**Investment Market Characteristics**

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# Introduction

The solutions to many financial problems involve trading securities and contracts. Investors and borrowers trade securities when they want to move money from the present to the future or vice versa, and when they want to close their positions. Risk managers trade contracts when they want to decrease or increase their exposure to risks that concern them. Speculators trade securities and contracts when they believe that they are not properly valued in the marketplace. These trades all take place in financial markets organized by brokers (agents who fill orders for but do not trade with their clients), dealers (traders who fill their clients’ orders by trading with them), exchanges, or financial information vendors.

This chapter discusses how investors, speculators, hedgers, corporations, and governments use financial markets to arrange trades. You will learn how these markets operate, how traders use them, and the value of their efficient operation.

The discussion starts with an introduction to the orders that investors use to indicate what trades they need to arrange to create long, short, and levered positions in securities and contracts. The chapter next considers how the financial markets are structured, how they operate, and why efficient markets are valuable.

# Primary Security Markets

*Primary security markets* are the markets in which issuers sell their securities to investors. *Issuers* are entities—typically corporations and governments—that sell securities such as stocks and bonds to raise money. An issuer makes an *initial public offering* (*IPO*)—sometimes called a *placing—*of a security issue when it sells the security to the public for the first time.

A *seasoned security* is a security that an issuer has already issued. If the issuer wants to sell additional units of a seasoned security, it makes a *seasoned offering*. Both types of offerings occur in the *primary market* where issuers sell their securities to investors. Later, if investors trade these securities among themselves, they trade in *secondary markets*.

## Public Offerings

Corporations generally contract with investment banks to help them sell their securities to the public. The investment banks then line up *subscribers* who will buy the security. Investment bankers call this process *book building*. In London, the book builder is called the *book runner*. The bank tries to build a book of orders to which they can sell the offering. Investment banks often support their book building by providing investment information and opinion about the issuer to their clients and to the public. Before the offering, the issuer generally makes a very detailed disclosure of its business, of the risks inherent in it, and of the uses for the funds.

When time is of the essence, European issuers may issue securities through an *accelerated book build* in which the investment bank arranges the offering in only one or two days. Such sales often occur at discounted prices.

The first public offering of common stock in a company consists of newly issued shares to be sold by the company. It may also include shares that the founders and other early investors in the company seek to sell. The initial public offering provides these investors with a means of liquidating their investments.

In an *underwritten offering*—the most common offering type—the investment bank guarantees the sale of the issue at an offering price that it negotiates with the issuer. If the issue is undersubscribed, the bank will buy whatever securities it cannot sell to the public at the offering price. In the case of an IPO, the underwriter also usually promises to make a market in the security for about a month to ensure that the secondary market will be liquid and to provide price support, if necessary. For large issues, a *syndicate* of investment banks and broker-dealers helps the *lead underwriter* build the book. The issuer usually pays an underwriting fee of about 7% for these various services. The underwriting fee is a *placement cost* of the offering.

In a *best efforts offering*, the investment bank acts only as broker. If the offering is undersubscribed, the issuer will not sell as many securities and may not be able to raise as much capital as it had planned.

For both types of offerings, the issuer and the bank usually jointly set the offering price following a negotiation. If they set a price that investors consider too high, the offering will be undersubscribed, and they will fail to sell the entire issue. If they set the price too low, the offering will be oversubscribed, in which case the securities are often allocated to preferred clients or on a pro-rata basis.

Investment banks have a conflict of interest with respect to the offering price in underwritten offerings. As agents for the issuers, they generally should select the offering price that will raise the most money. But as underwriters, they have strong incentives to choose a low price. If the price is low, the banks can allocate valuable shares to benefit their clients and thereby indirectly benefit the banks. If the price is too high, the underwriters will have to buy overvalued shares in the offering and perhaps also during the following month if they must support the price in the secondary market. Both types of purchases will be costly to the banks. These considerations tend to lower initial offering prices so that prices in the secondary market often rise immediately following an IPO. They are less important in a seasoned offering because trading in the secondary market helps identify the proper price for the offering.

First time issuers generally accept lower offering prices because they and many others believe that an undersubscribed IPO conveys very unfavorable information to the market about the firm’s prospects at a time when the corporation is most vulnerable to public opinion about its prospects. They fear that an undersubscribed initial public offering will make it substantially harder to raise additional capital in subsequent seasoned offerings.

## Private Placements and Other Primary Market Transactions

Corporations sometimes issue their securities to select investors in private placements. In a *private placement*, corporations sell securities directly to a small group of qualified investors, usually with the assistance of an investment bank. *Qualified investors* have sufficient knowledge and experience to recognize the risks that they assume, and sufficient wealth to assume those risks responsibly. Most countries allow corporations to do private placements without nearly as much public disclosure as is required for public offerings. Private placements therefore may be cheaper than public offerings, but the buyers generally require higher returns (lower purchase prices) because they cannot subsequently trade the securities in an organized secondary market.

Private investments in public equities are known as *PIPEs*. PIPEs may include common stocks, preferred stocks, or convertible debt securities.

Corporations sometimes sell new issues of seasoned securities directly to the public on a piecemeal basis via a shelf registration. In a *shelf registration*, the corporation makes all public disclosures that it would for a regular offering, but it does not sell the shares in a single transaction. Instead, it sells the shares directly into the secondary market over time when it needs additional capital. Shelf registrations provide corporations with flexibility over the timing of their capital transactions, and they can alleviate the downward price pressures often associated with large secondary offerings.

Many corporations may also issue shares via *dividend reinvestment plans* (*DRP*s or *DRIP*s, for short) that allow their shareholders to reinvest their dividends in newly issued shares of the corporation. These plans sometimes also allow existing shareholders and other investors to buy additional stock at a slight discount to current prices.

Finally, corporations also can issue new stock via a rights offering. In a *rights offering*, the corporation distributes rights to buy stock at a fixed price to existing shareholders in proportion to their holdings. Since the rights need not be exercised, they are options. However, the exercise price is set below the current market price of the stock so that buying stock with the rights is immediately profitable. Consequently, shareholders will experience dilution in the value of their existing shares. They can offset the dilution loss by exercising their rights or by selling the rights to others who will exercise them. Shareholders generally do not like rights offerings because they must provide additional capital (or sell their rights) to avoid losses through dilution. Financial analysts recognize that these securities, although called rights, are actually short-term stock warrants and value them accordingly.

The national governments of financially strong countries generally issue their bonds, notes, and bills in public auctions organized by a branch of the government, usually the finance ministry. They may also sell them directly to dealers who then resell them to their clients.

Smaller and less financially secure national governments and most regional governments often contract with investment banks to help them sell and distribute their securities. However, the laws of many governments require that they auction their securities.

## Importance of Secondary Markets to Primary Markets

Corporations and governments can raise money in the primary markets at lower cost when their securities will trade in liquid secondary markets. In a *liquid market*, traders can buy or sell with low transaction costs and small price concessions when they want to trade. Buyers value liquidity because they may need to sell their securities to raise cash. Investors thus will pay more for securities that they can easily sell than for those that are expensive to sell. Higher prices translate into lower costs of capital for the issuers.

# Secondary Security and Contract Market Structures

Trading is the successful outcome to a *bilateral search* in which buyers look for sellers and sellers look for buyers. Many market structures have been developed to reduce the costs of this search. Markets are liquid when the costs of finding a suitable counterparty to a trade are low.

Trading in securities and contracts takes place in many different market structures. The structures differ by when trades can be arranged, who arranges the trades, how they do so, and how traders learn about possible trading opportunities and executed trades. This section introduces the various market structures used to trade securities and contracts, first considering trading sessions, then execution mechanisms, and finally market information systems.

## Trading Sessions

Markets are organized as call markets or as continuous trading markets. In a *call market*, participants can arrange trades only when the market is called at a particular time and place. In contrast, in a *continuous trading market*, participants can arrange and execute trades anytime the market is open.

Buyers can easily find sellers and vice versa in call markets because all traders interested in trading (or orders representing their interests) are present at the same time and place. Call markets thus have the potential to be very liquid when they are called. But they are completely illiquid between calls. In contrast, traders can arrange and execute their trades at any time in continuous trading markets, but doing so can be difficult if the buyers and sellers (or their orders) are not both present at the same time.

Most call markets use single price auctions to match buyers to sellers. In these auctions, the market constructs order books representing all buy orders and all sell orders. The market then chooses a single trade price that will maximize the total volume of trade. The order books are supply and demand schedules, and the point where they cross determines the trade price.

Call markets usually convene just once a day, but some markets organize calls at more frequent intervals.

Many continuous trading markets start their trading session with a call market auction. During a pre-opening period, traders submit their orders for the market call. At the opening, any possible trades are arranged and then trading continues in the continuous trading session. Some continuous markets also close their trading with a call. In these markets, traders who are only interested in trading in the closing call submit market- or limit-on-close orders.

## Execution Mechanisms

The three main types of market structures are quote-driven markets (sometimes called price-driven), order-driven markets, and brokered markets. In *quote-driven market*s, customers trade with dealers. In *order-driven markets*, an order matching system run by an exchange, a broker, or an alternative trading system uses rules to arrange trades based on the orders that traders submit. Most exchanges, ECNs, and multilateral trading systems (MTSs) organize order-driven markets. In *brokered markets*, brokers arrange trades between their customers. Brokered markets are common for transactions of unique items such as real estate properties, intellectual properties, or large blocks of securities. Many trading systems employ more than one type of market structure.

### Quote-driven Markets

Worldwide, most trading takes place in quote-driven markets. Almost all bonds and currencies, and most spot commodities trade in quote-driven markets, also called dealer markets. Traders call them quote-driven (or price-driven) markets because customers trade at the prices quoted by dealers. Depending on the instrument traded, the dealers work for commercial banks, investment banks, broker-dealers, or proprietary trading houses.

Quote-driven markets also often are called *over-the-counter* (*OTC*) markets because securities once literally traded over a counter in the dealer’s office. Now most trades in OTC markets are conducted over proprietary computer communications networks, by telephone, or sometimes over instant messaging systems.

### Order-driven Markets

Order-driven markets arrange trades using rules to match buy orders to sell orders. The orders may be submitted by customers or by dealers. Almost all exchanges use order-driven trading systems, and every automated trading system is an order-driven system. Futures contracts, most standard options contracts, and many stocks trade in order-driven markets.

Since rules match buyers to sellers, traders often trade with complete strangers. Order-driven systems thus must have settlement systems to ensure that buyers and sellers perform on their trade contracts. Otherwise, dishonest traders would enter contracts that they would not settle if a change in market conditions made settlement unprofitable.

Two sets of rules characterize order-driven market mechanisms: Order-matching rules and trade-pricing rules. The *order-matching rules* match buy orders to sell orders. The *trade-pricing rules* determine the prices at which the matched trades take place.

#### Order-Matching Rules

Order-driven trading systems match buyers to sellers using rules that rank buy orders and sell orders based on price, and often other secondary criteria. The systems match the highest-ranking buy order with the highest-ranking sell order. If the buyer is willing to pay at least as much as the seller is willing to receive, the system will arrange a trade for the minimum of the buy and sell quantities. The remaining size, if any, then is matched with the next order on the other side and the process continues until the system can arrange no further trades.

The *order precedence hierarchy* determines which orders go first. The first rule is always *price priority*: The highest priced buy orders and the lowest priced sell orders go first. They are the most aggressively priced orders. *Secondary precedence rules* determine how to rank orders at the same price. Most trading systems use *time precedence* to rank these orders. The first order to arrive at a given price has precedence over other orders at that price. In trading systems that permit hidden and partially hidden orders, displayed quantities at a given price generally have precedence over the undisplayed quantities so that the complete precedence hierarchy is given by price priority, display precedence at a given price, and finally time precedence among all orders with the same display status at a given price. These rules give traders incentives to improve price, display their orders, and arrive early if they want to trade quickly. These incentives increase market liquidity.

#### Trade-Pricing Rules

Once the orders are matched, the trading system then uses its trade-pricing rule to determine trade prices. The three rules that various order-driven markets use to price their trades are the uniform pricing rule, the discriminatory pricing rule, and the derivative pricing rule.

Call markets commonly use the *uniform pricing rule*. Under this rule, all trades execute at the same price. The market chooses the price that maximizes the total quantity traded.

Continuous trading markets use the *discriminatory pricing rule*. Under this rule, the limit price of the order or quote that first arrived—the standing order—determines the trade price. This rule allows a large arriving trader to discriminate among standing limit orders by filling the most aggressively priced orders first at their limit prices and then filling less aggressively priced orders at their less favorable (from the point of view of the arriving trader) limit prices. If trading systems did not use this pricing rule, large traders would break their orders into pieces to price discriminate on their own.

For example, suppose that before the arrival of a large order, a market has the following limit orders standing on its book:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Buyer | Bid size | Limit price | Offer size | Seller |
| Takumi | 15 | ¥100.1 |  |  |
| Hiroto | 8 | ¥100.2 |  |  |
| Shou | 10 | ¥100.3 |  |  |
|  |  | ¥100.4 | 4 | Hina |
|  |  | ¥100.5 | 6 | Sakur |
|  |  | ¥100.6 | 12 | Miku |

Now suppose that buyer Tsubasa submits a day order to buy 15 contracts, limit ¥100.5. Tsubasa’s buy order first fills with the most aggressively priced sell order, which is Hina’s order for four contracts. A trade takes place at ¥100.4 for four contracts, Hina’s order fills completely, and Tsubasa still has 11 more contracts remaining.

The next most aggressively priced sell order is Sakur’s order for six contracts. A second trade takes place at ¥100.5 for six contracts, Sakur’s order fills completely, and Tsubasa still has five more contracts remaining.

The next most aggressively priced sell order is Miku’s order at ¥100.6. No further trade is possible, however, because her limit sell price is above Tsubasa’s limit buy price. Tsubasa’s average trade price is , which is less than the ¥100.6 price he would have had to pay if all trades were executed at the same price.

Since Tsubasa issued a day order, the five remaining contracts of his order are placed on the book on the buy side at ¥100.5. The following orders are then on the book:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Buyer | Bid size | Limit price | Offer size | Seller |
| Takumi | 15 | ¥100.1 |  |  |
| Hiroto | 8 | ¥100.2 |  |  |
| Shou | 10 | ¥100.3 |  |  |
|  |  | ¥100.4 |  |  |
| Tsubasa | 5 | ¥100.5 |  |  |
|  |  | ¥100.6 | 12 | Miku |

Had Tsubasa issued an immediate-or-cancel order, the remainder of the order would have been cancelled.

Crossing networks use the derivative pricing rule. *Crossing networks* are trading systems that match buyers and sellers who are willing to trade at prices obtained from other markets. Most systems cross their trades at the midpoint of the best bid and ask quotes published by the exchange at which the security primarily trades. This pricing rule is called a *derivative pricing rule* because the price is derived from another market. In particular, the price does not depend on the orders submitted to the crossing network. Some crossing networks are organized as call markets and others as continuously trading markets. One of the earliest and most important crossing markets is the equity trading system POSIT.

Internalizing dealers also use the derivative pricing rule. An *internalizing* *dealer* is a broker-dealer who fills its client’s marketable orders acting as a proprietary trader as opposed to an agency trader. In particular, the dealer fills client orders by trading with its clients rather than by arranging trades with others on behalf of its clients. Usually the dealer will fill marketable buy orders at the best offer exposed in the market, and marketable sell orders at the best exposed bid. They also often provide slightly better prices. Since their trade prices are derived from prices from other markets, their pricing rule is a derivative pricing rule.

Internalization is controversial because it takes orders away from primary exchanges where they may execute at better prices. For example, if the exchange market is 80 bid, offered at 82, an internalizing dealer may fill a customer buy order at 81.9. However, if the order were sent to the exchange, the buy order might fill at 81—a better price—if a hidden sell limit order was standing at 81.

### Brokered Markets

The third execution mechanism is the *brokered market* in which brokers arrange trades among their clients. Brokers organize markets for assets for which finding a buyer or a seller willing to trade is difficult because the assets are unique and thus of interest only to a limited number of people or institutions. These assets generally are also infrequently traded and expensive to carry in inventory. Examples of such assets include very large blocks of stock, real estate properties, fine art masterpieces, intellectual properties, operating companies, liquor licenses, and taxi medallions. Since dealers generally are unable or unwilling to hold these assets in their inventories, they will not make markets in them. Organizing order-driven markets for these instruments is not sensible because too few traders would submit orders to them.

Successful brokers in these markets try to know everyone who might now or in the future be willing to trade. They spend most of their time on the telephone and in meetings building their client networks.

### Electronic versus Floor-based Trading Systems

Order-driven exchange systems may be organized on trading floors or in electronic trading systems. Although electronic trading systems are rapidly replacing floor-based systems, many floor-based systems continue to operate.

In an electronic trading system, computers conduct the continuous auction. They organize the order book based on the exchange order precedence rules and they arrange trades, when possible, pricing them using their trade-pricing rules. Traders participating in these markets submit electronic orders to these systems.

Trading at floor-based exchanges varies by who organizes the market. At most stock and options exchanges that still maintain floor-based trading systems, exchange clerks or designated dealers manage the continuous auction. Generally with the assistance of electronic systems, they organize the order books using the order precedence rules, they ensure that electronically transmitted orders are fairly represented on the floor, and they conduct the continuous auction in which trades are arranged. Investors participating in these markets usually can submit electronic orders directly to the exchange or they can send orders to floor brokers who will represent them on the exchange floor.

Other floor-based exchanges—typically futures markets—use a pit trading system in which members of the exchange collectively organize the trading. The members consist of floor brokers and dealers. The *floor brokers* arrange trades on behalf of their non-member clients while the dealers, who are often known as *scalpers*, buy and sell for their own accounts.

These markets convene in a *pit*, which literally may be a pit with steps around the sides upon which the traders stand, or the pit may simply be a ring of chairs around an open space. Pits are designed to ensure that all traders have unobstructed sight lines to all other traders. In the pit, the traders shout out their bids and offers orally and often with hand signals with the hope that someone will want to trade with them. Buyers can purchase either by bidding and waiting from someone to hit their bid, or by taking an offer made by a seller. Likewise, sellers can sell either by offering and waiting from someone to take their offer, or by hitting a bid made by a buyer.

To newcomers, pit-based trading seems very chaotic. In fact, the trading generally is very well organized. In particular, exchange rules prohibit traders from bidding and offering when their bids and offers do not represent the best prices in the market. The rules also require that traders arrange their trades with the first buyer to bid a higher price or the first seller to offer a lower price. Experienced floor traders follow these rules exactly, and they quickly discipline those who violate them. The trading appears chaotic because these markets often operate very quickly, the traders generally use sign language to communicate their bids and offers, and because they only shout out the last digits of the price on the assumption that everyone knows the first digits.

Most floor-based exchanges employ reporters to collect trade price information for immediate public dissemination.

## Market Information Systems

Markets vary in the type and quantity of data that they disseminate to the public. Traders say that a market is *pre-trade transparent* if the market publishes real-time data about quotes and orders. Markets are *post-trade transparent* if the market publishes trade prices and sizes soon after trades occur.

Buy-side traders value transparency because it allows them to better manage their trading, understand market values, and estimate their prospective and actual transaction costs. In contrast, dealers prefer to trade in opaque markets because, as frequent traders, they have an informational advantage over those who see less than they do. Bid/ask spreads tend to be wider and transaction costs tend to be higher in opaque markets because finding the best available price is harder for traders in such markets.

# Exchange Service Providers

Exchange service providers are entities that help arrange trades. They include brokers, dealers, exchanges, and alternative trading systems.

## Brokers

*Brokers* are agents who fill orders for their clients. They do not trade with their clients. Instead, they search for traders who are willing to take the other side of their clients’ orders. Individual brokers may work for large brokerage firms, the brokerage arms of banks, or at exchanges. Some brokers match clients to clients personally. Others use specialized computer systems to identify potential trades and help their clients fill their orders. Many simply route their clients’ orders to exchanges or to dealers. Brokers help their clients trade by reducing the costs of finding counterparties for their trades.

*Block brokers* provide brokerage service to large traders. Large orders are hard to fill because finding a counterparty willing to do a large trade is often quite difficult. A large buy order generally will trade at a premium to the current market price, and a large sell order generally will trade at a discount to the current market price. These *price concessions* encourage other traders to trade with the large traders. However, they also make large traders reluctant to expose their orders to the public before their trades are arranged because they do not want to move the market. Block brokers therefore carefully manage the exposure of the orders entrusted to them, which makes filling them difficult.

## Dealers

*Dealers* are proprietary traders who fill their clients’ orders by trading with them. *Proprietary traders* are traders who trade for their own accounts. In contrast, *agency traders* are traders who trade on behalf of their clients. Brokers are agency traders, and dealers are proprietary traders.

Dealers buy from their clients when their clients want to sell securities or contracts. When their clients want buy securities or contracts, the dealers sell them sell them securities or contracts that they own, have borrowed (in the case of a security), or have created (in the case of a contract).

After completing a transaction, every dealer hopes to reverse the transaction by trading with another client on the other side of the market. When dealers buy after they sell or sell after they buy, they effectively connect buyers who arrived at one point in time with sellers who arrived at another point in time.

The service that dealers provide is liquidity. *Liquidity* is the ability to buy or sell with low transactions costs when you want to trade. By allowing their clients to trade when they want to trade, dealers provide liquidity to them.

In *over-the-counter markets*, dealers offer liquidity when their clients ask to trade with them. In exchange markets, dealers offer liquidity to anyone who is willing to trade at the prices that the dealers offer at the exchange.

Dealers profit when they can buy at prices that on average are lower than the prices at which they sell.

Dealers may organize their operations within proprietary trading houses, investment banks, hedge funds, or sole proprietorships. Some dealers are traditional dealers in the sense that individuals make trading decisions. Others use computerized trading systems to make all trading decisions. Examples of companies with large dealing operations include Deutsche Securities (Germany), RBC Capital Markets (Canada), Nomura (Japan), Timber Hill (US), Knight Securities (US), Goldman Sachs (US), and IG Group plc (UK). Almost all investment banks have large dealing operations.

Many dealers also broker orders, and many brokers also deal to their customers in a process called *internalization*. Accordingly, practitioners often use the term *broker-dealer* to refer to brokers who are also dealers. Broker-dealers have a conflict of interest with respect to how they fill their customers’ orders. When acting as a broker, they must seek the best price for their customers’ orders. However, when acting as dealers, they profit most when they sell to their customers at high prices or buy from their customers at low prices. This *dual trading problem* is most serious when customers allow their brokers to decide whether to trade their orders with other traders or to fill them internally. Consequently, when trading with broker-dealers, some customers may specify that they do not want their orders to be internalized. To avoid the dual trading problem, investors also may choose to trade only with *pure agency brokers* who do not also deal.

*Primary dealers* are dealers with whom central banks trade when conducting monetary policy. They buy bills, notes, and bonds when the central banks sell them to decrease the money supply. The dealers then sell these instruments to their clients. Likewise, when the central banks want to increase the money supply, the primary dealers buy these instruments from their clients and sell them to the central banks.

## Exchanges

*Exchanges* provide places where traders can meet to arrange their trades. Historically, brokers and dealers met on an exchange floor to negotiate trades. Increasingly, exchanges now arrange trades for traders based on orders that brokers and dealers submit to them. Such exchanges essentially act as brokers, blurring the distinction between exchanges and brokers. Exchanges and brokers that use electronic order matching systems to arrange trades among their clients are functionally indistinguishable in this respect. Examples of exchanges include the NYSE-Euronext, Eurex, Deutsche Börse, the Chicago Mercantile Exchange, the Tokyo Stock Exchange, and the Singapore Exchange.

Exchanges are most easily distinguished from brokers by their regulatory operations. Most exchanges regulate their members’ behavior when trading on the exchange, and sometimes also away from the exchange.

Many securities exchanges also regulate the issuers that list their securities on the exchange. These regulations generally require timely financial disclosure. Financial analysts use this information to value the securities traded at the exchange. Without such disclosure, valuing securities could be very difficult so that market prices might not reflect the fundamental values of the securities. In such situations, well-informed participants profit from less-informed participants. To avoid such losses, the less-informed participants withdraw from the market, which can greatly increase corporate costs of capital.

Some exchanges also prohibit issuers from creating capital structures that would concentrate voting rights in the hands of a few owners who do not own a commensurate share of the equity. These regulations attempt to ensure that the corporation is run for the benefit of all shareholders and not to promote the interests of controlling shareholders who do not have significant economic stakes in the company.

Exchanges derive their regulatory authority from their national or regional governments, or through the voluntary agreements of their members and issuers to subject themselves to the exchange regulations. In most countries, governmental regulators oversee the exchange rules and the regulatory operations. Most countries also impose financial disclosure standards upon public issuers. Examples of governmental regulatory bodies include the Japanese Financial Services Agency, the Hong Kong Securities and Futures Commission, the British Financial Services Authority, the German Bundesanstalt für Finanzdienstleistungsaufsicht, the U.S. Securities and Exchange Commission, the Ontario Securities Commission, and the Mexican Comisión Nacional Bancaria y de Valores.

## Alternative Trading Systems

*Alternative Trading Systems* (*ATS*s), also known as *Electronic Communications Networks* (*ECN*s) or *Multilateral Trading Facilities* (*MTF*s) are trading venues that function like exchanges but which do not exercise regulatory authority over their subscribers except with respect to the conduct of their trading in their trading systems. Some ATSs operate electronic trading systems that are otherwise indistinguishable from the trading systems operated by exchanges. Others operate innovative trading systems that suggest trades to their customers based on information that their customers share with them or that they obtain through research into their customers’ preferences.

Many ATSs are known as *dark pools* because they do not display the orders that their clients send to them. Large investment managers especially like these systems because market prices often move to their disadvantage when other traders know about their large orders.

ATSs may be owned and operated by broker-dealers, exchanges, banks, or by companies organized solely for this purpose, many of which may be owned by a consortium of brokers-dealers and banks. Examples of ATSs include PureTrading (Canada), the Order Machine (Netherlands), Chi-X Europe, BATS (US), POSIT (US), Liquidnet (US), Baxter-FX (Ireland), and Turquoise (Europe). Many of these ATSs provide services in markets besides the ones in which they are domiciled.

# Positions

The solutions to many financial and risk management problems require taking positions in various assets or contracts. A *position* is the quantity of an instrument that a person or institution owns or owes. A *portfolio* consists of a set of positions.

People have *long positions* when they own assets or contracts. Examples of long positions include ownership of stocks, bonds, currencies, contracts, commodities, or real assets. Long positions gain when prices rise.

People have *short positions* when they have sold assets that they do not own, or when they write and sell contracts. Short positions gain when prices fall. Short sellers profit by selling at high prices and repurchasing at lower prices. Information-motivated traders sell assets and contracts short when they believe that prices will fall.

Hedgers also often sell instruments short. They short securities and contracts when the financial risks inherent in these instruments are positively correlated with the risks to which they are exposed. For example, to hedge the risk associated with holding copper inventories, a wire manufacturer would sell short copper futures. If the price of copper falls, the manufacturer will lose on his copper inventories but gain on his short futures position.

Contracts have long sides and short sides. The *long side* of a forward or futures contract is the side that will take physical delivery or its cash equivalent. The short side of these contracts is the side that must make the delivery.

The identification of the two sides can be confusing for option contracts. The long side of an option contract is the side that holds the right to exercise the option. The short side is the side that must satisfy the obligation. Practitioners say that that the long side *holds* the option and the short side *writes* the option so that the long side is the *holder* and the short side is the *writer*.

The put contracts are the source of the potential confusion. The put contract holder has the right to sell the underlying instrument to the writer. The holder will benefit if the price of the underlying falls, in which case the price of the put contract will rise. The holder is long the put contract and has an indirect short position in the underlying instrument. Analysts call the indirect short position *short exposure* to the underlying. Put contract holders have long exposure to their option contracts and short exposure to the instruments underlying their options contracts.

*Exhibit 2*

*Options positions and their associated underlying risk exposures*

|  |  |  |
| --- | --- | --- |
| Type of option | Option position | Exposure to underlying risk |
| Call | Long | Long |
| Call | Short | Short |
| Put | Long | Short |
| Put | Short | Long |

The identification of the long side in a swap contract is often arbitrary because the swap contracts call for the exchange of contractually determined cash flows rather than for the purchase (or the cash-settled equivalent) of some underlying instrument. In general, the side that benefits from an increase in the quoted price is identified as the long side.

The identification of the long side in currency contracts also may be confusing. For currencies, the confusion stems from symmetry in the contracts. The buyer of one currency is the seller of the other currency, and vice versa for the seller. Thus, a long forward position in one currency is a short forward position in the other currency. When practitioners describe a position, they generally will say, “I’m long the dollar against the yen,” which means that they have bought dollars and sold yen.

## Short Positions

Short sellers create short positions in contracts when they sell contracts that they do not own. In a sense, they become the issuers of the contract when they create the liabilities associated with their contracts. In the same sense, corporations create short positions in their bonds when they issue bonds in exchange for cash. Although bonds are generally considered to be securities, they are also contracts between issuers and their bondholders.

Short sellers create short positions in securities by borrowing securities from long holders who become *security lenders* when they lend their securities. The short sellers then sell the borrowed securities to other traders. Short sellers close their positions by repurchasing the securities and returning them to the security lenders. If the securities drop in value, the short sellers profit because they repurchase the securities at lower prices than the prices at which they sold the securities. If the securities rise in value, they will lose. Short sellers who buy to close their positions are said to *cover their positions*.

The potential gains in a long position generally are unbounded. For example, the stock prices of highly successful firms such as Intel have increased more than 100-fold since they were first publicly traded. However, the potential losses on long positions are limited to no more than 100%—a complete loss—for long positions without any associated liabilities such as margin loans.

In contrast, the potential gains on a short position are limited to no more than 100% while the potential losses are unbounded. The unbounded potential losses on short positions make short positions very risky in volatile instruments. For example, if you shorted 100 shares of Yahoo! in July 1996 at $20 and you kept your position open for four years, you would have lost $148,000 on your $2,000 initial short position. During this period, Yahoo! rose 75-fold to $1,500 on a split-adjusted equivalent basis.

Although security lenders generally believe that they still own the securities that they lend, in fact, they do not actually own the securities during the periods of their loans. (For tax purposes, they remain the beneficial owners of their securities.) Instead, they own promises made by the short sellers to return the securities. These promises are memorialized in *security lending agreements*. These agreements specify that the short sellers will pay the long sellers all dividends or interest that they otherwise would have received had they not lent their securities. These payments are called *payments-in-lieu of dividends* (or *of interest*), and they may have different tax treatments than dividends and interest paid by issuers. The security lending agreements also protect the lenders in the event of a stock split.

To secure the security loans, lenders require that the short seller leave the proceeds of the short sale on deposit with them as collateral for the stock loan. They invest the collateral in short-term securities, and they rebate the interest to the short sellers at rates called *short rebate rates*. The short rebate rates are determined in the market and generally only are available to institutional and large retail short-sellers. If a security is hard to borrow, the rebate rate may be very small or even negative. Such securities are said to be *on special*. Otherwise the rebate rate is usually 10 basis points less than the overnight rate in the interbank funds market. When rebate rates are negative, the payments that short sellers make to security lenders are often called *hard-to-borrow* fees.

Most security loans agreements require *variation margin* payments to keep the counterparty risk among the parties from growing when prices change. *Counterparty risk* is the risk that one of the parties to a contract will fail to honor the contract. For a security loan, the lender risks that the borrower will fail to return the security if it rises in value, and the borrower risks that the lender will fail to return the collateral if the security drops in value. To reduce counterparty risk, the short seller must provide additional collateral to secure the loan if the security rises in value, and the lender must return some of the collateral if the security drops in value. These payments adjust the collateral in response to price changes (price variation).

Security lenders lend their securities because the short rebate rates they pay on the collateral are lower than the interest rates they receive from investing the collateral. The difference primarily is due to the implicit loan fees that they receive from borrowers for lending their securities.

## Levered Positions

In many markets, buyers can buy securities by borrowing some of the purchase price. They usually borrow the money from their brokers. The borrowed money is called the *margin loan*, and they are said to buy *on margin*. The interest rate that the buyers pay for their margin loans is called the *call money rate*. The call money rate is above the government bill rate and is negotiable. Large buyers generally obtain more favorable rates than do retail buyers. For large institutional buyers, the call money rate is quite low because their loans generally are well secured by securities held as collateral by the lender.

*Traders’ equity* is that portion of the security price that the buyer’s capital represents. Traders who buy securities on margin are subject to minimum margin requirements. The *initial margin requirement* is the minimum fraction of the purchase price that must be trader’s equity. This requirement may be set by the government, the exchange, or the exchange clearinghouse. For example, in the United States, the Federal Reserve Board sets the initial margin requirement through *Regulation T*. In Hong Kong, the Securities and Futures Commission sets the margin requirements. In all markets, brokers often require more equity than the government-required minimum from their clients when lending to them.

Some regulators allow brokers to lend their clients more money if the brokers use risk models to measure and control the overall risk of their clients’ portfolios. This system is called *portfolio margining*. Many hedge funds use these facilities to increase their exposure to hedged positions that otherwise would be quite secure.

(A *hedged position* is a portfolio consisting of two or more instruments in which the risks inherent in one asset are offset by opposite risks inherent in the other assets so that the combined position—called the *hedge portfolio*—is less risky than the instruments from which it is composed. For example, a long position in a broad stock market ETF held in combination with a short position in a corresponding broad stock futures contract will be substantially less risky than either of the two instruments held separately.)

Buying securities on margin increases the potential gains or losses for a given amount of equity in a position because the buyer can buy more securities on margin than otherwise. The buyer thus earns greater profits when prices rise and suffers greater losses when prices fall.

The relation between risk and borrowing is called *leverage*. Buyers lever their positions when they borrow to buy more securities. A highly levered position is large relative to the equity that supports it.

The *leverage ratio* is the ratio of the value of the position to the value of the equity in it. It thus indicates how many times larger a position is than the equity that supports it. If the trader’s equity represents 40% of the value of the position, then the leverage ratio is 2.5 (100% position ÷ 40% equity).

The leverage ratio also indicates how much more risky a levered position is relative to an unlevered position. For example, if a stock bought on 40% margin rises 10%, the buyer will experience a 25% (2.5 × 10%) return on the equity investment in her levered position. But if the stock falls by 10%, the return on the equity investment will be -25%. These calculations do not count interest on the margin loan and commission payments, both of which lower realized returns.

If prices drop by more than the buyer’s original margin, the buyer’s equity will become negative. The investor then would owe his broker more than the stock is worth. Brokers often lose money in such situations if the buyer does not repay the loan out of other funds.

To prevent such losses, brokers require that margin buyers always have a minimum amount of equity in their positions. This minimum is called the *maintenance margin requirement*. It is usually 25% of the current value of the position, but it may be higher or lower depending on the volatility of the instrument and the policies of the broker.

If the value of the equity falls below the maintenance margin requirement, the buyer will receive a *margin call*, which is a request for additional equity. If the buyer does not deposit additional equity (money) with the broker in a timely manner, the broker will sell all or part of the position to prevent further losses and thereby secure repayment of the margin loan.

Traders who sell securities short are also subject to margin requirements since they have borrowed securities. Initially, the trader’s equity supporting the short position must be at least equal to the margin requirement times the initial value of the short position. If prices rise, equity will be lost. At some point, the short-seller will have to contribute additional equity to meet the maintenance margin requirement. Otherwise, the broker will buy back the security to cover the short position to prevent further losses and thereby secure repayment of the stock loan.

Many investors, hedge funds, and investment banks get into trouble when they employ too much leverage. In an attempt to obtain greater profits by borrowing to increase their positions, they too often underestimate the risks to which they are exposed. If prices move against their positions, their losses can put them into financial distress, and in the extreme, bankruptcy.

# Orders

Buyers and sellers communicate with the buy-side traders, brokers, dealers, and exchanges that arrange their trades by issuing *orders*. All orders specify what instrument to trade, how much to trade, and whether to buy or sell. Most orders also have other instructions attached to them. These additional instructions may include execution, validity, or settlement instructions. *Execution instructions* indicate how to fill the order. *Validity instructions* indicate when the order may be filled. *Settlement instructions* indicate how to arrange the final settlement of the trade.

At most markets, dealers and various other proprietary traders often are willing to buy from or sell to other traders seeking to sell or buy. The prices at which they are willing to buy are called *bid* prices and those at which they are willing to sell are called *ask* prices, or sometimes *offer* prices. The ask prices are invariably higher than the bid prices.

Traders may also indicate the quantities that they will trade at their bid and offer prices. These quantities are called *bid sizes* for bids and *ask sizes* for offers. Depending on the market, these quotations sizes may or may not be exposed to the public.

Traders *quote a market* when they expose their bids and offers. Dealers often quote both bid and ask prices, in which case they quote a *two-sided market*.

The traders who offer to trade *make a market*. Those who trade with them *take the market*.

The highest bid in the market is the *best bid*, and the lowest ask in the market is the *best offer*. The difference between the best bid and the best offer is the *market bid/ask spread*. The market spread generally is smaller than every dealer’s spread (it can never be more) because dealers often quote better prices on one side of the market than another. Accordingly, the bids and offers that make up the best bid and best offer often come from different traders.

## Quote Formats

When traders ask “What’s the market?” they want to know the best bid and ask prices and their associated sizes. Markets with narrow (small) bid/ask spreads are markets in which the costs of trading are low for orders smaller than the quoted bid and ask sizes.

Traders generally quote stocks and bonds in a standard format. When traders quote only prices, they quote the bid first and then the offer. For example, in response to the question “What’s the market?” a dealer may quote “80 bid, offered at 82.” If in a hurry, the dealer might simply quote “80 up 2,” which would indicate the same information.

The quoted prices might be the full prices, or they may just be the last digits of those prices. For example, if the above quote were for the price of euros in terms of dollars, it might actually represent 1.3580 bid, offered at 1.3582, in which case, the quote requester presumably would be aware that 1.35 precedes the quoted numbers.

When traders quote prices and sizes, they quote the sizes between the prices as follows: “80 bid for 20, 60 offered at 82.” The bid and offer prices are 80 and 82. The bid size is 20 and the offer size is 60.

Note that traders use the word “for” exclusively for bids and “at” exclusively for offers. The standard format

bid price, “bid for,” bid size, offer size, “offered at” offer price

helps ensure that traders are not misunderstood.

In many markets, traders express quotation sizes in standard lots. For example, traders usually quote bonds denominated in euros in thousands of euros of face value. Thus a bid size of 80 presents a bid for €80,000 of bonds, or 80 €1,000-bonds. In institutional markets, traders often express the quotes in millions. The quotation size is also large for bonds denominated in currencies such as the Japanese yen (about 78 yen to the dollar in 2012) or Korean won (about 1,125 won to the dollar) that have small nominal values per unit.

For stocks, lot sizes also vary. In the United States, the typical lot size is 100 shares so that a bid size of 20 represents 2,000 shares. In many other countries, lot sizes depend on share prices with low price stocks having larger lot sizes.

Traders typically quote bond prices in percentage points of face value. Thus a quote of “80 bid” indicates a bid of 80 percent of face value, or €800 for a €1,000 bond.

## Order Execution Instructions

*Execution instructions* indicate how exchanges and brokers should arrange trades for their clients. Market and limit orders are the most common execution instructions. A *market order* instructs the broker or exchange to obtain the best price immediately available when filling the order. A *limit order* conveys almost the same instruction: Obtain the best price immediately available, but in no event accept a price higher than the specified limit price when buying or accept a price lower than the specified limit price when selling.

Many people mistakenly believe that limit orders specify the prices at which the orders will trade. While limit orders often do trade at their limit prices, remember that the first instruction always is to obtain the best price available. If better prices are available than the limit price, brokers and exchanges should, and regularly do, obtain those prices for their clients.

Market orders generally execute immediately if other traders are willing to take the other side of the trade. The main drawback with market orders is that they can be expensive to execute, especially when the order is placed in a market for a thinly traded security, or more generally, when the order is large relative to the normal trading activity in the market. In that case, a market buy order may fill at a high price, or a market sell order may fill at a low price, if no traders are willing to trade at better prices. High purchase prices and low sale prices represent price concessions given to other traders to encourage them to take the other side of the trade. Since the sizes of price concessions can be difficult to predict, and since prices often change between when a trader submits an order and when the order finally fills, execution prices for market orders, especially large ones, are often uncertain.

Buyers and sellers who are concerned about the possibility of trading at unacceptable prices add limit prices to their orders. The main problem with limit orders is that they may not execute. Limit orders do not execute if the limit price on a buy order is too low, or if the limit price on a sell order is too high. For example, if an investment manager submits a limit order to buy limit 20 and nobody is willing to sell at or below 20, the order will not trade. If prices never drop to 20, the manager will never buy. If the price subsequently rises, the manager will have lost the opportunity to profit from the price rise.

Whether traders use market orders or limit orders when trying to arrange trades depends on their concerns about price, trading quickly, and failing to trade. On average, limit orders trade at better prices than do market orders when they trade, but they often do not trade. Traders generally regret when their limit orders fail to trade because they usually would have profited had they traded. Limit buy orders do not fill when prices are rising, and limit sell orders do not fill when prices are falling. In both cases, traders would be better off if their orders had filled.

The probability that a limit order will execute depends on where the order is placed relative to market prices. An aggressively priced order is more likely to trade than is a less aggressively priced order. A limit buy order is *aggressively priced* when the limit price is high relative to the market bid and ask prices. If the limit price is placed above the best offer, the buy order generally will partially or completely fill at the best offer price, depending upon the size available at the best offer. Such limit orders are called *marketable limit orders* because at least part of the order can trade immediately. A limit buy order with a very high price relative to the market is essentially a market order.

If the buy order is placed above the best bid but below the best offer, traders say the order *makes a new market* because it becomes the new best bid. Such orders generally will not immediately trade, but they may attract sellers who want to trade. A buy order placed at the best bid is said to *make market*. It may have to wait until all other buy orders at that price trade first. Finally, a buy order placed below the best bid is *behind the market*. It will not execute unless prices drop. Traders call limit orders that are waiting to trade *standing limit orders*.

Sell limit orders are aggressively priced if the limit price is low relative to market prices. The limit price of a marketable sell limit order is below the best bid. A limit sell order placed between the best bid and the best offer makes a new market on the sell side; one placed at the best offer makes market; and one placed above the best offer is behind the market.

*Exhibit 1*

*Terms Traders Use to Describe Standing Limit Orders*

This exhibit presents a simplified *limit order book* in which orders are presented ranked by their limit prices for a hypothetical market. The market is “26 bid, offered at 28” because the best bid is 26 and the best offer is 28.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Order prices | | | |  |
|  | Bids | | Offers | |  |
|  |  | |  | | The least aggressively priced sell orders are far |
|  |  |  | 33 |  | from the market. |
|  |  |  | 32 |  |  |
|  |  |  | 31  30 |  | These sell orders are *behind the market*. We also say that they are *away from the market*. |
|  |  |  | 29 |  |  |
|  |  |  | **28** |  | The *best offer* is *at the market*. |
| The best bid and best offer make *the market*. |  |  |  |  | The space between the current best bid and offer is *inside the market*. If a new limit order arrives here, it *makes a new market*. |
|  |  | **26** |  |  | The *best bid* is *at the market*. |
|  |  | 25 |  |  |  |
|  |  | 24  23 |  |  | These buy orders *are behind the market*. We also  say that they are *away from the market*. |
|  |  | 22 |  |  |  |
|  |  | 21 |  |  | The least aggressively priced buy orders are far from the market. |

Source: *Trading and Exchanges*, Oxford University Press

A tradeoff exists between how aggressively priced an order is and the ultimate trade price. Although aggressively priced orders fill faster and with more certainty then do less aggressively priced limit orders, the prices at which they execute are inferior. Buyers seeking to trade quickly must pay higher prices to increase the probability of trading quickly. Likewise, sellers seeking to trade quickly must accept lower prices to increase the probability of trading quickly.

Some order execution instructions specify conditions on size. For example, *all-or-nothing orders* (*AON*) can only trade if their entire sizes can be traded. Traders can likewise specify minimum fill sizes. This specification is common where settlement costs depend on the number of trades made to fill an order and not on the aggregate size of the order.

## Order Exposure Instructions

*Exposure instructions* indicate whether, how, and sometimes also to whom orders should be exposed. *Hidden orders* are exposed only to the brokers or exchanges that receive them. These agencies cannot disclose hidden orders to other traders until they can fill the orders. Traders with large orders use hidden orders when they are afraid that other traders might behave strategically if they knew that a large order was in the market. Other traders can discover the hidden size only by submitting orders that will trade with that size. Thus, other traders only can learn about hidden size after they have committed to trading with a hidden order if one is present.

Traders also often indicate a specific *display size* for their orders. Brokers and exchanges then expose only the permitted display size. Any additional size is hidden from the public but can be filled if a suitably large order arrives. Traders sometimes call such orders *iceberg orders* because most of the order is hidden. Traders specify display sizes when they do not want to display their full sizes, but still want other traders to know that someone is willing to trade at the displayed price. Traders on the opposite side who wish to trade additional size at that price can discover the hidden size only if they trade the displayed size, at which point the broker or exchange will display any remaining size up to the display size. They also can discover the hidden size by submitting large orders that will trade with that size.

## Order Validity Instructions

Validity instructions indicate when an order may be filled. The most common validity instruction is the *day order*. A day order is good for the day on which it is submitted. If it has not filled by the close of the trading session, the order expires unfilled.

*Good-till-cancelled orders* (*GTC*) are just that. In practice, most brokers limit how long they will hold an order to ensure that they do not fill orders that their clients have forgotten. Such brokers may limit their GTC orders to a few months.

*Immediate or cancel orders* (*IOC*) are good only upon receipt by the broker or exchange. If they cannot be filled in part or in whole, they cancel immediately. In some markets these orders are also known as *fill or kill orders* (*FOK*). When searching for hidden liquidity, electronic algorithmic trading systems often submit thousands of IOC orders for every order that they fill.

*Good-on-close* orders can only be filled at the close of trading. These orders often are market orders that traders call *market-on-close* orders. Traders often use on-close orders when they want to trade at the same prices that will be published as the closing prices of the day. Mutual funds often like to trade at such prices because they value their portfolios at closing prices. Some traders also use *good-on-open* orders.

### Stop Orders

*A stop order* is an order to which a trader has specified a stop price condition. The stop order may not be filled until the stop price condition has been satisfied. For a sell order, the *stop price condition* suspends execution of the order until a trade occurs at or below the *stop price*. After that trade, the stop condition is satisfied and the order becomes valid for execution, subject to all other execution instructions attached to it. If the market price subsequently rises above the sell order’s stop price before the order trades, the order remains valid. Likewise, a buy order with a stop condition becomes valid only after price rises above the specified stop price.

Traders often call stop orders *stop loss orders* because many traders use them with the hope of stopping losses on positions that they have established. For example, a trader who has bought stock at 40 may want to sell the stock if the price falls below 30. In this case, the trader might submit a GTC, stop 30, market sell order. If price falls to or below 30, the market order becomes valid and it should immediately execute at the best price then available in the market. That price may be substantially lower than 30 if the market is falling quickly. The stop loss order thus does not guarantee to stop losses at the stop price. If potential sellers are worried about trading at too low a price, they can attach stop instructions to limit orders instead of market orders. In this example, if the trader were unwilling to sell below 25 dollars, the trader would submit a GTC, stop 30, limit 25 sell order.

If a trader wants to guarantee that he can sell at 30, the trader would buy a put option contract struck at 30. The purchase price of the option will include a premium for the insurance that the trader is buying. Option contracts can be viewed as limit orders for which execution is guaranteed at the strike price. A trader likewise might use a stop buy order or a call option to limit losses on a short position.

A portfolio manager also might use a stop buy order when the manager believes that a security is undervalued but is unwilling to trade without market confirmation. For example, suppose that a stock currently trades for 50 RMB and a manager believes that it should be worth 100 RMB. Further, the manager believes that the stock will much more likely be worth 100 if other traders are willing to buy it above 65. To take advantage of this information, the manager could issue a GTC, stop 65, limit 100 buy order.

Since sell stop orders become valid when prices are falling and buy stop orders become valid when prices are rising, traders using stop orders contribute to market momentum as their sell orders push prices down further and their buy orders push prices up. Execution prices for stop orders thus often are quite poor.

## Trade Settlement Instructions

*Settlement instructions* tell brokers how to arrange final settlement of trades. Traders generally do not attach these instructions to each order—instead they provide them as standing instructions. These instructions indicate what entity is responsible for settling the trade. For retail trades, that entity is the customer’s broker.

For institutional trades, another broker may settle the trade. When a client employs one broker to arrange trades and another broker to settle trades, traders say that the first broker *gives up the trade* to the other broker, who is often known as the *prime broker*. Institutional traders provide these instructions so that they can obtain specialized execution services from different brokers while maintaining a single account for custodial services and other prime brokerage services such as margin loans.

An important settlement instruction that must appear on security sale orders is an indication of whether the sale is a long sale or a short sale. In *long sales*, sellers own the security that they are selling. In *short sales*, traders do not own the securities that they sell. To settle their trades, they must borrow the securities first.

In both cases, the broker handling the sell order must ensure that the seller can deliver securities for settlement. For a long sale, the broker must confirm that the securities held are available for delivery. For a short sale, the broker must either borrow the security on behalf of the client, or confirm that the client can borrow the security.

# Settlement and Custodial Services

Financial markets—especially those that arrange trades among strangers—generally need intermediaries to help traders settle their trades and ensure that the resulting positions are not stolen or pledged more than once as collateral.

*Clearinghouses* arrange for final settlement of trades. In futures markets, they also guarantee contract performance. In other markets, they may only act as escrow agents, transferring money from the buyer to the seller while transferring securities from the seller to the buyer.

The members of a clearinghouse are the only traders for whom the clearinghouse will settle trades. To ensure that their members settle the trades that they present to the clearinghouse, clearinghouses require that their members have adequate capital and post performance bonds. Clearinghouses also limit the aggregate net quantities (buy minus sell) that their members can settle.

Brokers and dealers who are not members of the clearinghouse must arrange to have a clearing member settle their trades at the clearinghouse. To ensure that their broker and dealer clearing customers can settle their trades, clearing members require that their clearing customers have adequate capital and post margins. They also they limit the aggregate net quantities that their clearing customers can settle, and they monitor their customers’ trading to ensure that they do not arrange trades that they cannot settle.

This hierarchical system of responsibility generally ensures that traders settle their trades. The brokers and dealers guarantee settlement of the trades they arrange for their retail and institutional customers. The clearing members guarantee settlement of the trades that their clearing customers present to them, and clearinghouses guarantee settlement of all trades presented to them by their clearing members. If a clearing member fails to settle a trade, the clearinghouse settles the trade using its own capital or capital drafted from the other members of the clearinghouse.

Reliable settlement of all trades is extremely important because it allows strangers to confidently contract with each other without worrying about *counterparty risk*, the risk that their counterparties will not settle their trades. A secure clearing system thus greatly increases liquidity because it vastly increases the number of counterparties with whom a trader can safely arrange a trade.

In many national markets, clearinghouses clear all securities trades so that traders can trade securities through any broker, dealer, exchange, or alternative trading system. These clearing systems promote competition among these exchange service providers.

In contrast, most futures exchanges have their own clearinghouses. These clearinghouses usually will not accept trades arranged away from their associated exchanges so that a competing exchange cannot trade another exchange’s contracts. Competing exchanges may create similar contracts, but moving traders from one established market to a new market is extraordinarily difficult because traders prefer to trade where other traders trade.

## Clearing and Settlement Cycles

Trade settlement consists of two processes. *Clearing* refers to all activities taken from the arrangement of the trade up until settlement. *Settlement* consists of the final exchange of cash for securities.

The most important clearing activity is *confirmation*. Before a trade can be settled, the buyer and seller must confirm that they traded, and they must confirm the exact terms of their trade. Confirmation generally takes place on the day of the trade, and is necessary only for manually arranged trades. When electronic trading systems arrange trades, the automated system confirms the trade to both parties. Records of trades that do not match are called *out-trades*. At exchanges that use floor-based trading systems, traders generally must resolve all out-trades before trading starts on next trading day.

Following confirmation, settlement usually takes place a few days after the trade. The *settlement cycle* refers to the timing of the procedures used to settle trades. For example, in most countries, stocks and bonds settle on a rolling 3-day net settlement cycle. Three trading days following the negotiation of a trade, the seller must deliver the security to the clearing agent and the buyer must deliver cash. The settlement agent then makes the exchange in a process called *delivery versus payment* which links the two transfers. If on the day of the trade, a trader both bought and sold the same security, then the trader must deliver only the net difference in the securities and cash. This settlement cycle is called *T+3* where T stands for the trade date.

Settlement cycles differ across markets. Certificates of deposit and commercial paper generally settle on T+0, government securities and options contracts on T+1, and foreign exchange transactions on T+2. Some markets also settle in real time as the trades occur.

Many markets used to have weekly or biweekly batch settlement cycles, although these are now uncommon. In a batch settlement cycle, all trades made during a given period are settled on a net basis on a single day shortly after the period.

Markets are switching to rolling net settlement because rolling settlement is less stressful on banking systems than is batch settlement. Many markets also are reducing the length of their settlement cycles to reduce counterparty risk: The fewer unsettled trades outstanding, the less damage occurs when a trader fails to settle. Also, the shorter the settlement period, the fewer extreme price changes will occur before final settlement that might increase incentives to fail.

Once a trade in a corporate security trade is settled, the settlement agent reports the trade to the corporation’s *transfer agent* who maintains a registry of who owns the corporation’s securities. Most transfer agents are banks or trust companies, but sometimes corporations act as their own transfer agent. Corporations need to maintain these databases so that they know who is entitled to any interest and dividend payments that they make to their security holders, who can vote in corporate elections, and to whom various corporate communications should be sent. The transfer agents also issue and cancel certificates of ownership, if the corporation issues such certificates. Otherwise, the transfer agent maintains *book-entry* records of ownership. To avoid problems with lost certificates and the costs of handling paper documents, securities increasingly are only issued in electronic form.

*Depositories* or *custodians* hold securities on behalf of their clients. Custodial services, which are often offered by banks or trust companies, help prevent the loss of securities through fraud, oversight, or natural disaster. The depositories may hold certificates in their vaults, or they may maintain systems to ensure the validity of book-entry ownership records. Institutional investors who invest globally often must use depositories in different countries.

Broker-dealers generally hold securities on behalf of their retail and small institutional customers. This service allows their customers to avoid holding their securities in certificate form, and it ensures that the customers can easily sell their securities without arranging to deliver securities or confirm book-entry ownership before they trade. Broker generally deposit their customers’ securities in their depositories for safekeeping. Depending on the nature of the account and on the regulatory jurisdiction, the brokers also may lend out these securities. Securities held in a brokerage account are said to be *held in street name*, and the broker or the broker’s depository appears as the registered owner. The customer remains the beneficial owner for all purposes.

Many settlement agents also provide systems that allow brokerage customers to transfer securities from one brokerage account to another. These systems make brokers more responsive to their customers’ desire for high quality, low cost services because dissatisfied customers can easily use them to transfer their accounts to competing brokers.

## Dual-listed securities

Many corporate issuers list their securities on two or more exchanges. Such securities are *dual-listed*. Dual listing can make the securities available to more potential investors, especially if the listings are in different countries. If the securities trade in liquid secondary markets, more investors may be inclined to purchase them in the primary markets, which will lower the corporate costs of capital.

Dual listing can be costly. In addition to paying listing fees in two or more markets, the company must subject itself to the regulations and disclosure requirements of all markets in which it is listed. Multiple disclosure requirements are particularly burdensome if different accounting standards require that dually listed issuers prepare two or more sets of accounts.

Securities of foreign issuers often trade as depository receipts. *Depository receipts* represent ownership of shares that are held by a custodian. The depository receipts trade in local markets at prices typically denominated in the local currency. Trade settlement also occurs in the local markets. The custodian converts any dividends paid to the local currency and distributes them to the receipt holders. This mechanism permits investors to easily trade and hold securities issued by foreign issuers.

Dual listed securities often do not trade as actively in local markets as they do in their home markets. Accordingly, traders who can easily access an issuer’s home market often can obtain better prices than they can find in their own markets.

# Transaction Costs

Trading is costly. The costs of trading accrue from brokerage commissions, bid/ask spreads, and market impact. Collectively, these costs are called *transaction costs*.

Most market participants employ brokers to trade on their behalf. They pay their brokers *commissions* for arranging their trades. The commissions usually are a fixed percentage of the principal value of the transaction or a fixed price per share, bond, or contract.

The commissions compensate brokers for the resources that they must employ to fill orders. They pay fixed costs for order routing systems, market data systems, accounting systems, exchange memberships, office space, and personnel to manage the trading process. On behalf of their clients, brokers also pay variable costs such as exchange, regulatory, and clearing fees. Traders who do not trade through brokers pay these fixed and variable costs of trading themselves.

Traders who demand quick trades tend to purchase at higher prices than they sell. The difference is due to the price concessions that they give to encourage other traders—often dealers and proprietary traders—to trade with them when the impatient traders want to trade. For small orders, the cost of these price concessions is one-half of the bid/ask spread. To understand why, imagine that an impatient trader simultaneously buys and sells the same quantity of the same security in two trades. These two trades will offset each other so that the trader will accomplish nothing but generate transaction costs. The buy will occur at the offer (ask) and the sell at the bid so that the trader will lose the bid/ask spread for the two trades, or one-half of the spread per trade.

For large trades, impatient buyers generally must raise prices to encourage other traders to sell to them. Likewise, large impatient sellers must lower prices to encourage other traders to purchase from them. These price concessions—called *market impact* or *price impact—*often occur over time as large buyers push prices up, and large sellers push them down, in multiple transactions. For large institutions, the price impact of trading large orders generally is the largest component of their transaction costs. Since these costs often limit the scale of their activities, minimizing them is very important.

Traders who are willing to wait until other traders want to trade with them generally incur lower transaction costs on their trades. In particular, by using standing limit orders instead of marketable orders, they can buy at the bid price or sell at the ask price. However, these traders risk that they will not trade when the market is moving away from their orders. They lose the opportunity to profit when their buy orders fail to execute when prices are rising, and they lose the opportunity to avoid losses when the sell orders fail to execute when prices are falling. These costs of not trading are called *opportunity costs*.

Traders choose their order submission strategies to minimize their transaction costs and their opportunity costs of not trading. Efficient traders ultimately are more successful than those who do not trade well. They buy at lower prices, sell at higher prices, and less often fail to trade when they wish that they had.

Market participants use various techniques to lower their transaction costs. They employ skillful brokers, use electronic algorithms to manage their trading, and use hidden orders or dark pool trading systems to hide their size.

Most brokers and large institutional traders conduct transaction cost analyses of their trades to measure the costs of their trading and to determine which trading strategies work best for them. In particular, these studies help large institutions better understand how their order submission strategies affect the tradeoff between transaction costs and opportunity costs.

# Efficient Financial Markets

Well-functioning financial markets are beneficial to everyone who needs to trade. Most obviously, they allow people to cheaply acquire or divest positions in the financial instruments that they use to invest, borrow, manage risks, and speculate.

Markets in which trades are easy to arrange with low transaction costs are *operationally efficient*. Operationally efficient markets have small bid/ask spreads, and they can absorb large orders without substantial price impacts.

The most operationally efficient markets tend to be markets in which many people are interested in trading the same instrument at the same exchange. In these markets, buyers can easily find sellers, and vice versa. In contrast, markets for instruments that do not interest many people tend to have high transaction costs because buyers and sellers find it difficult to find each other. Instead, they often must trade with dealers who quote large spreads because they face little competition, or because they believe that they will not quickly sell their purchases or repurchase their sales.

The benefits of operationally efficient markets are huge. For example, in operationally efficient markets, investors who need to move money to the future can easily connect with entrepreneurs who need money now to develop new products and services. Likewise, producers who would otherwise avoid valuable projects because they are too risky can easily transfer those risks to others who can better bear them. Most importantly, these transactions such as these can take place among strangers so that the benefits from trading can be derived from an enormous number of potential matches.

In contrast, economies that have poorly functioning financial markets have great difficulties allocating capital among the many companies that could use it. Financial transactions tend to be limited to arrangements within families when people cannot easily find trustworthy counterparties who will honor their contracts. In such economies, capital is allocated inefficiently, risks are not easily shared, and production is inefficient.

An extraordinarily important byproduct of operationally efficient markets is the production of informationally efficient prices. Prices are *informationally efficient* when they reflect all available information about fundamental values. Informative prices are crucially important to the welfare of an economy because they help ensure that the resources available to the economy—labor, capital, materials, and ideas—are well used.

In particular, in a market economy, when the price of some resource reflects its value to the economy, the people who will use the resource will be the ones who value it most. If people who own a resource value it at less than the market price, they will sell the resource. Likewise, if people without the resource value it at more than the market price, they will buy the resource.

The resulting allocation of the resource will be to those who most value it, but this only occurs if the market price reflects its value. If the market price is too low, some people who value the resource at more than the market price will not be able to obtain it because some people who value it less may still value it at more than the market price, and therefore will not sell it. In this event, the economy would be better off if the market price rose. Likewise, if the market price is too high, some people who own the resource but value it at less than the market price will not be able to sell it to people who value it more than they do, but not as much as the market price. In this event, the economy would be better off if the market price fell.

Economies that use resources where they are most valuable are *allocationally efficient*. Economies that misallocate their resources waste their resources and consequently often are quite poor.

Well-informed speculators make prices informationally efficient. When they buy assets and contracts that they think are undervalued, they tend to push their prices up towards their estimates of value. Likewise, when they sell assets and contracts that they think are overvalued, they tend to push their prices down toward their estimates of value. The effect of their trading thus causes prices to reflect their information about values.

How accurately prices reflect fundamental information depends on the costs of obtaining fundamental information and upon the liquidity available to well-informed speculators. Accounting standards and reporting requirements that produce meaningful and timely financial disclosures reduce the costs of obtaining fundamental information and thereby allow analysts to form more accurate estimates of fundamental values. Liquid markets allow well-informed speculators to fill their orders at low cost. If filling orders is very costly, informed trading may not be profitable. In which case, information-motivated traders will not commit resources to collect and analyze data, and they will not trade. Without their research and their associated trading, prices would be less informative.