (100 \times \$50.00) = \$2,000$.
11. C For a long position, the formula for the margin call = $\frac{\text{original price} \times (1 - \text{initial margin \%})}{1 - \text{maintenance margin \%}} = \frac{50 \times (1 - 0.4)}{1 - 0.25} = \40.00 .
12. B The new margin account balance = initial margin balance – change in stock value = $2,000 - 500 = \$1,500$ (note the \$2,000 equity balance comes from the answer to question 10). The \$500 represents the \$5 loss per share.
13. C First, determine the sales proceeds: $(\$60 \times 100 \text{ shares}) = \$6,000$. Then, calculate the loan payoff = total cost of purchase – initial margin amount = $5,000 - 2,000 = 3,000$. The return = $[(\text{proceeds from sale} - \text{loan payoff}) / \text{equity}] - 1 = [(6,000 - 3,000) / 2,000] - 1 = 1.50 - 1 = 0.50$, or 50%. An alternative is to divide the profit by the initial equity = $\frac{6,000 - 5,000}{2,000} = 0.50$, or 50%.
14. A $100 \times 50 = \$5,000$. $\$5,000 \times 0.4 \text{ margin requirement} = \$2,000$
15. B $(50 \times 1.4) / 1.3 = \53.85 (remember with a short sale, the investor is hurt by rising prices).
16. B In the U.S., margin lending limits are set by the Federal Reserve Board under Regulations T and U.
17. A Specialists are exchange market makers who handle the limit order book and act as dealers, buying and selling their specific stocks to provide market liquidity. Floor brokers, registered traders, and commission brokers only trade for various accounts.
18. D Continuous markets are defined as markets where stocks can trade anytime the market is open.

SECURITY-MARKET INDEXES

Study Session 13

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Stock market index series are used to measure the performance of markets, as benchmarks to evaluate portfolio performance, and as a proxy for the overall market in academic studies. It is important for you to know how price-weighted, value-weighted, and equal-

weighted indexes are constructed and the potential biases of each method. Be familiar with the major indexes and learn a couple of the problems with constructing bond indexes.

SECURITY MARKET INDEXES

Security market indexes are used in the following areas of investment management:

- Measuring portfolio performance over various time periods. Since it takes no effort to earn the market return, the performance measure would be what you earn above the market index's return for the period under study. Remember that returns must be adjusted for risk.
- Helping in the construction of index portfolios. Since index portfolios are designed to track the index, you need a market index for each segment of the market.
- Evaluating the financial variables that influence overall security price movements.
- Aiding market technicians in their investment decisions.
- Helping in the calculation of beta and portfolio theory studies.

Indexes are intended to represent the behavior of a market. When constructing an index, you need to decide what market you want to evaluate and what aspect of the market's performance you want to measure.

- The sample must be representative of the population. You must consider the source, size, and breadth of the sample. If not, your results may be biased.
- Next, you must decide the weighting to give the individual items in your sample. You can weight the items by price or total value, or you can weight them equally.
- Finally, you must decide on the mathematical or computational procedure you will use to combine the individual items into the whole index. You may use arithmetic averaging, geometric averaging, or base-period weighting.

LOS 56.a: Discuss the source and direction of bias exhibited by each of the three predominant weighting schemes, and compute a price-weighted, a market-weighted, and an unweighted index series for three stocks.

A price-weighted index is the arithmetic average of current security prices. As such, movements in the series are influenced by the different prices of the index components.

Computationally, a price-weighted index adds together the market price of each stock in the index and then divides this total by the number of stocks in the index. *The returns on a price-weighted index could be matched by purchasing an equal number of shares of each stock represented in the index.* Since the index is price-weighted, a percentage change in a high-priced stock will have a relatively greater effect on the index than the same

percentage change in a low priced stock. Also, due to the price weighting, the denominator must be adjusted for stock splits and other changes in the index portfolio to maintain the continuity of the series.

$$\text{price-weighted index} = \frac{\text{sum of stock prices}}{\text{number of stocks in index adjusted for splits}}$$

The two major price-weighted indexes are the Dow Jones Industrial Average (DJIA) and the Nikkei Dow Jones Stock Average.

The DJIA is a price-weighted index that uses 30 stocks. Criticisms of the DJIA are:

- Limited number of stocks in the index.
- Downward bias in the computation of the index.
- Large size of the companies included in the index.

The Nikkei Dow is the arithmetic average of the prices of 225 stocks that trade in the first section of the Tokyo Stock Exchange. It is calculated the same way as the DJIA. The Nikkei Dow represents only 15% of the first section stocks.

A market value-weighted index is calculated by summing the total value (current stock price times the number of shares outstanding) of all the stocks in the index. This sum is then divided by a similar sum calculated during the selected base period. The ratio is then multiplied by the index's base value (typically 100). *A value-weighted index assumes you make a proportionate market value investment in each company in the index.* The major problem with a value-weighted index is that firms with greater market capitalization have a greater impact on the index than do firms with lower market capitalization.

$$\frac{\sum [(price_{\text{today}})(\text{number of shares outstanding})]}{\sum [(price_{\text{base year}})(\text{number of shares outstanding})]} \times \text{base year index value}$$

The following is a listing of the major market value-weighted indexes:

- Standard & Poor's 500 (S&P 500) Index Composite measures 500 firms.
- New York Stock Exchange Index considers all NYSE stocks in one of five value-weighted indexes: industrial, utility, transportation, financial, and the composite index.
- Other U.S. value-weighted series include the NASDAQ series, the AMEX Market Value Index, the Dow Jones Equity Market Index, the Wilshire 5000 Equity Index, and the Russell Index.
- International value-weighted indexes include the Morgan Stanley Capital International Indexes, the Dow Jones World Stock Index, and the Salomon-Russell World Equity Index.
- Non-U.S. value-weighted national indexes include the Financial Times Actuaries Share Index, which represents stocks on the London Stock Exchange, and the Tokyo Stock Exchange Price Index, which represents stocks listed on the first section of the Tokyo Stock Exchange.

An unweighted index places an equal weight on the returns of all index stocks, regardless of their prices or market values. A \$20 stock is just as important as a \$4,000 stock, and a small-size company is just as important as a large-size company. The procedure used to compute an unweighted index value *assumes that the index portfolio makes and maintains an equal dollar investment in each stock in the index.* In effect, you are working with percentage price changes.

The change in value of an unweighted index may be calculated using two methods:

- Arithmetic mean: change in the average index value $= \frac{\sum X_i}{n}$, where X_i = the return on each stock from time = t to time = $t + 1$.
- Geometric mean: change in the average index value $= \sqrt[n]{X_1 \times X_2 \times \dots \times X_n} - 1$,
where $X_i = (1 + \text{HPR}_i) = \frac{\text{Price}_{t+1}}{\text{Price}_t}$ for stock i .

The use of the geometric mean rather than the arithmetic mean will result in a lower index value. Recall that the geometric mean of returns is always less than the arithmetic mean, unless all returns are equal.

- The Value Line (VL) Composite Average is an equal-weighted index where VL's 1,695 stock returns are averaged using the geometric mean.
- The Financial Times Ordinary Share Index is a geometric average of 30 major stocks on the London Stock Exchange.
- Most academic studies are conducted using arithmetically averaged equal-weighted indexes.

Professor's Note: Note that none of these indexes considers dividend income. Index returns are net of dividends (based only on prices). "Total return index" is the term we use to describe the return on an index under the assumption that dividends are reinvested.

Source and Direction of Bias

Price-weighting bias. Once a price-weighted index is established, the denominator must be adjusted to reflect stock splits and changes in the sample over time. After a stock split, the denominator is adjusted downward, so the index is the same before and after the split. This places a downward bias on the index because large successful firms tend to split their stocks more often than low growth stocks and will lose weight within the index simply by splitting their stock.

Value-weighting bias. The major problem with a value-weighted index is that firms with greater market capitalization have a greater impact on the index than do firms with lower market capitalization. Thus, if large market capitalization growth firms have exceptionally high returns, much of the S&P 500 Index return could be attributable to only a few firms.

Unweighted (i.e., equal-weighted) bias. As noted earlier, the use of the geometric mean rather than the arithmetic mean causes a downward bias in the index. The geometric average will always be lower than the arithmetic average unless all stocks have equal-percentage price changes.

Computing Price-Weighted, Market-Weighted, and Unweighted Indexes

Example: Price-weighted index

Given the information for the three stocks presented in Figure 1, calculate a price-weighted and value-weighted index return over a 1-month period.

Figure 1: Index Firm Data

<i>As of December 31, 2006</i>				<i>As of January 31, 2007</i>		
	<i>Share Price</i>	<i>Number of Shares Outstanding (000's)</i>	<i>Total Market Value (000's)</i>	<i>Share Price</i>	<i>Number of Shares Outstanding (000's)</i>	<i>Total Market Value (000's)</i>
Stock X	\$10	3,000	\$30,000	\$20	3,000	\$60,000
Stock Y	\$20	1,000	\$20,000	\$15	1,000	\$15,000
Stock Z	\$60	500	\$30,000	\$40	500	\$20,000
Total	\$90	4,500	\$80,000	\$75	4,500	\$95,000

Answer:

The price-weighted index is $[(10 + 20 + 60) / 3] = 30$ as of December 31 and $[(20 + 15 + 40) / 3] = 25$ as of January 31. Hence, the price-weighted 1-month percentage return is:

$$\frac{25}{30} - 1 = -16.7\%$$

Value-weighted indexes normally use a beginning (base year) index value of 100. The total market values of the index portfolio on December 31 and January 31 are \$80 million and \$95 million, respectively. So the index value at the end of January is:

$$\text{current index value} = \frac{\text{current total market value of index stocks}}{\text{base year total market value of index stocks}} \times \text{base year index value}$$

$$\text{current index value} = \frac{\$95 \text{ million}}{\$80 \text{ million}} \times 100 = 118.75$$

Thus, the value-weighted index percentage return is:

$$(118.75/100) - 1 = 18.75\%$$

Let's look at an example of price-weighting versus market value-weighting designed to show how these two indexes are calculated and how they differ.

Example: Price-weighted vs. market-weighted indexes

Consider the three firms described in Figure 2.

Figure 2: Index Firm Data

Company	Number of Shares (000's)	Stock Price	Capitalization (000's)
A	100	\$100	\$10,000
B	1,000	\$10	\$10,000
C	20,000	\$1	\$20,000

The price-weighted index equals:

$$\frac{100 + 10 + 1}{3} = 37$$

If stock A doubles in price to \$200, the index value is:

$$\frac{200 + 10 + 1}{3} = 70.33$$

If stock C doubles in price to \$2, the index value is:

$$\frac{100 + 10 + 2}{3} = 37.33$$

If A doubles in value, the index goes up 33.33 points; while if C doubles in value, the index only goes up 0.33 points. Changes in the value of the firm with the highest stock price have a disproportionately large influence on a price-weighted index.

Using a base market capitalization of \$40,000,000 = [(100,000 × \$100) + (1,000,000 × \$10) + (20,000,000 × \$1)] and a base index value of 100, we can also calculate the market value-weighted index return.

If stock A doubles in price to \$200, the index goes to:

$$\frac{100,000 \times \$200 + 1,000,000 \times \$10 + 20,000,000 \times \$1}{\$40,000,000} \times 100 = 125$$

If stock C doubles in price to \$2, the index goes to:

$$\frac{100,000 \times \$100 + 1,000,000 \times \$10 + 20,000,000 \times \$2}{\$40,000,000} \times 100 = 150$$

In the market value-weighted index, the returns on Stock C have the greatest influence on the index return because Stock C's market capitalization is larger than that of Stock A or Stock B. Note that the value-weighted index automatically adjusts for stock splits, since if the number of shares goes up, the price of each share will fall so that the total market value of firm shares remains the same.

Example: Unweighted (equal-weighted) index

Calculate both the arithmetic and geometric unweighted index values for the three stocks described in Figure 3, assuming an initial index value of 131.

Figure 3: Unweighted Index Data

Stock	Initial Price	Current Price	Price Change
A	\$12.00	\$15.00	+25%
B	\$52.00	\$48.00	-7.7%
C	\$38.00	\$45.00	+18.4%

Answer:

$$\text{Arithmetic: change in index} = \frac{25\% - 7.7\% + 18.4\%}{3} = 11.9\%$$

$$\text{new index value} = 131(1 + 0.119) = 146.59$$

$$\text{Geometric: change in index} = (1.25 \times 0.923 \times 1.184)^{1/3} - 1 = 10.96\%$$

$$\text{new index value} = 131(1 + 0.1096) = 145.36$$

Using the geometric mean instead of the arithmetic mean generates a lower unweighted index value.

LOS 56.b: Compare and contrast major structural features of domestic and global stock indexes, bond indexes, and composite stock-bond indexes.

Domestic equity indexes. The Dow Jones Industrial Average in the U.S. and the Nikkei Dow Jones Stock Market Average for Japan's Tokyo Stock Exchange are examples of domestic equity indexes. As we discussed above, both of these indexes are price-weighted.

Global equity indexes. Global equity indexes were created to circumvent the comparability problems with using locally created indexes. These problems were from the different sample selection, weighting, and computational procedures across borders. The most common global indexes are:

- Financial Times/S&P Actuaries World Indexes are based on 2,461 stocks from 30 countries. The indexes are market value-weighted and have a 1986 base value of 100.
- Morgan Stanley Capital International (MSCI) Indexes are made up of three international, 19 national, and 38 international industry indexes, all of which are market value-weighted. The indexes are reported in U.S. dollars and the country's local currency.
- Dow Jones World Stock Index represents 2,200 companies from around the globe, organized into 120 industry groups. The countries are grouped into three regions (Americas, Europe/Africa, and Asia/Pacific). The indexes are calculated in the domestic currency as well as the U.S. dollar.

Bond market indexes. Bond market indexes are relatively new. Furthermore, the creation of bond market indexes is more difficult than stock market indexes for several reasons:

- The bond universe is much broader than the universe of stocks.
- The bond universe is changing constantly due to the wide variety of new issues, bond maturities, calls, and sinking funds.
- The price volatility of a bond is constantly changing. Volatility is measured by the bond's duration, which changes with the bond's maturity and the market yield.
- There are significant problems in pricing the individual bond issues in an index due to the lack of continuous trade data like that found for most exchange-listed stocks.

Bond indexes fall into three basic categories:

- Investment-grade bond indexes include those provided by Lehman Brothers, Merrill Lynch, Salomon Brothers, and Ryan. The correlation between investment-grade bond returns is 0.95, as bond returns are driven by aggregate interest rates changes.
- High-yield bond indexes are maintained by First Boston, Lehman Brothers, Merrill Lynch, Salomon Brothers, and academics Blume-Keim. Merrill Lynch also does a series of indexes on convertible securities. The correlation between the high-yield indexes is much weaker than between the investment-grade indexes.
- Global bond indexes are made available by Lehman Brothers, Merrill Lynch, and Salomon Brothers. These indexes show long-run risk return performance differences, low correlation between countries, and a significant exchange rate effect on volatility and correlations.

Composite stock-bond indexes. Composite stock-bond indexes are developed to measure the performance of all securities in a given country. The Merrill Lynch-Wilshire Capital Markets Index is an example of one of these indexes. The Brinson Partner Global Securities Market Index contains U.S. stocks and bonds, non-U.S. equities and nondollar bonds, and cash.

Comparison of indexes over time. The risk/return performances of indexes are different. This is explained by the fact that different indexes represent different asset classes (stocks versus bonds). Also, within a given asset class, there are indexes for different subclasses (e.g. small-cap indexes versus large-cap equity indexes). Studies have found a low correlation to exist between indexes within a given country and between different countries. These findings support the argument for diversification, both domestically and globally.

KEY CONCEPTS

1. A price-weighted index is a simple average of the prices of the stocks in the index and gives the most weight to higher-priced stocks. The divisor must be adjusted over time for stock splits, and the index is biased downward because faster-growth firms tend to split their shares, decreasing the weights of the most successful companies in the index.
2. A value-weighted index shows the change in the total market value of all index stocks relative to a base year value of 100 and can exhibit bias because stocks with the largest market capitalizations can have a disproportionate influence on the index.
3. An equal-weighted (unweighted) index can be calculated as a simple average of the percentage holding period returns on each index stock or as the geometric average of the holding period returns, but the geometric average puts a downward bias on the index returns.
4. The DJIA and Nikkei indexes are domestic stock indexes. Global stock indexes are calculated for companies in many different countries. Bond indexes are challenging to create due to pricing difficulties on individual issues and a changing universe of bonds. Composite indexes have both stock and bond components and can be domestic or international.

CONCEPT CHECKERS: SECURITY-MARKET INDEXES

1. Which of the following will have the *least effect* on index returns?
 - A. How the sample is chosen.
 - B. How the data are collected.
 - C. The weighting scheme for the index firms.
 - D. The computational procedure for calculating the index.
2. Which of the following is a price-weighted index?
 - A. The NYSE Index.
 - B. The Standard and Poor's 500.
 - C. The Value Line Composite Average.
 - D. The Dow Jones Industrial Average.
3. In which of the following weighting schemes do firms with greater market capitalizations have a greater impact on the index than do firms with less market capitalization?
 - A. Price-weighted.
 - B. Value-weighted.
 - C. Equal-weighted.
 - D. The Dow Jones Industrial Average.
4. Stock splits potentially cause a downward bias in which of the following index weighting schemes?
 - A. Price-weighted.
 - B. Value-weighted.
 - C. Equal-weighted.
 - D. The Standard and Poor's 500.
5. Which index weighting scheme would produce returns *closest* to those of a portfolio of index stock with an equal dollar investment in each stock in the index?
 - A. Unweighted.
 - B. Price-weighted.
 - C. Value-weighted.
 - D. The Standard and Poor's 500.
6. Which index weighting scheme would produce returns *closest* to those of a portfolio of index stocks with an equal number of shares of each index stock?
 - A. Unweighted.
 - B. Price-weighted.
 - C. Value-weighted.
 - D. The NYSE Index.
7. Which of the following is a reason why creating bond market indexes is more difficult than creating stock market indexes?
 - A. The price volatility of a bond is constant.
 - B. The universe of bonds is much smaller than that of stocks.
 - C. Bond markets have continuous trade data unlike stock markets.
 - D. The universe of bonds is constantly changing because of numerous new issues, bond maturities, calls, and bond sinking funds.

Use the information in the following table to answer Questions 8 through 11.

As of January 1			As of December 31	
	Share Price	Number of Shares Outstanding (000's)	Share Price	Number of Shares Outstanding (000's)
Stock A	\$22	1,500	\$28	1,500
Stock B	\$40	10,000	\$50	10,000
Stock C	\$34	3,000	\$30	3,000

8. The 1-year return on a price-weighted index of these three stocks is *closest* to:
 - A. 12.0%.
 - B. 12.5%.
 - C. 13.5%.
 - D. 18.0%.

9. The 1-year return on an unweighted index of these three stocks using the arithmetic mean is *closest* to:
 - A. 12.0%.
 - B. 12.5%.
 - C. 13.5%.
 - D. 18.0%.

10. The 1-year return on a value-weighted index of these stocks is *closest* to:
 - A. 12.0%.
 - B. 12.5%.
 - C. 13.5%.
 - D. 18.0%.

11. The 1-year return on an unweighted index of these three stocks using the geometric mean is *closest* to:
 - A. 12.0%.
 - B. 12.5%.
 - C. 13.5%.
 - D. 18.0%.

ANSWERS – CONCEPT CHECKERS: SECURITY-MARKET INDEXES

1. B Collecting the data for a market index is simply recording security prices. Selecting the sample, weighting the sample, and the method of computation are the key factors that influence index returns.
2. D The DJIA is a price-weighted index. The NYSE and the S&P 500 are market value-weighted, while the Value Line Composite is an unweighted price index.
3. B Market capitalization has a large effect on value-weighted indexes because firms with the largest market cap may dominate the index.
4. A Stock splits potentially introduce a downward bias in a price-weighted index. Large, successful firms splitting their stock and, hence, lowering their representative weight in the index, cause the downward bias. Value- and equal-weighted indexes are not affected by stock splits.
5. A An unweighted price series assumes that the investor makes and maintains an equal dollar investment in each stock in the index. Don't confuse this with a price-weighted index, which assumes that an investor invests in an equal number of shares of each stock.
6. B A price-weighted series is an arithmetic average of the current prices of a sample of securities. A price-weighted index assumes an investor purchases an equal number of shares of each stock represented in the index.
7. D New issues, maturities, calls and sinking funds cause the universe of bonds to change constantly. The price volatility of bonds is always changing; the universe of bonds is much larger than that of stocks; and bond markets do not have continuous trade data.

$$8. B \quad \frac{22+40+34}{3} = 32, \quad \frac{28+50+30}{3} = 36, \quad \frac{36}{32} - 1 = 0.125 = 12.5\%$$

$$9. C \quad \left[\left(\frac{28}{22} - 1 \right) + \left(\frac{50}{40} - 1 \right) + \left(\frac{30}{34} - 1 \right) \right] \left(\frac{1}{3} \right) = 0.135 = 13.5\%$$

10. D Total portfolio value January 1:

$$[22(1,500) + 40(10,000) + 34(3,000)](1,000) = \$535,000,000$$

Total portfolio value December 31:

$$[28(1,500) + 50(10,000) + 30(3,000)](1,000) = \$632,000,000$$

$$\frac{632}{535} - 1 = 0.1813 \approx 18\%$$

From a base value of 100, the December 31 index value would be:

$$\frac{632}{535} \times 100 = 118.13$$

$$11. A \quad \left[\left(\frac{28}{22} \right) \left(\frac{50}{40} \right) \left(\frac{30}{34} \right) \right]^{\frac{1}{3}} - 1 = 0.1197 \approx 12\%$$

EFFICIENT CAPITAL MARKETS

Study Session 13

EXAM FOCUS

Market efficiency is a key concept. It has been tested extensively and has important implications for investment strategy. You must know the three forms of market efficiency and what the evidence from tests of the three forms has been. Know the types of tests for

the various forms of market efficiency. Finally, you must understand the implications of the various forms of market efficiency, technical analysis, fundamental analysis, and the role of portfolio managers in the investment process.

LOS 57.a: Define an efficient capital market, discuss arguments supporting the concept of efficient capital markets, describe and contrast the forms of the efficient market hypothesis (EMH): weak, semistrong, and strong, and describe the tests used to examine the weak form, the semistrong form, and the strong form of the EMH.

An efficient capital market is one in which the current price of a security fully reflects all the information currently available about that security, including risk. An informationally efficient capital market is one in which security prices adjust rapidly and completely to new information. Market efficiency is based on the following set of assumptions:

- A large number of profit maximizing participants are analyzing and valuing securities independent of each other.
- New information comes to the market in a random fashion, and news announcements are independent of each other in regard to timing.
- Investors adjust their estimates of security prices rapidly to reflect their interpretation of the new information received. Market efficiency does not assume that market participants correctly adjust prices, just that their price adjustments are unbiased. Some prices will over-adjust, and some will under-adjust.
- Expected returns implicitly include risk in the price of the security.

Under these assumptions, the competitive behavior of this large group of market participants should cause rapid price adjustments in response to any newly released information. The new price will reflect investors' new estimates of the investment's value and riskiness. Should these assumptions not hold (as in emerging markets), abnormal returns may be possible.

The Forms of the Efficient Market Hypothesis (EMH)

In an influential academic paper, Eugene Fama divided the efficient market hypothesis (EMH) into three categories.

Weak-form efficient markets. The weak form of the EMH states that current stock prices *fully reflect all currently available security market information*. Thus, past price and volume information will have no predictive power about the future direction of security prices. The conclusion is that an investor cannot achieve excess returns using technical analysis.

Semistrong-form efficient markets. The semistrong form of the EMH holds that security prices rapidly adjust to the arrival of all new public information. As such, current security prices *fully reflect all publicly available information*. The semistrong form says security prices include all security market and nonmarket information available to the public. The conclusion is that an investor cannot achieve abnormal returns using fundamental analysis.

Strong-form efficient markets. The strong form of the EMH states that stock prices *fully reflect all information from public and private sources*. The strong form includes all types of information: market, nonmarket public, and private (inside) information. This means that no group of investors has monopolistic access to information relevant to the formation of prices, and none should be able to consistently achieve abnormal returns.

Professor's Note: As a base level knowledge of the EMH, you should know that weak form addresses security market information; the semistrong form addresses security market and nonmarket public information; and the strong form addresses security market, nonmarket, and inside or private information.

Tests Used to Examine the Weak Form, the Semistrong Form, and the Strong Form of the EMH

Since the efficient market hypothesis has major implications as to the value of security analysis, there have likely been more academic studies in finance on the topic of market efficiency than any other single area.

Weak-Form Tests of the EMH

There have been two types of tests of the weak form of the EMH, statistical tests and trading rule tests.

Statistical tests for independence. The weak form contends that, over time, security returns are independent of each other. Statistical tests have been conducted to test for this independence.

- Autocorrelation tests indicate that security returns are not significantly correlated over time.
- Runs tests also indicate that stock price changes (upticks and downticks) are independent over time.

Trading rule tests. A lot of EMH studies have been conducted to see if investors can earn abnormal returns following mechanical trading rules (filter rules) based on price data.

- Tests of filter rules show that investors cannot earn abnormal returns after accounting for the impact of transactions costs. (Filter rules entail trading stocks when prices move up or down certain amounts.)
- Researchers have tested other trading rules and generally found that such activity does not outperform a buy-and-hold policy on a risk-adjusted basis after taking account of commissions.

Semistrong-Form Tests of the EMH

Semistrong-form tests require that security returns be adjusted to reflect market returns and risk.

Early tests looked at a security's performance in excess of the market return. Abnormal returns were measured as the stock's actual return less the market's actual return.

$$\text{abnormal return} = R_{\text{actual}} - R_{\text{mkt}}$$

Later tests looked at the security's performance in excess of market returns adjusted for the security's volatility (beta risk): Abnormal returns are measured as the stock's actual return less the stock's expected return based on its beta risk.

$$\text{abnormal return} = R_{\text{actual}} - E(R) = R_{\text{actual}} - [RFR + \beta[E(R_{\text{mkt}}) - RFR]]$$

Example: Abnormal returns

A stock has a 10% return when the market return is 5% and the risk-free rate (RFR) is 2%. The stock's beta is 1.2. Compute the unadjusted and adjusted abnormal return for this security.

Answer:

The stock's non-risk-adjusted abnormal return is $10\% - 5\% = 5\%$. The stock's risk-adjusted abnormal return is $10\% - [2\% + 1.2(5\% - 2\%)] = 4.4\%$.

Time-series tests are based on the assumption that, in efficient markets, the best estimate of future returns is the long-run historical rate of return. So if markets are semistrong-form efficient, an investor should not be able to outperform these estimates in the short or long term.

Cross-sectional tests of the semistrong-form of the EMH are based on the assumption that markets are efficient when all securities' returns lie along the security market line. That is, a security's rate of return should be directly related to its level of market risk (i.e., beta). So after adjusting returns for risk, all security returns should be equivalent or comparable. The hypothesis is that firm characteristics such as size, analyst coverage, or book value to market value ratios should not be useful in predicting abnormal returns. Note that the results of these tests depend on the effectiveness of the asset pricing model employed.

Event studies examine abnormal returns before and after the release of information about a significant firm-related event. The hypothesis is that investors should not be able to earn positive abnormal returns on average by buying or selling based on types of firm events.

Strong-Form Tests of the EMH

In addition to informational efficiency, the strong-form EMH implies that no group of investors has access to private information that would allow the group to consistently experience above-average profits. (This implies perfect markets in addition to efficient markets.) Academic tests of the strong form look at the legal use of private information and exclude illegal insider trading. The reported tests identify and study four groups of investors who are expected to be able to outperform the market, or who claim to be able to do so because of their access to private information.

Insider trading. Tests of Securities Exchange Commission (SEC) insider trading filings indicate that inside purchasers have made above-average profits. Other tests show that public traders tracking the purchases of insiders via SEC filings were able to earn excess returns. However, studies conducted after 1976 indicate that this inefficiency seems to have been eliminated.

Exchange specialists. Stock exchange specialists, by the very nature of their membership on the exchange, have access to information in the limit order book that is only available to them. Tests show that specialists derive above-average returns from this information.

Security analysts. Some strong-form tests have addressed the question of whether analysts and their advice can provide excess returns. These tests are based on the assumption that analysts may have information that the rest of the market does not have.

- *The Value Line (VL) enigma.* Studies indicate that VL rankings of 1 and 5 contain significant information (stocks rated 1 are the most attractive). Changes in the rankings from 2 to 1 also appear to be significant. Recent studies, however, show that any information in the VL reports is already reflected in price by the second day after publication.
- *Analyst recommendations.* Studies of the "Heard on the Street" column in *The Wall Street Journal* show that stocks have a significant price change on the day they appear in the column.

Professional money managers. Tests indicate that mutual funds, bank trust departments, pension plans, and endowment funds are *not* able to match the performance of a simple buy-and-hold policy.

LOS 57.b: Identify various market anomalies and explain their implications for the EMH, and explain the overall conclusions about each form of the EMH.

An anomaly is something that deviates from the common rule. The common rule here is the efficient market hypothesis. Tests of the EMH are frequently called “anomaly studies,” so in the efficient markets literature, an anomaly is something that helps to disprove the efficient markets hypothesis.

The following are documented market anomalies:

1. *Earnings surprises to predict returns.* Studies of quarterly earnings reports indicate that the markets have not adjusted stock prices to reflect the release of quarterly earnings surprises as fast as would be expected based on the semistrong EMH. As a result, it appears that earnings surprises can be used to identify individual stocks that will produce abnormal returns.
2. *Calendar studies.* The “January Anomaly” shows that, due to tax-induced trading at year-end, an investor can profit by buying stocks in December and selling them during the first week in January. The “weekend effect” shows that the average return for weekdays is positive but that a negative return is associated with the Friday close to the Monday open. Also, prices tend to rise on the last trade of the day.
3. *Price-earnings ratio (P/E) tests* indicate that low P/E ratio stocks experienced superior results relative to the market, while high P/E ratio stocks have significantly inferior results.
4. *Small firm effect.* Small firms consistently experienced significantly larger risk-adjusted returns than larger firms. This is called the *small firm effect*. Many academics claim these results reflect the inability of the asset-pricing model to provide a complete measure of risk for small-firm stocks.
5. The *neglected firms effect* is a result of tests of the small firm effect. Small firm tests also found that firms that have only a small number of analysts following them have abnormally high returns. These excess returns appear to be caused by the lack of institutional interest in the firms. The neglected firm effect applies to all sizes of firms.
6. *Book value/market value ratios* have been associated with abnormal returns. It has been found that the greater the ratio of book value/market value, the greater the risk-adjusted rate of return, regardless of firm size.

Overall Conclusions About the EMH

Most, but not all, evidence generated by testing the weak form of the EMH indicates that, after incorporating trading costs, simple trading rules cannot generate positive abnormal returns on average. Hence the results support the weak-form of the EMH.

The results are mixed for the semistrong form of the EMH. Event studies strongly support the EMH, while time-series and cross-sectional tests give evidence that markets are not always semistrong-form efficient.

Aside from the results on corporate insiders and specialists, the tests support the strong form of the EMH. It appears that corporate insiders and exchange specialists have monopolistic access to highly valuable information.

LOS 57.c: Explain the implications of stock market efficiency for technical analysis and fundamental analysis, discuss the implications of efficient markets for the portfolio management process and the role of the portfolio manager, and explain the rationale for investing in index funds.

If weak-form market efficiency holds, technical analysis (based on past price and volume information) has no value, and it cannot be used to earn positive abnormal returns on average.

If semistrong-form efficiency holds, neither technical nor fundamental analysis has any value because both are based on public information. Remember, semistrong-form efficiency is based on market information and other publicly available information, so it includes weak-form efficiency.

Implications of Efficient Markets, the Portfolio Management Process, and the Role of the Portfolio Manager

Portfolio management. In an efficient market, portfolio managers must create and maintain the appropriate mix of assets to meet their clients' needs. In other words, portfolio management should be centered on client objectives and constraints and the construction of the appropriate portfolio through effective asset allocation decisions.

Portfolio managers should help:

- Quantify their clients' risk tolerances and return needs within the bounds of the client's liquidity, income, time horizon, and legal and regulatory constraints.
- Verbalize their clients' portfolio policies and strategies needed to meet the client's needs, then construct an optimal portfolio by allocating funds between financial and real assets. This is referred to as asset allocation.
- Diversify their clients' portfolios (on a global basis) to eliminate unsystematic risk.
- Monitor and evaluate changing capital market expectations as they affect the risk/return expectations of the assets in the client's portfolio.
- Monitor their clients' needs and circumstances.
- Rebalance their clients' portfolios when changes are necessary.

Portfolio managers should also help their clients minimize their total transaction costs. There are three ways to lower costs: minimize taxes, reduce trading turnover, and minimize liquidity costs by trading relatively liquid stocks.

Performance measurement. One of the major outcomes of the EMH tests is that the proper way to gauge performance is to measure investment professionals against a randomly selected buy-and-hold strategy of stocks within the same risk class.

Tests do show that it may be possible to achieve above-average performance by selecting stocks that are neglected by other analysts, have high book value/market value ratios, and are small market capitalization firms. Also, strong-form tests of the Value Line enigma indicate that analysts have outperformed expectations in the past.

Money managers. The implication of the strong-form tests is that money managers as a group have not outperformed the buy-and-hold policy. It is argued that the investor's job is to separate good managers from average and poor managers. This approach is supported by the research showing that some analysts (e.g., Value Line) have the ability to separate the best and the worst stocks from a universe of stocks.

- **The rationale for investing in index funds.** The conclusion you might draw from the efficient market literature is that since you cannot, in general, expect to beat the market, you should attempt to match the market while minimizing your costs. One way to match the market's performance is to put your money into an index fund. An index fund is designed to duplicate the composition and performance of a specific index or market segment. There are index funds for domestic and international markets and for various market segments.

Proper diversification is the key to utilizing index funds. Most investors do not have the resources to purchase individual securities in the correct proportions so that their portfolio mimics the market. Moreover, certain securities may lack proper market liquidity to warrant inclusion in a market replication strategy. The result is that market index funds like the Vanguard 500 (which mimics the S&P 500) or unit trusts such as the Standard and Poor's Depositary Receipts (SPDRs or "spiders") are an easy, cost-effective way for most investors to gain the proper exposure to a market index.

KEY CONCEPTS

1. A market is (informationally) efficient with respect to a particular set of information if no positive abnormal (risk-adjusted) returns can be earned on average by trading based on that information.
2. The concept of informational efficiency of markets is supported by the large number of market participants seeking to gain a trading advantage and the fact that new, relevant information arrives randomly (is unpredictable).
3. The three forms of efficiency refer to efficiency with respect to different information sets. The three forms and the respective information they refer to are:
 - Weak—market information, including all past price and volume information.
 - Semistrong—public information, including market and fundamental information.
 - Strong—all information, including private, insider, fundamental, and market information.
4. The tests of the three forms of market efficiency can be categorized as:
 - Weak—statistical tests of independence and mechanical trading rules (filter rules).
 - Semistrong—time series tests, cross-sectional tests, event studies.
 - Strong—test the performance of insiders, specialists, analyst recommendations, and money manager performance.
5. Six anomalies with respect to semistrong-form efficiency have been well supported. Abnormal returns have been shown to be predictable using earnings surprises, calendar effects, P/E ratios, firm size, analyst neglect, and book-to-market ratios.
6. Overall tests have supported weak-form efficiency, offered mixed results with respect to semistrong-form efficiency, and shown violations of strong-form efficiency for corporate insiders and exchange specialists.
7. If weak-form efficiency holds, technical analysis has no value. If semistrong-form efficiency holds, neither technical nor fundamental analysis has any value in stock selection and portfolio construction.
8. Even if markets are informationally efficient, portfolio managers can still add value by matching portfolios to each client's constraints and risk tolerance, providing diversification and minimizing transactions costs.
9. Index funds provide broad diversification at very low cost. To the extent that markets are efficient, index funds will outperform the average money manager who devotes time and resources to "beating the market."

CONCEPT CHECKERS: EFFICIENT CAPITAL MARKETS

1. The two major tests employed to test the weak-form efficient market hypothesis (EMH) are:
 - A. event studies and runs tests.
 - B. autocorrelation tests and runs tests.
 - C. event studies and performance tests.
 - D. time-series tests and cross-sectional tests.
2. Which of the following forms of the EMH assumes that no group of investors has monopolistic access to relevant information?
 - A. Weak form.
 - B. Strong form.
 - C. Semistrong-form.
 - D. Both weak and semistrong form.
3. The strong-form EMH asserts that stock prices fully reflect which of the following types of information?
 - A. Market.
 - B. Market and public.
 - C. Public and private.
 - D. Public, private, and future.
4. The strong-form EMH goes beyond the semistrong-form in that it calls for:
 - A. perfect markets.
 - B. a large number of profit-maximizing participants.
 - C. information to come to the market on a random basis.
 - D. all nonmarket public information should be incorporated into security prices.
5. A stock's abnormal rate of return is defined as the:
 - A. rate of return during abnormal price movements.
 - B. the market rate of return less the actual rate of return.
 - C. actual rate of return less the expected risk-adjusted rate of return.
 - D. expected risk-adjusted rate of return minus the market rate of return.
6. Which of the following is NOT an assumption behind the semistrong form of the EMH?
 - A. A large number of profit-maximizing participants.
 - B. In regard to timing, news announcements are independent of each other.
 - C. All information is cost free and available to everyone at the same time.
 - D. Investors adjust their expectations rapidly when confronted with new information.
7. Research has revealed that the performance of professional money managers compared to the performance of the market is:
 - A. equal.
 - B. inferior.
 - C. superior.
 - D. slightly better.
8. Under the EMH, the major effort of the portfolio manager should be:
 - A. to maximize transactions costs.
 - B. to achieve complete diversification of the portfolio.
 - C. to help clients underperform the market benchmark.
 - D. all of the above.

9. Which of the following efficient market studies suggests that securities markets are semistrong-form efficient?
- Small-firm effect studies.
 - Neglected-firm effect studies.
 - Price/earnings ratio studies.
 - Event studies.

10. An analyst has gathered the following data about a stock:
- A beta of 1.375.
 - An actual return of 10.5%.
 - The market rate of return is 6%.
 - The risk-free rate is 2%.

Compute the stock's abnormal return.

- 2%.
 - 3%.
 - 4%.
 - 5%.
11. Assume the following data:

	<i>Beginning Price</i>	<i>Ending Price</i>	<i>Cash Flow During the Year</i>
Analyst's portfolio	\$40	\$41	\$6.00
Risk-matched market portfolio	\$10	\$11	\$0.25

How does the analyst's portfolio performance compare to the risk-matched portfolio performance?

- Equal.
 - Inferior.
 - Superior.
 - Slightly worse.
12. The implication of the weak-form EMH is:
- insider information is of no value for obtaining excess abnormal returns.
 - all public and private information is rapidly incorporated into security prices.
 - technical analysts can make excess returns on filter rules but not runs rules.
 - there should be no relationship between past price changes and future price changes.
13. The January anomaly, the neglected firm effect, and the book value/market value ratio are studies examining which form of the EMH?
- Weak form of the EMH.
 - Strong form of the EMH.
 - Semistrong form of the EMH.
 - Both the weak and semistrong forms of the EMH.
14. If a firm announces an unexpected large cash dividend, the EMH would predict which of the following price changes at the announcement?
- No price change.
 - An abnormal price change to occur before the announcement.
 - An abnormal price change to occur at the time of the announcement.
 - A gradual price change to occur for several weeks after the announcement.

15. Which of the following is NOT one of the three assumptions that underlie an efficient capital market?
- A. Expected returns implicitly include risk in the price of the security.
 - B. A large number of profit-maximizing participants are analyzing and valuing securities independent of each other.
 - C. Investors adjust their estimates of security prices slowly to reflect their interpretation of the new information received.
 - D. New information comes to the market in a random fashion, and the timing of news announcements is independent.
16. Autocorrelation tests and tests of the predictive power of earnings surprises apply to which forms of the EMH?
- | <u>Autocorrelation</u> | <u>Earnings surprises</u> |
|------------------------|---------------------------|
| A. Weak | Strong |
| B. Semistrong | Strong |
| C. Weak | Semistrong |
| D. Semistrong | Weak |

ANSWERS – CONCEPT CHECKERS: EFFICIENT CAPITAL MARKETS

1. B The two types of tests used to examine the weak form of the EMH are:
 1. Statistical tests of the independence of security returns (runs and autocorrelation tests).
 2. Trading rule tests to examine if mechanical trading rules can generate excess returns.
2. B Strong-form EMH states that stock prices fully reflect all information from public and private (inside) sources. Thus, no group of investors has an advantage. Note that the semistrong form only deals with public information.
3. C Strong-form EMH states that stock prices fully reflect all information from public and private (inside) sources.
4. A The strong-form EMH assumes perfect markets in which all information is cost free and available to everyone at the same time. The other answer choices apply to any market.
5. C Abnormal returns are measured by taking the security's actual return less the security's expected return based on its beta risk.
6. C The semistrong form of EMH assumes that stock prices reflect all public information. The semistrong form of EMH does not dispute that information could be held by insiders. All information being cost free and available to everyone at the same time is actually an assumption of strong-form EMH.
7. B Tests indicate that mutual funds, bank trust departments, pension plans, and endowment funds are not able to match the performance of a simple buy-and-hold policy. The performance of professionals has been inferior to that of the market.
8. B Portfolio managers should minimize transaction costs, help clients try to outperform the market benchmark, and diversify the portfolio to minimize risk.
9. D The majority of studies that have looked at firm-related events have concluded that there are no predictable short-run or long-run impacts on security returns because of these events. This supports the EMH. The neglected firm, small firm, and P/E ratio studies have found significant positive risk-adjusted abnormal returns to small, underfollowed, and low P/E firms, results which do not support the semistrong form of the EMH.
10. B $10.5\% - [2\% + 1.375(6\% - 2\%)] = 3\%$
11. C Analyst: $\frac{\$41 - \$40 + \$6}{\$40} = 0.175$; Market: $\frac{\$11 - \$10 + \$0.25}{\$10} = 0.125$
12. D Weak-form EMH states that security prices reflect all historical market information, meaning that there should be no relationship between past price changes and future price changes.
13. C The January anomaly, neglected firm effect, and book/market value ratio all deal with public information and are studies of semistrong-form EMH.
14. C EMH would suggest that stock prices adjust rapidly to new information—this implies that the stock dividend would cause an abnormal change in price to occur at the time of the announcement.
15. C Investors adjust rapidly (not slowly) to new information.
16. C Autocorrelation tests test the weak form (past price information), and tests of the predictive power of earnings surprises test the semistrong form (publicly available information).

MARKET EFFICIENCY AND ANOMALIES

Study Session 13

EXAM FOCUS

This topic review is fairly straightforward. Know two limitations to the claim that market prices should be perfectly efficient, and know the limitations on arbitrage as a mechanism for forcing securities prices

to their informationally efficient levels. Know the main reasons that research evidence suggesting anomalous returns behavior may be misleading.

LOS 58.a: Explain limitations to fully efficient markets.

LOS 58.b: Describe the limits of arbitrage to correct anomalies.

There are three primary limitations on the market's ability to produce informationally efficient prices.

1. Processing new information entails costs and takes at least some time. If market prices are efficient, there are no returns to the time and effort spent on fundamental analysis. But if no time and effort is spent on fundamental analysis, there is no process for making market prices efficient. We can resolve this apparent conundrum by looking to the time lag between the release of new value-relevant information and the adjustment of market prices to their new efficient levels.

There must be an adequate return to fundamental analysis and trading based on new information to compensate analysts and traders for their time and effort. Those who act rapidly and intelligently to the release of new information will be rewarded. If stock prices adjust to their new efficient levels within minutes or hours of the release of new information, we can consider markets to be efficient. If this price-adjustment process takes days or weeks, stock prices are not efficient. In this case we expect that more activity by analysts, traders, and arbitrageurs will tend to reduce the adjustment period over time.

2. Market prices that are not precisely efficient can persist if the gains to be made by information trading are less than the transaction costs such trading would entail. The difficulties associated with short sales can be viewed as relatively high transaction costs. This means that deviations from efficient prices on the upside (overvalued stocks) may be more prevalent than downside deviations (undervalued stocks) since the transaction costs of increasing long positions are low relative to those of short selling. In general, for securities with larger transaction costs, the deviations from informationally efficient prices should be greater.
3. There are limits on the ability of the process of arbitrage to bring about efficient prices. Arbitrage is frequently not riskless. Just because fundamentals indicate that one stock is overpriced relative to another, or absolutely over- or underpriced, does not mean that trading based on this information will be immediately profitable. For example, one risk of shorting overvalued stocks during the internet stock bubble of the late 1990s was that a shorted company might be taken over at a significantly higher stock price than the one at which a trader sold short. The fact that the acquiring firm paid too much for the shares offers no solace to short sellers who have to cover their positions at the takeover price.

Even in pairs trading, where an arbitrageur buys the underpriced security and shorts the overpriced security, significant risk from stock-specific factors remains. Additionally, there is no guarantee that even correctly-identified relative mispricings of similar stocks will be corrected in the near term. Investors of the funds that

arbitrageurs and traders use can be notoriously impatient, removing funds when trades go against them or if results are not consistently good. Since capital is limited, in periods where there are many apparent mispricings, money will be used only to pursue the most attractive trades, leaving other mispricings unexploited.

LOS 58.c: Illustrate why investors should be skeptical of anomalies.

Investors should be skeptical of many “identified” anomalies. There are several issues concerning research methods and statistical significance to consider.

Measurement of Abnormal Returns

One of the most persistent criticisms of studies that document anomalous returns based on firm characteristics is that the model used to estimate normal returns may be flawed. Researchers often use the CAPM to model normal returns based on estimated firm betas. The fact that small firms show positive abnormal (risk-adjusted) returns on average may indicate that small firms are persistently underpriced, or that investing in small firms entails risk that is not captured by the firms' betas. This is especially problematic when tests for abnormal returns involve returns over longer periods. Since normal returns over a day or a week are close to zero, measuring abnormal returns is not as heavily influenced by the returns model used. Using such factors as firm size and price-book values may mitigate such problems, but the theoretical support for these characteristics as risk factors is weak.

The bottom line here is that we must be aware that firm characteristics associated with positive abnormal returns may be characteristics associated with a type of risk that is not captured by the returns model estimates to which actual returns are compared.

Strategy Risk

In addition to the concerns with the inadequate specification of firm risk in estimating normal returns, investors should consider strategy risk. Capturing the abnormal returns of a trading strategy is not without risk, even if the anomalous returns behavior persists. If the strategy is based on returns over a 20-year period, abnormal returns may be positive in only some of those years. Investors seeking to exploit the predictability of abnormal returns may have one or more down years in a row, even if the firm characteristics upon which the strategy is based continue to have predictive power over the long term. Any strategy designed to exploit anomalous returns behavior has the inherent risk that the behavior will either not continue, or be significantly reduced by other investors pursuing similar or identical strategies. Additional strategy risk such as this must be rewarded with higher returns and should not be disregarded.

Data Mining

Recall from quantitative methods, that statistical tests have a probability of a type I error equal to their significance level. A test of the hypothesis that stock prices are efficient (no abnormal returns) at the 5% level of significance will be rejected at the 5% level of significance 1 out of 20 times by chance, even when it is actually true.

Consider a researcher who tests 20 different factors using the same sample of data. In each test he tries to determine whether abnormal returns could have been earned by forming portfolios based on one of these factors. Even if none of the factors actually is valuable in predicting abnormal returns, chances are that one of the tests will show a statistically significant relation between a factor and subsequent abnormal returns. Now imagine thousands of researchers doing a hundred thousand tests all on the same data sample. This results in a data mining problem.

There are certainly many relationships in the data resulting purely from chance. Standard statistical tests will identify these as statistically significant when they are in fact not driven by any real characteristics of markets and are unlikely to be repeated outside the sample period. While a less-than-ethical researcher could be guilty of

purposely mining the data, a large number of independent skilled researchers who just use the same data (e.g., U.S. stock returns) can also be mining the data.

Survivorship Bias

When constructing samples, researchers must be careful not to include just surviving companies, mutual funds, or investment newsletters. Since survivors tend to be those that have done well (by skill or chance), samples of mutual funds that have 10-year track records, for example, will exhibit performance histories with upward bias. Mutual fund companies regularly discontinue funds with poor performance histories or roll their assets into better-performing funds.

Sample Selection Bias

Sample selection bias (of the unintentional variety) occurs when the method of selecting a sample is not truly random. It is present when the researcher has inadvertently selected a sample that exhibits characteristics that are not present, or not present to the same degree of significance, in the overall population. If a researcher finds evidence of an anomaly in sample data, but the data are predominantly from small firms because that was the only information available to the researcher, it could be a mistake to make inferences about characteristics of the whole population of publicly-traded firms based on that sample.

Small Sample Bias

Inferences about an entire population drawn from tests on a small sample may be incorrect. One type of small sample bias is to use a short time period. What is true over one time period is not necessarily true over longer periods.

Nonsynchronous Trading

Closing stock prices in market data may be actual trading prices very close to the market close for large-cap, heavily traded stocks. For stocks that trade infrequently, closing prices may be prices from much earlier in the day. Using these “stale” prices can make strategies appear more attractive than they really are. Assuming that one could actually trade at closing prices at or near the close of the market, may make a strategy look profitable when the strategy could not really be implemented.

KEY CONCEPTS

1. Market prices are generated by the activities of researchers and traders who analyze and react to new information. There must be some reward for this effort, but that reward may be earned only by those who process and act on the new information rapidly and skillfully.
2. Transaction costs prevent trading and arbitrage from resulting in perfectly efficient securities prices. Securities and strategies with higher transaction costs permit greater deviations from perfectly efficient prices.
3. Information-based trading is not without risks. Arbitrageurs have no guarantee that prices will move to “more rational” levels or that strategies will consistently perform well, have limited capital, and constraints imposed on them by the suppliers of investment capital.
4. Research purporting to have identified anomalous returns behavior may be subject to data mining bias, incorrect measurement of risk and abnormal returns, small sample bias, survivor bias, sample selection bias, or the use of stale prices due to nonsynchronous trading.

CONCEPT CHECKERS: MARKET EFFICIENCY AND ANOMALIES

1. The effect on market efficiency of restricting short sales is *most likely* to:
 - A. create a band of efficient prices.
 - B. improve market efficiency.
 - C. lead to upside bias in stock prices.
 - D. reduce the speed of adjustment to new information.

2. A researcher has examined the performance of the shares of firms that went public during the period 1998–1999 and found evidence of positive abnormal returns over the three months after the firms' shares began trading. This evidence of anomalous returns behavior is *least likely* subject to:
 - A. measurement problems for abnormal returns.
 - B. sample selection bias.
 - C. small sample bias.
 - D. survivorship bias.

3. A researcher has examined a sample of shares of smaller firms that trade infrequently and found that they have had greater volatility of the price change between the market closing price and the opening price the next trading day than large-cap stocks in similar industries. Based on this information, he suggests entering into an options trading strategy to exploit the differences in overnight volatility. The researcher has *most likely*:
 - A. misestimated normal returns.
 - B. confused price change with volatility.
 - C. overestimated overnight volatility of his sample.
 - D. introduced small sample bias into his results.

ANSWERS – CONCEPT CHECKERS: MARKET EFFICIENCY AND ANOMALIES

1. C The best answer here is “lead to upside bias.” The higher the transactions costs of short sales, the more security prices may be above efficient levels without causing short sales to drive them down to efficient levels. This will not necessarily reduce the speed of adjustment to new information as much as it will limit adjustment when stocks are overpriced.
2. D The researcher has used a relatively small time period during which the post-initial public offering (IPO) returns of new issues may not have been representative of those over longer time periods. There is potential bias in the sample because the selection criterion may have produced a sample that is highly concentrated in one, or a few, industries that were experiencing unexpectedly rapid growth. Any time abnormal returns are being measured over longer periods, such as three months, there are potential measurement errors. Additionally, since the stocks had no trading history, estimating risk is problematic. There is no indication that the sample suffers from survivorship bias, since IPOs were included regardless of their fates.
3. C The estimating of normal returns is not an issue here and we have no information suggesting that his sample or sample period is necessarily small. The most likely problem here is one of nonsynchronous trading. For stocks that trade infrequently, market closing prices may be those from trades many hours earlier and the opening trades the next day may come many hours after the opening. The problem, then, is that he is measuring volatility over a potentially much longer period for the small-cap stocks than for the large-cap stocks that likely trade near both the close and the opening.

The following is a review of the Analysis of Equity Investments principles designed to address the learning outcome statements set forth by CFA Institute®. This topic is also covered in:

AN INTRODUCTION TO SECURITY VALUATION AND INDUSTRY ANALYSIS

Study Session 14

EXAM FOCUS

To estimate the market value of any investment, find the present value of its future cash flows: estimate the number and dollar amount of future cash flows, estimate when they will be received and what form they will take, and discount these cash flows to the present using the required rate of return. The required return on any investment is the real rate of interest plus premiums for inflation and risk. To make an

investment decision, compare the estimated value of the security to its current market price. For success on the Level 1 exam, candidates should be prepared to calculate the value of an investment with the valuation formulas presented in this review. All of them are variations of the same discounted cash flow technique. The single LOS for Reading 60 is included here.

LOS 59.a: Explain the top-down approach, and its underlying logic, to the security valuation process.

The **top-down, three-step approach** to security valuation starts with a forecast of the direction of the general economy. Next, based on this economic forecast, project the outlook for each industry under review. Third, within each industry, select the firms most likely to perform the best given these economic and industry forecasts. As indicated, this approach is a three-step analytical process:

economic analysis → industry analysis → stock analysis

Step 1: Forecast macroeconomic influences

Fiscal policy is a direct approach to affect aggregate demand in an attempt to manage the rate of economic growth. Tax cuts encourage spending (demand) and speed up the economy; tax increases discourage spending and slow economic growth. Government spending creates jobs, thus increasing aggregate demand.

Monetary policy is used by the central bank to manage economic growth. Decreasing the money supply causes interest rates to rise, putting upward pressure on costs and downward pressure on demand. Increasing the money supply reduces interest rates and increases demand. Inflation can result from increasing the money supply too fast. Rising interest rates reduce the demand for investment funds and rising consumer prices reduce product demand.

From a global (import/export) perspective, the potential domestic economic impact from political changes in major international economies must be considered.

Step 2: Determine industry effects

Identify industries that should prosper or suffer from the economic outlook identified in Step 1. Consider how these industries react to economic change: some industries are cyclical, some are counter-cyclical, and some are noncyclical.

Consider global economic shifts: an industry's prospects within the global business environment determine how well or poorly individual firms in the industry will do. Thus, industry analysis should precede company analysis.