Market Microstructure and Strategies

Recently, much attention has been given to market microstructure, which is the process by which securities such as stocks are traded. For a stock market to function properly, a structure is needed to facilitate the placing of orders, speed the execution of the trades ordered, and provide equal access to information for all investors.

Stock Market Transactions

Some of the more common stock market transactions desired by investors are market and limit orders, margin trades, and short sales. Each of these types of transactions is discussed next.

Placing an Order

To place an order to buy or sell a specific stock, an investor contacts a brokerage firm. Brokerage firms serve as financial intermediaries between buyers and sellers of stock in the secondary market. They receive orders from customers and pass the orders on to the exchange through a telecommunications network. The orders are frequently executed a few seconds later. Full-service brokers offer advice to customers on stocks to buy or sell; discount brokers only execute the transactions desired by customers. The larger the transaction amount, the lower the percentage charged by many brokers. Some discount brokers charge a fixed price per trade, such as $10 to $30 for any trade that is less than 500 shares.

Investors can contact their brokers to determine the prevailing price of a stock. The broker may provide a bid quote if the investor wants to sell a stock or an ask quote if the investor wants to buy a stock. The investor communicates the order to the broker by specifying (1) the name of the stock, (2) whether to buy or sell that stock, (3) the number of shares to be bought or sold, and (4) whether the order is a market or a limit order. A market order to buy or sell a stock means to execute the transaction at the best possible price. A limit order differs from a market order in that a limit is placed on the price at which a stock can be purchased or sold.

Creo Stock is currently selling for $55 per share. If an investor places a market order to purchase (or sell) the stock, the transaction will be executed at the prevailing price at the time the transaction takes place. For example, the price may have risen to $55.25 per share or declined to $54.75 by the time the transaction occurs.

Alternatively, the investor could place a limit order to purchase Creo stock only at a price of $54.50 or less. The limit order can be placed either for the day only or for a longer period.
investors who wish to sell Creo stock may place limit orders to sell the stock only if it can be sold for $55.25 or more. The advantage of a limit order is that it may enable an investor to obtain the stock at a lower price. The disadvantage is that there is no guarantee the market price will ever reach the limit price established by the investor.

**Stop-Loss Order**  A stop-loss order is a particular type of limit order. The investor specifies a selling price that is below the current market price of the stock. When the stock price drops to the specified level, the stop-loss order becomes a market order. If the stock price does not reach the specified minimum, the stop-loss order will not be executed. Investors generally place stop-loss orders either to protect gains or to limit losses.

**EXAMPLE**

Paul bought 100 shares of Bostner Corporation one year ago at a price of $50 per share. Today, Bostner stock trades for $60 per share. Paul believes that Bostner stock has additional upside potential and does not want to liquidate his position. Nonetheless, he would like to make sure that he realizes at least a 10 percent gain from the stock transaction. He therefore places a stop-loss order with a price of $55. If the stock price drops to $55, the stop-loss order will convert to a market order and Paul will receive the prevailing market price at that time, which will be about $55. If Paul receives exactly $55, his gain from the transaction would be 100 shares \( \times (55 - 50) = 500 \). If the price of Bostner stock continues to increase, the stop-loss order will never be executed.

**Stop-Buy Order**  A stop-buy order is another type of limit order. In this case, the investor specifies a purchase price that is above the current market price. When the stock price rises to the specified level, the stop-buy order becomes a market order. If the stock price does not reach the specified maximum, the stop-buy order will not be executed.

**EXAMPLE**

Karen would like to invest in the stock of Quan Company, but only if there is some evidence that stock market participants are demanding that stock. The stock is currently priced at $12. She places a stop-buy order at $14 per share, so if demand for Quan stock is sufficient to push the price to $14, she will purchase the stock. If the price remains below $14, her order will not be executed.

**Placing an Order Online**  Many Internet brokers accept orders online, provide real-time quotes, and provide access to information about stocks. Some of the more popular online brokerage firms include TD Ameritrade (www.tdameritrade.com), Charles Schwab (www.schwab.com), and E*Trade (www.etrade.com).

Some online brokerage services offer zero-commission trades. However, investors must maintain a certain amount of funds in their brokerage accounts. Thus, the brokerage firms can still profit from these no-commission trades because they can use the funds in the accounts to earn a higher return than they pay the investors as interest.

**Margin Trading**

When investors place an order, they may consider purchasing the stock on margin; in that case, they use cash along with funds borrowed from their broker to make the purchase. The Federal Reserve imposes margin requirements, which represent the minimum proportion of funds that must be covered with cash. This limits the proportion of funds that may be borrowed from the brokerage firm to make the investment. Margin requirements were first imposed in 1934, following a period of volatile market swings, to discourage excessive speculation and ensure greater stability. Currently, at least 50 percent of an investor’s invested funds must be paid in cash. Margin requirements are intended to ensure that investors can cover their position if the value of their investment
declines over time. Thus, with margin requirements, a major decline in stock prices is
less likely to cause defaults on loans from brokers and therefore will be less damaging
to the financial system.

To purchase stock on margin, investors must establish an account (called a margin
account) with their broker. Their initial deposit of cash is referred to as the initial
margin. To meet the requirements imposed by the Federal Reserve, the initial margin
must be at least 50 percent of the total investment (although some brokerage firms
impose a higher minimum). The brokerage firm can provide financing for the remainder
of the stock investment, and the stock serves as collateral. Over time, the market value
of the stock will change. Investors are subject to a maintenance margin, which is the min-
imum proportion of equity that an investor must maintain in the account as a propor-
tion of the market value of the stock. The investor’s equity position represents what the
stock is worth to the investor after paying off the loan from the broker. The New York
Stock Exchange (NYSE, which is now part of the company NYSE Euronext following its
merger with the European electronic stock exchange, Euronext) and Nasdaq have set the
minimum maintenance margin at 25 percent, but some brokerage firms require a higher
minimum. If the investor’s equity position falls below the maintenance margin, the
investor will receive a margin call from the brokerage firm and will have to deposit
cash to the account in order to boost the equity.

**EXAMPLE**

Five days ago, Trish purchased 100 shares of Rimax stock at $60 per share through Ohio Brokerage
Firm. Thus, the shares were valued at $6,000. Ohio Brokerage required an initial margin of 50
percent. Trish used $3,000 cash as her equity investment and borrowed the remaining $3,000
from Ohio Brokerage to purchase the stock. Ohio Brokerage requires a maintenance margin of
30 percent. Two days later, the price of Rimax stock declined to $50 per share, so the total
value of her shares was $5,000. Since Trish still owed the brokerage firm $3,000, her equity posi-
tion was equal to $2,000 (computed as the market value of the stock minus the $3,000 that is
still owed to the broker). The equity position represented 40 percent of the market value of the
stock (computed as $2,000/$5,000), which was still above the maintenance margin of 30 percent.
Today, the stock price declined to $40 per share, so the market value of the stock is $4,000.
Now Trish’s equity position is $1,000 (computed as $4,000 minus $3,000). This position represents
25 percent of the market value of the stock (computed as $1,000/$4,000). Now this position is
below the 30 percent maintenance margin required by Ohio Brokerage. Consequently, Trish
receives a margin call from Ohio Brokerage, in which she is informed that she must deposit suf-
cient cash to her account to raise her equity position to at least 30 percent of the market value
of the stock. ●

**Margin Calls** Because of the potential for margin calls, a large volume of margin
lending exposes the stock markets to a potential crisis. A major downturn in the
market could result in many margin calls, some of which may force investors to
sell their stock holdings if they do not have the cash to build their maintenance
margin. Such a response results in more sales of stocks, additional downward
pressure on stock prices, and additional margin calls. When the stock market plum-
meted during the credit crisis in 2008, investors who did not have cash available to
respond to margin calls sold their stock, putting additional downward pressure on
stock prices.

**Impact on Returns** The return on a stock is affected by the proportion of the
investment that is from borrowed funds. Over short-term periods, the return \( (R) \) on
stocks purchased on margin can be estimated as follows:

\[
R = \frac{SP - INV - LOAN + D}{INV}
\]

[WEB] www.bloomberg.com
Discloses today’s return for stocks contained in major stock indexes.
where

\[
SP = \text{selling price of stock} \\
INV = \text{initial investment by investor, not including borrowed funds} \\
LOAN = \text{loan payments on borrowed funds, including principal and interest} \\
D = \text{dividend payments}
\]

**EXAMPLE**

Consider a stock priced at $40 that pays an annual dividend of $1 per share. An investor purchases the stock on margin, paying $20 per share and borrowing the remainder from the brokerage firm at 10 percent annual interest. If, after one year, the stock is sold at a price of $60 per share, the return on the stock is

\[
R = \frac{SP - INV - D + D}{INV} = \frac{60 - 20 - 22 + 1}{20} = \frac{19}{20} = 95
\%
\]

In this example, the stock return (including the dividend) would have been 52.5 percent if the investor had used only personal funds rather than borrowing funds. This illustrates how the use of borrowed funds can magnify the returns on an investment.

Any losses are also magnified, however, when borrowed funds are used to invest in stocks. Reconsider the previous example and assume that the stock is sold at a price of $30 per share (instead of $60) at the end of the year. If the investor did not use any borrowed funds when purchasing the stock for $40 per share at the beginning of the year, the return on this investment would be

\[
R = \frac{SP - INV}{INV} = \frac{30 - 40}{40} = -25
\%
\]

However, if the investor had purchased the stock on margin at the beginning of the year, paying $20 per share and borrowing the remainder from the brokerage firm at 10 percent annual interest, the return over the year would be

\[
R = \frac{SP - INV - LOAN + D}{INV} = \frac{30 - 20 - 22 + 1}{20} = -55
\%
\]

As these examples illustrate, purchasing stock on margin not only increases the potential return from investing in stock but also magnifies the potential losses.

**Short Selling**

In a **short sale**, investors place an order to sell a stock that they do not own. They sell a stock short (or “short the stock”) when they anticipate that its price will decline. When they sell short, they are essentially borrowing the stock from another investor and will ultimately have to return that stock to the investor from whom they borrowed it. The short-sellers borrow the stock through a brokerage firm, which facilitates the process. The investors who own the stock are not affected when their shares are borrowed and, in fact, are not even aware of it.

If the price of the stock declines by the time the short-sellers purchase it in the market (to return to the investor from whom they borrowed), the short-sellers earn the difference between the price at which they initially sold the stock and the price they paid to obtain the stock. Short-sellers must make payments to the investor from whom the stock was borrowed to cover the dividend payments that the investor would have received if the stock had not been borrowed. After subtracting any dividend payments made, the short-seller’s profit is the difference between the original selling price and the price paid
for the stock. The risk of a short sale is that the stock price may increase over time, forcing the short-seller to pay a higher price for the stock than the price at which it was initially sold.

On May 5, the market value of Vizer Company stock was $70 per share. Ed conducted an analysis of Vizer stock and concluded that the price should be much lower. He called his broker and placed an order to sell 100 shares of Vizer stock. Since he did not have shares of Vizer to sell, this transaction was a short sale. Vizer stock does not pay dividends, so Ed did not have to cover dividend payments for the stock that his brokerage firm borrowed and sold for him. The sale of the stock resulted in proceeds of $7,000, which he placed in his account at the brokerage firm. During the next two months, the price of Vizer stock declined. On July 18, Ed placed an order through his brokerage firm to purchase 100 shares of Vizer stock and offset his short position. The market value at the time was $60, so he paid $6,000 for the shares. Thus, Ed earned $1,000 from his short position. This example ignores transaction costs associated with the short sale.

The risk from taking a short position is that the stock’s price may rise instead of decline as expected. If the price had increased after Ed created the short position, his purchase price would have been higher than his selling price. In this case, Ed would have incurred a loss on the short position.

**Measuring the Short Position of a Stock** One measure of the degree of short positions is the ratio of the number of shares that are currently sold short divided by the total number of shares outstanding. For many stocks, this measure is between 0.5 and 2 percent. A higher percentage (such as 3 percent) suggests a large amount of short positions in the market, which implies that a relatively large number of investors expect the stock’s price to decline.

Some financial publications disclose the level of short sales for stocks with the short interest ratio, which is the number of shares that are currently sold short divided by the average daily trading volume over a recent period. The higher the ratio, the higher the level of short sales. A short interest ratio of 2 for a particular stock indicates that the number of shares currently sold short is two times the number of shares traded per day, on average. A short interest ratio of 20 or more reflects an unusually high level of short sales, indicating that many investors believe that the stock price is currently overvalued. Some stocks have had short interest ratios exceeding 100 at certain times.

The short interest ratio is also measured for the market to determine the level of short sales for the market overall. A high short interest ratio for the market indicates a high level of short-selling activity in the market. The largest short positions are periodically disclosed in *The Wall Street Journal*. For each firm with a large short position, the number of shares sold short is disclosed and compared to the corresponding number a month earlier. The change in the overall short position by investors from the previous month is also shown.

**Using a Stop-Buy Order to Offset Short Selling** Investors who have established a short position commonly use a stop-buy order to limit their losses.

A year ago, Mary sold short 200 shares of Patronum Corporation stock for $70 per share. Patronum’s stock currently trades for $80 a share. Consequently, Mary currently has an unrealized loss on the short sale, but she believes that Patronum stock will drop below $70 in the near future. She is unwilling to accept a loss of more than $15 per share on the transaction. Consequently, she places a stop-buy order for 200 shares with a specified purchase price of $85 per share. If Patronum stock increases to $85 per share, the stop-buy order becomes a market order and Mary will pay approximately $85 per share. If Patronum stock does not increase to $85 per share, the stop-buy order will never be executed.
Concerns about Short Selling When the credit crisis intensified in 2008, hedge funds and other investors took large short positions on many stocks, especially those of financial institutions. Some critics argued that the large short sales placed additional downward pressure on prices and created paranoia in the stock market. Such fear could make stock prices decline to a greater degree, which would be beneficial to the short-sellers.

EXAMPLE Just after the failure of the securities firm Lehman Brothers in September 2008, there were rumors that Morgan Stanley (another securities firm) was unable to obtain financing and was about to fail. During the three-day period from September 15 to 17, 2008, the number of Morgan Stanley shares sold short increased from fewer than 5 million shares to about 39 million shares. Many of these short sales may be attributable to this unfounded rumor. During this three-day period, the stock price of Morgan Stanley declined by a third. Arguably, much of the decline in the stock price was due to the massive short selling, which was likely triggered by the rumor.

Restrictions on Short Selling Following the massive short sales of Morgan Stanley, the Securities and Exchange Commission (SEC) temporarily protected more than 800 firms from short sales. For the most part, the protected firms were financial institutions and other companies that were exposed to the credit crisis, and the SEC was attempting to limit the adverse effect that short sales might have on the stock prices of these firms. The SEC also mandated that traders had to borrow the stock before they could execute a short sale. In some cases, traders were using loopholes in the short sale rules to short stock without borrowing it. The SEC delegated authority to the stock exchanges to identify other firms that should be protected from short sales. Some other countries including Australia, Taiwan, and the Netherlands subsequently instituted their own short-selling regulations.

Many critics argued that these restrictions did not affect the general behavior of the speculators who were engaging in short sales. Some short-sellers were focused on financial institutions that had very little equity and used mostly borrowed funds (financial leverage) to generate large returns on their equity. These short-sellers might argue that the stock prices of the target financial institutions were declining not because of the short selling but rather because regulators failed to ensure that these institutions would have sufficient capital backing their business. Furthermore, even though short sales were banned, speculators have other methods (e.g., put options) of betting against a stock that might place downward pressure on a stock’s price. In October 2008, the ban on short selling was eliminated in the United States because regulators determined that the ban was not stabilizing stock values.

However, in 2008 and 2009, the Securities and Exchange Commission imposed new restrictions on short selling. In October 2008, it required that short-sellers borrow and deliver the shares to the buyers within three days. This rule is important because there were many cases in which brokerage firms were allowing speculators to engage in naked shorting, in which they sell a stock short without first borrowing the stock. Therefore, speculators were able to take larger short positions than would have been possible if they were required to first borrow the shares that they were selling, which resulted in more downward pressure on the stock’s prices. This new rule by the SEC was a stronger version of an SEC rule implemented to prevent naked short selling in 2005 (called Regulation SHO), which applied only to specific stocks and was not strictly enforced.

In 2009, the SEC also reinstated the uptick rule (previously eliminated in 2007), which prohibits speculators from taking a short position in stocks that experienced a decline of at least 10 percent for the day, except when the most recent trade resulted in an increase in the stock price. This rule is intended to prevent short selling in response to a stock’s continuous downward price momentum.
Transactions on the stock exchanges and the Nasdaq are facilitated by floor brokers and market-makers.

**Floor Brokers**

Floor brokers are situated on the floor of a stock exchange. There are hundreds of computer booths along the perimeter of the trading floor, where floor brokers receive orders from brokerage firms. The floor brokers then fulfill and execute those orders.

**Example**

Bryan Adams calls his broker at Zepellin Securities, where he has a brokerage account, and requests the purchase of 1,000 shares of stock in Clapton, Inc., which is traded on the NYSE. The broker at Zepellin communicates this information to the NYSE trading floor. A floor broker (who may be an employee of Zepellin or of some other brokerage firm) receives the order at a booth and goes to a specific trading post where Clapton stock is traded. There are 20 trading posts on the NYSE, and a different set of stocks is traded at each trading post. The floor broker communicates the desire to purchase 1,000 shares of Clapton stock at a specific price. Other floor brokers who have orders to sell Clapton stock either communicate their willingness to accept the bid or signal the “ask” price at which they would be willing to sell the shares. If the floor brokers can agree on a price, a transaction is executed. The transaction is recorded and transmitted to the tape display. Bryan will likely receive a message from the broker indicating that the trade was executed, and he will receive confirmation in the mail within three days. Bryan provides payment to his brokerage firm within three days.

**Market-Makers**

Market-makers (previously referred to as “specialists” on the NYSE) can serve a broker function by matching up buy and sell orders on the New York Stock Exchange. They gain from accommodating these orders because their bid and ask prices differ. In addition, they also take positions in specific stocks. Market-makers facilitate trading on the NYSE. The role of the market maker has been subject to much controversy. In the past, this role was described as "making a market" in particular stocks. Making a market implies that they stand ready to buy or sell certain stocks even if no other investors are willing to participate. However, it does not mean that such specialists are offsetting all orders by taking the opposite side of every transaction. In fact, many transactions on the NYSE are executed electronically and do not require participation by market-makers.

Transactions in the Nasdaq market are also facilitated by market-makers. They benefit from the difference (spread) between the bid and ask prices and can also take positions in stocks. Some market-makers make a market in a few stocks, while others make a market for many stocks. However, stocks that are more actively traded tend to have a larger number of market-makers.

Market-makers take positions to capitalize on the discrepancy between the prevailing stock price and their own valuation of the stock. When many uninformed investors take buy or sell positions that push a stock’s price away from its fundamental value, the stock price is distorted as a result of the “noise” caused by the uninformed investors (called "noise traders"). Market-makers may take the opposite position of the uninformed investors and therefore stand to benefit if their expectations are correct.

Brokers choose the route by which an order is executed, which means that they determine whether the order will be filled by a specific market-maker. The spread quoted for a given stock may vary among market-makers. Therefore, the manner by which the trade is routed by the broker can affect the size of the spread. Some market-makers compensate brokers for orders routed to them. So, while a brokerage firm may charge a customer only $10 for a trade, it may also receive a payment from the market-maker. The
market-maker may use a wider spread so that it can offer such a payment to the broker. The point is that some customers may pay only $10 for a buy order to be executed, but the order is executed at a price that is relatively high because the market-maker charged a large spread. Customers should attempt to compare not only the fee brokers charge for a trade, but also the spread quoted by the market-maker selected by the brokerage firm. Investors do not have direct control over the routing process, but they can at least select a broker that uses their preferred type of process. The market is not sufficiently transparent for the routing process to be monitored, but technology may soon allow customers to more easily monitor the routing and the quoted spreads.

**The Spread on Stock Transactions**

When investors place an order, they are quoted an ask price, or the price that the broker is asking for that stock. There is also a bid price, or the price at which the broker would purchase the stock. The *spread* is the difference between the ask price and the bid price, and it is commonly measured as a percentage of the ask price.

**EXAMPLE**

Boletto Company stock is quoted by a broker as bid $39.80, ask $40.00. The bid-ask spread is  

\[
\text{Spread} = \frac{\text{Ask Price} - \text{Bid Price}}{\text{Ask Price}} = \frac{\$40.00 - \$39.80}{\$40.00} = 0.5\%
\]

This spread of 0.5 percent implies that if investors purchased the stock and then immediately sold it back before market prices changed, they would incur a cost of 0.5 percent of their investment for the round-trip transaction.

The transaction cost due to the spread is separate from the commission charged by the broker. The spread has declined substantially over time in response to more efficient methods of executing orders and increased competition from electronic communications networks. The spread is influenced by the following factors:

\[
\text{Spread} = f(\text{Order costs}, \text{Inventory costs}, \text{Competition}, \text{Volume}, \text{Risk})
\]

**Order Costs** Order costs are the costs of processing orders, including clearing costs and the costs of recording transactions.

**Inventory Costs** Inventory costs include the cost of maintaining an inventory of a particular stock. There is an opportunity cost because the funds could have been used for some other purpose. If interest rates are relatively high, the opportunity cost of holding an inventory should be relatively high. The higher the inventory costs, the larger the spread that will be established to cover these costs.

**Competition** For stocks traded on the NYSE or the Nasdaq market, having multiple market-makers promotes competition. When more market-makers are competing to sell a particular stock, the spread is likely to be smaller.

**Volume** Stocks that are more liquid have less chance of experiencing an abrupt change in price, and stocks that have a large trading volume are more liquid because there is a sufficient number of buyers and sellers at any time. This liquidity makes it easier to sell a stock at any point in time and therefore reduces the risk of a sudden decline in the stock's price.

**Risk** If the firm represented by a stock has relatively risky operations, its stock price is normally more volatile. Thus, a market-maker is subject to more risk when holding inventory in this type of stock and will therefore set a higher spread.
At any particular moment, the spread can vary among stocks. Those who make a
market for a particular stock are exposed to the risk that the stock’s price could change
abruptly in the secondary market and reduce the value of their position in that stock.
Thus, any factors that affect this type of risk to a stock’s market-maker can affect the
spread of that stock.

Electronic Communication Networks

Electronic communication networks (ECNs) are automated systems for disclosing and
sometimes executing stock trades. The SEC requires that any quote provided by a
market-maker be made available to all market participants. This requirement eliminated
the practice of providing more favorable quotes exclusively to proprietary clients. It also
resulted in significantly lower spreads between quoted bid and ask prices. Electronic
communication networks are appealing to investors because they may allow for more
efficient execution of trades.

Some ECNs focus on market orders. They receive orders and route them through var-
ious networks searching for the best price. Other ECNs receive limit orders and electron-
ically match them up with other orders that are still not fulfilled. Exhibit 12.1 shows
an example of an ECN book at a given moment in time. The book lists the limit buy orders
and limit sell orders that are currently not fulfilled. When a new limit order matches an
existing order, the transaction is immediately executed and the matching order is
removed from the book. If the new limit order cannot immediately be matched to an
existing order on the ECN book, it is added to the book.

Assume that the ECN book shown in Exhibit 12.1 is the book for a particular stock and that a new
limit order is placed to sell 300 shares of that stock at a price of no less than $32.68. This order
can be matched by the order to buy 300 shares at a bid price of $32.68. Upon the execution of this
trade, the order on the ECN book to buy 300 shares at a bid price of $32.68 is removed. Assume now
that a new limit order is placed to purchase 1,400 shares at a price of no more than $32.80. This
order is matched up with the order to sell 400 shares at an ask price of $32.78 and the order to
sell 1,000 shares at $32.80. Then those orders are removed from the ECN book because they have
been fulfilled.

In order to improve execution of orders, both the NYSE and Nasdaq have acquired
companies that developed ECNs.

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**Interaction between Direct Access Brokers and ECNs** A direct access broker is a trading platform on a computer website that allows investors to trade stocks without the use of a broker. The website itself serves as the broker and interacts with ECNs that can execute the trade. Some of the more popular direct access brokers include a division of Charles Schwab (www.schwab.com), Interactive Brokers (www.interactivebrokers.com), and NobleTrading (www.nobletrading.com). Each of these websites offers a variety of trading platforms, which range from those that are easier to use and offer less information to those that are more complex but provide more information. A monthly fee is usually charged for access to a trading platform; the fee is higher for platforms that offer more information.

The advantage of a direct access broker is that investors interested in trading a particular stock can monitor the supply and prices of shares for sale and the demand for shares at various prices on different ECNs. Thus, the market becomes more transparent because investors can visualize the overall supply and demand conditions at various possible prices. Investors can use this information to determine how stock prices may change in the near future.

The use of direct access brokers and ECNs allows computers to match buyers and sellers without relying on the floor brokers or traders on stock exchanges. The trend is toward a “floorless” exchange in which all trades are executed in cyberspace and orders are submitted and confirmed through automated systems. As this technology is implemented across countries, it may ultimately create a single global floorless exchange where investors can easily trade any security in any country by submitting requests from a personal computer.

**Program Trading**

A common form of computerized trading is program trading, which the NYSE defines as the simultaneous buying and selling of a portfolio comprising at least 15 different stocks with a combined value of more than $1 million. This is a narrow definition, and the term is often used in other contexts. More generally, program trading represents a computerized response by institutional investors to either buy or sell a large basket of stocks in response to movements in a particular stock index.

For example, in one form of program trading, numerous stocks that have become “overpriced” (based on a particular model used to value those stocks) are sold. In other words, program trading may reflect the sale of a large basket of stocks because a stock index just reached an unusually high level, indicating a likely decline in stock prices in the near future. Likewise, the program might call for the purchase of a large basket of stocks because a stock index just reached an unusually low level, indicating a likely increase in stock prices in the near future.

Institutional investors establish their own unique program trading strategies. In fact, the trigger that leads one institutional investor to buy a large basket of stocks might lead another to sell a large basket of stocks. The most common program traders are large securities firms. They conduct the trades for their own accounts or for other institutional investors such as pension funds, mutual funds, and insurance companies.

Program trading can be combined with the trading of stock index futures to create portfolio insurance. With this strategy, the investor uses futures or options contracts on a stock index. Thus, a decline in the market would result in a gain on the futures or options position, which can offset the reduced market value of the stock portfolio.

**Impact of Program Trading on Stock Volatility** Program trading is often cited as the cause of a decline or rise in the stock market. The underlying reason for a large amount of program trading, however, is that institutional investors believe that
numerous stocks are over- or undervalued. Although program trading can cause share prices to reach a new equilibrium more rapidly, this does not imply that it causes more volatility in the stock market.

Yet on May 6, 2010, stock prices declined abruptly in what is now referred to as the “flash crash.” Overall, stocks declined by more than 9 percent on average before reversing and recovering most of those losses on that same day, when more than 19 billion shares were traded. It appears that the flash crash was triggered by computerized trading. Computers were programmed to trade based on specific trigger points—for example, automatically selling shares if a stock index declined by a certain percentage. These automated sales of shares pushed the stock levels lower, which triggered additional sales by computers. Finally, the stock index levels reached such low levels that the computer programs were triggered to start purchasing shares. Most of this activity occurred in a 30-minute period, the most volatile half hour in the history of the New York Stock Exchange.

**Regulation of Stock Trading**

Regulation of stock markets is necessary to ensure that investors are treated fairly. Without regulation, there would be more trading abuses that would discourage many investors from participating in the market. Stock trading is regulated by the individual exchanges and by the SEC. The **Securities Act of 1933** and the **Securities Exchange Act of 1934** were enacted to prevent unfair or unethical trading practices on the security exchanges. As a result of the 1934 act, stock exchanges were empowered and expected to discipline individuals or firms that violate regulations imposed by the exchange. The NYSE states that every transaction made at the exchange is under surveillance. The NYSE uses a computerized system to detect unusual trading of any particular stock that is traded on the exchange. It also employs personnel who investigate any abnormal price or trading volume of a particular stock or unusual trading practices of individuals.

In 2002, the NYSE issued a regulation requiring its listed firms to have a majority of independent directors (not employees of the firm) on their respective boards of directors. This requirement was intended to reduce directors’ potential conflicts of interests so that they will concentrate on ensuring the firm’s management is focused on maximizing the stock’s value for shareholders.

**Circuit Breakers**

Stock exchanges can impose **circuit breakers**, which are restrictions on trading when stock prices or a stock index reaches a specified threshold level. In general, circuit breakers are intended to temporarily stop the trading of stocks in response to a large decline in stock prices within a single day. They may prevent an initial pronounced stock market decline from causing panic selling in the market. See [http://www.nyse.com/press/circuit_breakers.html](http://www.nyse.com/press/circuit_breakers.html) for more information on circuit breakers.

**Trading Halts**

Stock exchanges may impose trading halts on particular stocks when they believe market participants need more time to receive and absorb material information that could affect the stock’s value. They have imposed trading halts on stocks that are associated with mergers, earnings reports, lawsuits, and other news. A trading halt does not prevent a stock from experiencing a loss in response to news. Instead, the purpose of the halt is to ensure that the market has complete information before trading on the news. A trading halt may last for just a few minutes or for several hours or even for several days. Once the stock exchange believes that the market has complete information, it will allow trading to resume.
Trading halts are intended to reduce stock price volatility, as the market price is adjusted by market forces in response to news. Thus, the halts can prevent excessive optimism or pessimism about a stock by restricting trading until the news about the firm is completely and widely disseminated to the market. However, some critics believe that the trading halts slow the inevitable adjustment in the stock’s price to the news. In general, research has found that stock volatility is relatively high after a halt is lifted but that the volatility subsides over the next few days.

**Securities and Exchange Commission**

The Securities Act of 1933 and the Securities Exchange Act of 1934 gave the Securities and Exchange Commission authority to monitor the exchanges and required listed companies to file a registration statement and financial reports with the SEC and the exchanges. In general, the SEC attempts to protect investors by ensuring full disclosure of pertinent information that could affect the values of securities. In particular, some of the more relevant SEC regulations involve the following requirements.

- Firms must publicly disclose all information about themselves that could affect the value of their securities.
- Employees of firms may take positions in their own firm’s securities only during periods when they do not know of inside information that will affect the value of the firm once the information becomes public.
- Participants in security markets who facilitate trades must work in a fair and orderly manner.

These regulations are meant to prevent abuses that would give someone an unfair advantage over other investors, reducing the willingness of investors to participate in security markets. The SEC regulations allow all investors to have the same access to public information. Note that the SEC’s focus is on sufficient disclosure, not on accuracy; it relies on auditors to certify that the financial statements are accurate.

**Structure of the SEC**

The SEC consists of five commissioners appointed by the President of the United States and confirmed by the Senate. Each commissioner serves a five-year term. The terms are staggered so that, each year, one commissioner’s term ends and a new appointee is added. The president also selects one of the five commissioners to chair the commission.

The commissioners meet to assess whether existing regulations are successfully preventing abuses and to revise the regulations as needed. Specific staff members of the SEC may be assigned to develop a proposal for a new regulation to prevent a particular abuse that is occurring. When the commission adopts new regulations, they are distributed to the public for feedback before final approval. Some of the more important proposals are subject to congressional review before final approval.

**Key Divisions of the SEC**

The SEC has several important divisions that attempt to ensure a fair and orderly stock market. The Division of Corporate Finance reviews the registration statement filed when a firm goes public, corporate filings for annual and quarterly reports, and proxy statements that involve voting for board members or other corporate issues. The Division of Market Regulation requires the orderly disclosure of securities trades by various organizations that facilitate the trading of securities. The Division of Enforcement assesses possible violations of the SEC’s regulations and can take action against individuals or firms. An investigation can involve the examination of securities data or transactions, and the SEC has subpoena power to obtain information from specific individuals. When the SEC finds that action is warranted, it may negotiate
a settlement with the individuals or firms that are cited for violations, file a case against them in federal court, or even work with law enforcement agencies if the violations involve criminal activity. Such actions are normally intended to prevent the violations from continuing and to discourage other individuals or firms from engaging in illegal securities activities.

**SEC Oversight of Corporate Disclosure** In October 2000, the SEC issued Regulation Fair Disclosure (FD), which requires firms to disclose relevant information broadly to investors at the same time. One of the most important results of Regulation FD is that a firm may no longer provide analysts with information that they could use before the market was aware of the information. Before Regulation FD, some firms would commonly hint to analysts that their earnings would be higher than initially anticipated. Thus, the analysts could advise their preferred clients to purchase the stocks before the price was pushed up by the increased demand for shares by other investors who received the information later.

Since the implementation of Regulation FD, a firm must announce a change in expected earnings to all investors and other interested parties (such as analysts) at the same time. The firm may disclose the information on its website, through a filing of a document (8-K form) with the SEC, and through a news release. The firm may hold a conference call with analysts after the news is announced, but is expected to include all material information in the announcement. Thus, the conference call will not give analysts an unfair advantage because the key information has already been disclosed. In addition, most firms have now opened up their conference calls to investors, who can listen in by phone or online through a website. Analysts who always relied on their own analytical abilities to develop their recommendations are continuing business as usual, but analysts who relied on what might be considered inside information from firms have had to modify their methods of forming opinions about the firms they cover.

Some analysts suggest that the regulation has caused firms to disclose less information to them and to the public than before. To ensure that they do not violate Regulation FD, some firms may offer less information so that no parties have an unfair advantage. In particular, smaller firms find it expensive to issue a press release every time they have relevant information. The SEC is reviewing Regulation FD, which may be altered to continue allowing for a flow of information from firms while ensuring that investors receive this information at the same time as analysts.

**Trading International Stocks**

Although the international trading of stocks has grown over time, until recently it was limited by three barriers: transaction costs, information costs, and exchange rate risk. Now, however, these barriers have been reduced, as explained next.

**Reduction in Transaction Costs**

Most countries have their own stock exchanges where the stocks of local, publicly held companies are traded. In recent years, countries have consolidated their exchanges, increasing efficiency and reducing transaction costs. Some European stock exchanges use an extensive cross-listing system (called Eurolist) so that investors in a given European country can easily purchase stocks of companies based in other European countries.

Many international stock exchanges (such as that used in Switzerland and in Belgium) are now fully computerized, so a trading floor is not needed to execute orders. The details of the orders (including the stock’s name, the number of shares to be bought or sold, and the price at which the investor is willing to buy or sell) are fed into a computer...
system. The system matches buyers and sellers and then sends information confirming the transaction to the financial institution, which informs the investor that the transaction has been completed.

When there are many more buy orders than sell orders for a given stock, the computer will not be able to accommodate all orders. Some buyers will then increase the price they are willing to pay for the stock. Thus, the price adjusts in response to the demand (buy orders) for the stock and the supply (sell orders) of the stock for sale, as recorded by the computer system. Furthermore, the Internet allows investors to use their computers to place orders (through the website of a member of the stock exchange) that will then be executed and confirmed by the computer system back through the Internet to the investor. Thus all parts of the trading process, from the placement of orders to the confirmations that transactions have been executed, will be conducted by computers. The ease of placing such orders regardless of the investor’s location and that of the stock exchange will likely increase the volume of international stock transactions in the future.

**Reduction in Information Costs**

Information about foreign stocks is now available on the Internet, enabling investors to make more informed decisions without having to purchase information about these stocks. Consequently, investors should be more comfortable assessing foreign stocks. Differences in accounting rules may still limit the degree to which financial data about foreign companies can be interpreted or compared to data about firms in other countries, but there has been some progress in making accounting standards uniform across countries.

**Reduction in Exchange Rate Risk**

When investing in a foreign stock denominated in a foreign currency, investors are subject to the possibility that the currency denominating the stock will depreciate against the investor’s currency over time. The potential for a major decline in a stock’s value simply because of a large degree of depreciation is greater in emerging markets, such as Indonesia or Russia, where the local currency can change by 10 percent or more on a single day.

The ongoing conversion of European countries to a single currency (the euro) should lead to more stock offerings in Europe by U.S.- and European-based firms. Previously, a European firm needed a different currency in every European country in which it conducted business, so the firm would borrow currency from local banks in each country. Now that firm can use the euro to finance its operations across several European countries and may be able to obtain all the financing it needs with one stock offering denominated in euros. The firm can then use a portion of the revenue (in euros) to pay dividends to shareholders who have purchased the stock. In addition, European investors based in countries where the euro serves as the local currency can now invest in euro-denominated stocks in other European countries without being exposed to exchange rate risk.

**Summary**

- Investors engage in various types of stock transactions. They can place an order by phone or online. They can request that a transaction be executed at the prevailing price or only if the stock price reaches a specified level. They can finance a portion of their stock purchase with borrowed funds as a means of increasing the potential return on their investment. They can also sell stocks short.
- Organized stock exchanges such as the NYSE and the Nasdaq market facilitate secondary stock market
transactions. Members of the exchanges trade stock for their own accounts or for their clients. The exchanges are served by floor brokers and market-makers, who execute transactions. An over-the-counter exchange also exists, where stock transactions are executed through a telecommunications network. Electronic communication networks (ECNs) facilitate the execution of orders. ECNs can interact with a trading platform on a website that allows investors to trade stocks without the use of a broker.

Stock markets are regulated to ensure that investors are treated fairly. Stock trading is regulated by the individual exchanges and by the SEC. Many of the regulations are intended to prevent unfair or unethical trading practices on the security exchanges. The stock exchanges and the SEC attempt to prevent the use of inside information by investors.

As various stock markets have removed their barriers to foreign investors, they have become more globally integrated. Transaction costs, information costs, and exchange rate risk have all been reduced, making it easier for investors to engage in international stock trading.

**Point Counter-Point**

Is a Market-Maker Needed?

**Point** Yes. A market-maker can make a market by serving as the counterparty on a transaction. Without market-makers, stock orders might be heavily weighted toward buys or sells, and price movements would be more volatile.

**Counter-Point** No. Market-makers do not prevent stock prices from declining. A stock that has more selling pressure than buying pressure will experience a decline in price, as it should. The electronic communication networks can serve as the intermediary between buyer and seller.

**Who Is Correct?** Use the Internet to learn more about this issue and then formulate your own opinion.

**Questions and Applications**

1. **Orders** Explain the difference between a market order and a limit order.

2. **Margins** Explain how margin requirements can affect the potential return and risk from investing in a stock. What is the maintenance margin?

3. **Short Selling** Under what conditions might investors consider short selling a specific stock?

4. **Short Selling** Describe the short-selling process. Explain the short interest ratio.

5. **Market-Makers** Describe the roles of market-makers.

6. **ECNs** What are electronic communication networks (ECNs)?

7. **SEC Structure and Role** Briefly describe the structure and role of the Securities and Exchange Commission (SEC).

8. **SEC Enforcement** Explain how the Securities and Exchange Commission attempts to prevent violations of SEC regulations.

9. **Circuit Breakers** Explain how circuit breakers are used to reduce the likelihood of a large stock market crash.

10. **Trading Halts** Why are trading halts sometimes imposed on particular stocks?

**Advanced Questions**

11. **Reg FD** What are the implications of Regulation FD?

12. **Stock Exchange Transaction Costs** Explain how foreign stock exchanges such as the Swiss stock exchange have reduced transaction costs.

13. **Bid-Ask Spread of Penny Stocks** Your friend just told you about a penny stock he purchased, which increased in price from $0.10 to $0.50 per share. You start investigating penny stocks and, after conducting a large amount of research, you find a stock with a quoted price of $0.05. Upon further investigation, you notice that the ask price for the stock is $0.08 and that the bid price is $0.01.
Discuss the possible reasons for this wide bid–ask spread.

14. Ban on Short Selling Why did the SEC impose a temporary ban on short sales of specific stocks in 2008? Do you think a ban on short selling is effective?

Interpreting Financial News

Interpret the following statements made by Wall Street analysts and portfolio managers.

a. “Individual investors who purchase stock on margin might as well go to Vegas.”

b. “During a major stock market downturn, market-makers suddenly are not available.”

c. “The trading floor may become extinct due to ECNs.”

Managing in Financial Markets

Focus on Heavily Shorted Stocks As a portfolio manager, you commonly take short positions in stocks that have a high short interest ratio. What is the advantage of focusing on these types of firms? What is a possible disadvantage?

PROBLEMS

1. Buying on Margin Assume that Vogl stock is priced at $50 per share and pays a dividend of $1 per share. An investor purchases the stock on margin, paying $30 per share and borrowing the remainder from the brokerage firm at 10 percent annualized interest. If, after one year, the stock is sold at a price of $60 per share, what is the return to the investor?

2. Buying on Margin Assume that Duever stock is priced at $80 per share and pays a dividend of $2 per share. An investor purchases the stock on margin, paying $50 per share and borrowing the remainder from the brokerage firm at 12 percent annualized interest. If, after one year, the stock is sold at a price of $90 per share, what is the return to the investor?

3. Buying on Margin Suppose that you buy a stock for $48 by paying $25 and borrowing the remaining $23 from a brokerage firm at 8 percent annualized interest. The stock pays an annual dividend of $0.80 per share, and after one year you are able to sell it for $65. Calculate your return on the stock. Then, calculate the return on the stock if you had used only personal funds to make the purchase. Repeat the problem assuming that only personal funds are used and that you are able to sell the stock at $40 at the end of one year.

4. Buying on Margin How would the return on a stock be affected by a lower initial investment (and higher loan amount)? Explain the relationship between the proportion of funds borrowed and the return.

Flow of Funds Exercise

Shorting Stocks

Recall that if the economy continues to be strong, Carson Company may need to increase its production capacity by about 50 percent over the next few years to satisfy demand. It would need financing to expand and accommodate the increase in production. Recall that the yield curve is currently upward sloping. Also recall that Carson is concerned about a possible slowing of the economy because of potential Fed actions to reduce inflation. It is also considering issuing stock or bonds to raise funds in the next year.

a. In some cases, a stock’s price is too high or too low because of asymmetric information (information known by the firm but not by investors). How can Carson attempt to minimize asymmetric information?

b. Carson Company is concerned that if it issues stock, its stock price over time could be adversely affected by certain institutional investors that take large short positions in a stock. When this happens, the stock’s price may be undervalued because of the pressure on the price caused by the large short positions. What can Carson do to counter major short positions taken by institutional investors if it really believes that its stock price should be higher? What is the potential risk involved in this strategy?
INTERNET/EXCEL EXERCISES

1. Go to http://finance.yahoo.com/ and insert the ticker symbol of the firm of your choice in the “Get Quotes” section. Review the statistics provided. What is the average daily trading volume (Avg Vol)? What is the market capitalization of the firm? What is its price–earnings ratio (P/E)? What is the amount of dividends paid, if any, and what is the dividend yield (Div & Yield)?

2. For the same firm, click on ”Key Statistics.” What is the firm’s beta? What are its return on assets (ROA) and return on equity (ROE)? What is its short ratio?

ONLINE ARTICLES WITH REAL-WORLD EXAMPLES

Find a recent practical article available online that describes a real-world example regarding a specific financial institution or financial market that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary of the article there and provide a link to the article so that other students can access it. If your class is live, your professor may ask you to summarize your application of the article in class. Your professor may assign specific students to complete this assignment or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples related to this chapter, consider using the following search terms (be sure to include the prevailing year as a search term to ensure that the online articles are recent):

1. stock AND transaction cost
2. stock loss AND margin requirement
3. buying on margin AND risk
4. short selling AND gains
5. short selling AND risk
6. stock AND bid/ask spread
7. stock AND market-makers
8. stock AND ECNs
9. stock regulations AND conflict
10. international stock AND transaction cost