PART

Two

Products and Services

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CHAPTER 3

Cash Market

INTRODUCTION

The *cash market* refers to the buying and selling of stocks either on an exchange or in "upstairs" transactions negotiated directly between brokers and clients. Regardless of his or her area of specialization, every member of the sales and trading division must have a detailed understanding of how the underlying cash market functions. The practical knowledge of how the markets work, and the ability to use that knowledge to service client requests, is an important part of the value salespeople and traders add.

In this chapter we look first at the structure of the market and how buyers and sellers are matched off to complete trades, and then examine the various roles within the equities sales and trading business and how they work together to service the customer business. While our focus here is on single stocks, the market structure, as well as the division of responsibility between traders and salespeople, is similar across all equity products and the concepts presented here are applicable to the sales and trading of derivatives as well.

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HOW A STOCK EXCHANGE FUNCTIONS

The concept of a stock exchange is the same as that of any other market—it is a place where buyers and sellers come together to trade. In this case, the goods traded are financial assets: the shares of public companies. However, due to the central importance of a smoothly functioning stock market for the health of the national financial system, there are some important characteristics that make a stock exchange very different from, for example, your local antiques fair.

The most important of these is the fact that, rather than simply providing a central location where buyers and sellers trade among themselves, the exchange acts as an intermediary: after pairing up a buy and sell order,

the exchange acts as the counterparty to both trades. In this way, each market participant must only establish a settlement procedure with a single counterparty (the exchange) rather than setting up individual relationships with every other participant. This not only greatly simplifies the clearing and settlements of trades but ensures that buyers and sellers are indifferent to the identity of the counterparty of a transaction (if they are even aware of who it is), which increases the ease and fluidity of trading.

The centralization of all clearing and settlement through the exchange gives it a tremendous amount of power to regulate the activities of market participants to promote fair dealing by all parties involved. In order to trade directly on the exchange, a firm must become a member (which will require payment of a fee). The stock exchange also can require that member firms maintain certain minimum standards for financial stability, internal controls, and legal compliance. If a member firm is found to employ unfair practices or attempt to manipulate the market, the exchange can simply revoke their membership, effectively shutting down their business. (While most trading is centralized through a single primary exchange, the existence of several alternative exchanges prevents the abuse of this sort of power or the establishment of monopolistic control of trading.)

Investor confidence is extraordinarily important in financial markets and exchanges make great efforts to encourage investors to perceive the stock market as a safe place to invest their money. A key component of this is the establishment by the stock exchange of listing requirements for companies wishing to have their shares traded on the exchange. These may include minimum levels of earnings, market capitalization or trading volume and are designed to ensure that the stocks traded on the exchange represent ownership in legitimate businesses with sound financial characteristics. Companies that do not meet these requirements cannot trade their shares on the exchange and those companies that are listed on the exchange must maintain their status or risk a delisting (i.e., have their shares removed from trading on the exchange). While exchange-listed companies can and do go bankrupt and equity share ownership always implies a level of risk, exchange listing provides an implicit "stamp of approval" and prevents the listing of phony shell companies for the purpose of defrauding investors.

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Centralization of Orders

In assuming the role of intermediary to all trades, the exchange guarantees that there is a fair process for matching up buyers and sellers to complete orders. While the process is quite simple—priority of execution is given based on price and, where orders have the same price, on order of arrival—we will walk through it in some detail to illustrate the concepts and simultaneously

introduce the particular language used on the trading floor to communicate orders and market information.

An investor who has purchased shares of stock is said to be *long* the shares. When he sells them he is selling out of a long position or *selling from long*. Many financial assets also admit the possibility of selling a position before buying it. In this case the seller borrows shares from a long holder and *sells them short,* on the agreement that at some future point, he will buy back the shares (*cover his short*) and return the shares to the lender. The specific mechanics of how the market for borrowing and lending shares works is provided in Chapter 11.

Short sales are perceived somewhat differently by market participants than long sales. A long seller, by eliminating his long exposure to the stock, will no longer make money as the stock rallies. In so doing, he is expressing a view that the balance of probabilities between the stock going up and going down are equal or perhaps skewed in favor of a downward move. Whether he is right or wrong, it is only an opportunity cost that is lost—the investor is out of the position and can, for all intents and purposes, forget about the stock. A short-seller, however, is expressing a much clearer view in favor of a downward move. If the stock rallies, his loss is not merely the missed opportunity of the premature long seller, but an actual economic loss, as the proceeds needed to repurchase the stock will exceed those raised by the initial sale. Additionally, there is a fee that must be paid to the lender of the shares for facilitating the short sale. In this way, the act of shorting implies a significantly more negative assessment of the future prospects for a stock than does a long sale.

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Bids and Offers

Market participants submit *orders* to the exchange, which consist of four elements:

1. *Side:* Indicates whether they want to buy or sell
2. *Stock identifier:* A code which specifies the company whose shares are to be bought or sold
3. *Quantity:* The number of shares desired
4. *Limit:* The price where they are willing to buy or sell the shares (Orders can be submitted to the exchange without a limit, as we will see later.)

An order to buy shares of stock is called a *bid*, while an order to sell is called an *offer*. (The *offer price* is also known as the *ask price*.) One of the primary responsibilities of the exchange is to organize the bids and offers in a stock and disseminate them so that investors can make informed decisions

based on the current state of the market. At any point in time there may be hundreds of different orders to buy and sell a given security at dozens of different prices. However, what most traders and salespeople will watch on their screens is a one-line summary of the *inside quote* and *last trade*. The inside quote summarizes the highest bid price (*best bid*) and lowest offer price (*best offer*) and the number of shares for which those bids and offers are valid. (The best bid and offer may actually be the aggregation of several individual orders that have the same limit price.) The last trade information simply indicates the last price at which the stock traded and the number of shares executed at that price.

We refer to the combination of the inside quote and last sale information as simply *the quote*. For shares of our hypothetical company XYZ Inc. the quote that would be displayed on a trader's screen might look like the following:

Ticker[1]	Last	Last Size	Bid-Ask	Bid-Ask Size	Prior Close	% Chg
XYZ	25.41	12	25.40/ 25.42	45 × 61	25.2	0.83%

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The last traded price in XYZ is $25.41 and the current *best bid* is $25.40 and the *best offer* is $25.42. In the United States, share quantities are indicated in *round lots* of 100 shares,[2] so the quote indicates that the last trade was for 1,200 shares executed at $25.41 and that the current $25.40 bid is good for 4,500 shares and the offer for 6,100. The *bid-offer spread* (also known as the *bid-ask spread*) is the price difference between the best bid and offer and can either be quoted in cents per share (cps) or in basis points (bps—pronounced "beeps" or "bips") relative to the midpoint of the inside quote. For XYZ, the bid-ask spread is 2 cps (= $25.42 – $25.40) or $0.02/$25.41 = 0.08% or 8 bps. A basis point quotation is generally preferable as a cents-per-share quotation is only meaningful if the stock price is known. (A 2 cps spread means much more in a $1 stock than a $100 stock.)

The measure of the amount of stock that can be easily bought or sold in the market without excessive price impact, usually measured in terms of shares, is called the *liquidity*. A liquid stock is one where lots of buyers and sellers transact or, even if trading volume is small, where the bids and offers in the market provide ample opportunity to trade at prices close to the current market price. An illiquid stock is one where trading is infrequent, occurs in small size, and the available shares on the bid or offer are small.

Traders also refer to the shares available to be traded as the liquidity of the stock. In our example we would say there is greater liquidity on the offer side (6,100 shares) than on the bid side (4,500 shares).

It is market convention to always list bids on the left and offers on the right. In addition to the inside quote and last sale, traders and salespeople will generally watch the change in the stock price on the day, computed as the difference between the last sale price and the prior night's closing price, to get a sense of the stock's performance on the day. (In our example, this is equal to \$25.41 – \$25.20 = 21 cps or \$0.21/\$25.20 = 83bps.) The Bloomberg **Q** (*Quote*) function provides precisely this one-line summary, along with a few other useful facts such as the intraday high, low, and opening prices and the notional value traded on the day (i.e., the total dollar value of all shares traded).

Most of the time, there are multiple bids below and offers above the inside quote. In many markets it is possible to see the whole *book*, that is, the summary of all bids and offers. This is also called *market depth* and for our sample case might look like the following:

Ticker		Last	Last Size
XYZ		25.41	12
Bid Size	**Bid**	**Ask**	**Ask Size**
45	25.40	25.42	61
112	25.38	25.45	100
95	25.30	25.47	82

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There are two bids below the best bid of \$25.40: a \$25.38 bid for 11,200 shares and a \$25.30 bid for 9,500 shares, and two offers above the best offer of 6,100 shares at \$25.42: 10,000 shares at \$25.45 and 8,200 shares at \$25.47. The number of shares available on the best bid or offer is often referred to as the size available *at the touch*.

Subject to appropriate market data permissions, the Bloomberg **BBO** (*Best Bid and Offer*) function allows the user to see the entire depth of the order book (all bids and offers and sizes) updating in real time.

Order Matching

When an order to buy or sell shares is submitted, the exchange will determine whether that order can be matched against an existing bid or offer in the market to complete a trade. If it cannot, it will be added to the order book for that stock and remain unexecuted. In our example of stock XYZ, if an

order to pay $25.42 for 2,000 shares is submitted it will be filled immediately against the offer of 6,100 shares and the quote in the stock will change to:

Ticker	Last	Last Size	Bid-Ask	Bid-Ask Size	Prior Close	% Chg
XYZ	25.42	20	25.40 / 25.42	45 × 41	25.2	0.87%

The size of the offer has been reduced to 4,100 shares and the last trade price has changed to $25.42. The execution of 2,000 shares would be automatically recorded by the exchange and disseminated via market data providers so that all investors are made aware of the most recent activity in the stock. When this happens a trade is said to have printed *to the tape,* a linguistic remnant of the days when trade prices were communicated to brokerage houses by the exchange via ticker tape (which is also why stock symbols are referred to as "tickers").

The minimum increment by which the price can move is called the *tick* size, and is equal to $0.01 for most stocks. Traders will commonly describe a stock as "ticking up" (rallying) or "ticking off" (going down). The word "tick" is also used to classify stock trades into one of four types, depending on how the trade price compares to those that came before it:

1. *Plus-tick* (also an *uptick*): The trade price is higher than the price of the last trade that occurred.
2. *Zero plus-tick:* The trade price is equal to the last traded price but higher than the most recent trade that occurred at a different price.
3. *Minus-tick* (or *downtick*): The trade price is lower than the price of the last trade that occurred.
4. *Zero minus-tick:* The trade price is equal to the last traded price but lower than the most recent trade that occurred at a different price.

As mentioned, the best offer of $25.42 may be composed of several individual orders; for example, 800 shares from one seller and 5,300 from another. The question of who will make the sale to the buyer of 2,000 shares depends on which of the two orders was submitted first. Where there are multiple orders to trade at a particular price, a queue is formed based on time of arrival. If the 5,100 share order arrived first, that seller will sell 2,000, leaving 3,100 shares unexecuted, while the seller of 800 shares will sell nothing. However, if the 800 share offer was placed first, that order will be completed and the seller of 5,300 shares will only sell 1,200. In either case, the buyer pays $25.42 for 2,000 shares and, as this trade is

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settled versus the exchange, can remain happily indifferent to the identities of the sellers or how many of them there are.

The results would be exactly the same if the buyer had used a limit of $25.43 rather than $25.42. The fact that the buyer was willing to pay a higher price than what was offered in the market does not mean that she has to. Orders *on the book* are always filled at their limit prices while new orders submitted to the exchange are filled against the existing orders on the book and may receive better prices than their limit. It is also possible to submit a *market order* in which a share quantity is specified but no limit price. A market order will be filled immediately against existing orders in the market at their limit prices. Using the original summary of market depth for stock XYZ, an order to buy 20,000 shares of XYZ at market would be filled in three pieces: 6,100 shares at $25.42, 10,000 shares at $25.45, and 3,900 shares at $25.47. The last traded price would update three times though in such rapid succession that an observer would see only a flicker and then a final inside quote of:

Ticker	Last	Last Size	Bid-Ask	Bid-Ask Size	Prior Close	% Chg
XYZ	25.47	39	25.40 / 25.47	45 × 43	25.2	1.07%

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While three individual trades will be recognized by the exchange and need to be settled, it would be inconvenient for investors to have to deal with all of the individual executions, particularly when working large orders that may be broken up into hundreds of individual trades. To simplify customer bookings (i.e., the recognition of the transactions in the customer's account), brokers use a special structure called a *wash account* (also called an *average price account*), which allows them to book the multiple individual executions versus the exchange but then settle versus the customer at a single average price, in this case, of $25.4448. (Average execution prices are usually computed to four decimal places.)

Once an order has been submitted to the exchange, it can be amended by the broker who submitted it. Each order is assigned a unique order ID by the exchange and the broker retains the right to cancel, replace, or amend that order as they wish. However, in most cases, an amendment to an order (change of limit price or share quantity) is treated as a cancellation and replacement of the existing order and will therefore cause the order to lose its priority in the order book.

For example, using the market depth example just presented, let us assume that the $25.38 bid for 11,200 shares is composed of one order for

1,000 shares, followed by 10,200 shares that arrived later. If the owner of the 1,000 share bid wishes to increase the quantity to 1,500, he would cancel-and-replace his order with a $25.38 bid for 1,500 shares, which would then sit behind the other 10,200 shares in the queue. Alternatively, if the bid price were increased to match the best bid of $25.40, the existing order would be cancelled and the new order would be placed behind the 4,500 shares already on the best bid. The exception to this is in the case of a reduction in the order size. Because a reduction in the share quantity of an order is already implicitly yielding to other orders by taking less of the available liquidity from the market, the order retains its priority in the order book.

Conceptually, the priority rules of the order book are the same as waiting in line at the supermarket checkout counter. You pick a checkout lane (price) and get in line behind the other customers (orders) who were there first. If you want to buy something more than what's in your shopping cart (increase the order size), you need to get out of line and go get the other items, which causes you to lose your place in line (lose priority in the order book). If you decide not to buy a few of your items (reduced order size), you're only speeding up the process for everyone else behind you so you can leave them with the cashier and stay where you are (no loss of priority in the order book). If you change lanes (new limit price) because you think you can check out more quickly in another (get your order filled), you have to go to the back of the line (lose your place in the order book) in the new lane, regardless of how long you've been waiting.

The summary of all executed trades and the time each one took place (*"time and sales"*) is available on Bloomberg via the **QR** (*Quote Recap*) function. The **QRM** *(Quote Recap & Market)* function provides a recap not only of trades but of every change of the inside quote (best bid and offer and size).

There are two other functions that provide very useful summaries of trading activity as well as a graph of price performance and other information about a stock: **BQ** (*Block Quote*), provides a large amount of fundamental and historical data, while **EQ** (*Equity Quote*) features a more prominent graph and can be used as a an alternative to **GIP** for monitoring intraday price action.

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EXCHANGE STRUCTURE

Though the specific rules and regulations of each stock exchange are unique, the overall structure of the exchange can be generally described as following one of three general models (or a combination thereof) based on the number of participant firms that are designated as *market makers* in each particular stock on the exchange. Market makers act as continuous participants in the

trading of a stock by displaying at all times a bid and offer price against which other market participants can trade (this is called *making a market*). In return for providing liquidity, market makers receive reduced transaction costs and other benefits from the exchange. On some exchanges there are predefined minimum sizes for bids and offers and maximum bid-offer spreads that the market maker can show, while on others the guidelines are more subjective. The presence of a market maker is intended to give potential investors confidence to trade on the exchange by guaranteeing that, when they want to trade, whether to open a new position or close out an existing one, they will always find a bid or offer against which to transact.

The Specialist System (A Single Market Maker)

The New York Stock Exchange (NYSE) is one of the few stock exchanges left in the world that still uses a single market maker, or *specialist* system, as well as a physical trading floor staffed by floor brokers. Over time, the role of the specialist has been diminished as technological alternatives have proven more efficient. However, the general model of a single market maker still exists and continues to provide certain unique benefits.

Under the specialist system, a single broker (a physical person), called the *specialist*, working for an independent company is selected by the exchange to act as the center point for all flow in a particular stock. All orders must be routed through him (or her) and it is his responsibility to maintain a "fair and orderly" market. Where the bids and offers in the market are sufficient to meet investor demand, the specialist simply matches buyers and sellers on the book against each other according to the standard priority of price and time. However, whenever there is no bid or offer, or when the inside market created by the bids and offers available on the book is too wide, the specialist is obligated to show a bid and/or offer price at which he is willing to trade. The specialist is also required to take the other side of any market order where the liquidity on the book is insufficient to complete it.

By agreeing to provide a bid or offer where none is available the specialist puts himself in a compromised position. The most obvious example is when important news comes out during the trading session, which then causes a sudden flood of orders on one side of the market. For example, consider a pharmaceutical company that receives FDA approval to sell a new drug, which will significantly improve earnings in the future. Where this result was not expected previously, and is therefore not already factored into in the stock price, the news should result in a substantial revaluation for the stock and an increase in the "fair" price for the shares, triggering a significant inflow of orders, many of which will be market orders and expect an immediate fill. While the first orders are paired off against existing offers

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on the book, these offers will quickly be filled or pulled out of the market by the sellers as they decide they either do not want to sell the stock, or see the opportunity to sell at much higher prices.

The specialist is now left as the only seller into a crowd of buyers. On the stock exchange floor, where brokers stand at the post and verbally communicate orders with the specialist, it can in fact be a crowd of people shouting orders at the specialist, who must then decide on the appropriate level at which to fill these orders against his own book. What no one else wants to sell, he must sell short and will need to buy back later. The question is, at what price? As he fills each new order at successively higher prices, the sales made at previous (lower) prices become more and more costly. When other sellers arrive in the market they will require still higher prices creating even greater losses for the specialist. The specialist must make a rapid judgment as to the appropriate level at which to sell short shares to facilitate the buyers.

In the case of very significant news announcements that result in particularly violent price action, the specialist can request that the exchange halt trading in the stock temporarily to allow buyers and sellers to digest the news and submit their orders more calmly, rather than in the frenzied rush to jump in first. During the halt, the specialist will disseminate an indicative level at which the stock will reopen. In our pharmaceutical company example, a temporary halt of 10 or 15 minutes would give time for buyers to more accurately assess the true impact on the company's earnings to determine a new price (as opposed to just submitting a market order) and also for potential sellers or short-term traders to put in offers at levels where they consider the stock price to have overreacted to the news.

The decision as to the appropriate price at which to fill orders is a function of the specialist's view on what is the equilibrium level for the stock and where he thinks he can likely get out of the position. In an actively traded stock, the specialist may have confidence that new orders will be received quickly enough that only a few cents cushion is necessary to ensure that he can unwind the position profitably (or at least breakeven). In a thinly traded stock, where the specialist will likely take a long time to get out of the position, he may offer liquidity only at a significant spread (discount or premium) to the current market, even for reasonably small size. He must adhere at all times to the "fair and orderly market" guidelines and, were a complaint to be raised to the exchange that markets were unfairly wide, he could be called upon to justify his pricing. If it is found that the specialist is failing to provide appropriate liquidity by taking unduly large spreads and then subsequently trading out of the position at a significant profit, the exchange may judge that he is not fulfilling his responsibilities and either sanction him or, in an extreme case, remove his right to act as specialist in the stock.

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As described so far, it is hard to see why anyone would *want* to be the specialist in a stock. There is, however, a flipside to the responsibilities and risks. The specialist is allowed to trade in the shares of the stock for his own account, and does so at a tremendous informational advantage to other market participants. While his actions are governed by strict rules that prevent him from unfairly using this knowledge to the detriment of other members, there are significant opportunities to make a profit based on the short-term mismatches between buyers and sellers. The simplest example is simply capturing the bid-offer spread. Where the bid and offer prices belong to the specialist, he fills market buy orders at the offer price and sellers on the bid and captures the spread between them as profit. The specialist sees all market orders before they are filled and can decide at what level to facilitate liquidity based on his knowledge of what other market participants are likely to do. Until only a few years ago, the full order book was visible only to the specialist while outsiders relied on the limited information available from the inside quote and last sale price. Historically, this informational advantage has been sufficient to provide substantial profits to the specialist firms whose business it is to take on this role, though recent technological advances and the move toward greater transparency by the exchanges have diminished this opportunity.

It should be noted that while the specialist system evolved from a face-to-face verbal dialog between brokers and the specialist, the NYSE currently employs a hybrid system which allows for direct electronic trading with the specialist's book as well as intermediation by a broker physically located on the floor of the exchange.

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The Multiple Market Maker Electronic Exchange

A far more common model globally for structuring an exchange is via a multiple market maker model in which the exchange is electronic and functions primarily as a regulated communication network between participants, some of whom (the number depends on the exchange structure) are designated as market makers. This is the model of the NASDAQ market in the United States and most European exchanges.

In a multiple market maker model, each market maker is required to continuously post a bid and offer of a minimum size and maximum spread in the stock, which they must then update continually as the market moves. When an order is executed against the market maker's quote, he is momentarily relieved of his obligation to quote on that side of the market to give him an opportunity to adjust his quote and hedge or trade out of the position as necessary.

Compared with the specialist model, there are advantages and disadvantages to a multiple market maker model. For each individual market maker, the risks are far smaller—in the event of a sudden move in a stock, each market maker can pull back their quote to the minimum size and widest spread possible to reduce the risk of losses. There is, however, a commensurate decrease in the informational advantage and the opportunities it provides. In general, the trade-off for each individual market maker is the reward of continually capturing the bid-offer spread versus the risk of being caught in a sudden market movement. In recent years, as the speed and sophistication of electronic market-making technology has eclipsed that of humans, many brokers have drastically reduced their staff of market makers and rely primarily on electronic algorithms.

For the individual buyer or seller submitting an order to the market, the benefits of the multiple market maker model are generally positive. The distribution of risk among many market makers tends to reduce the bid-offer spread as each participating broker takes only a small portion of the risk. However, when news is released that impacts the stock price, the absence of a centralized ownership for maintaining the orderliness of the market can result in greater price volatility. To counteract this, many electronic exchanges establish automatic triggers that temporarily halt trading in a stock that has experienced excessive price volatility. These may also be supplemented by manual halts by the exchange regulators in the event of pending news to ensure all interested parties have had an opportunity to hear and digest the news and provide a more orderly mechanism for finding the new equilibrium price in the stock.

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A Pure Electronic Exchange (No Market Makers)

The third option for structuring an exchange is a flat playing field, in which there are no market makers. In the United States, the pure electronic exchanges are not generally thought of as proper exchanges (though legally they may be registered as such) but referred to under the general description of *electronic communication networks* (ECN). In this model, the exchange is simply a venue where buyers and sellers meet and, where no counterparty exists to an order, the order is simply left unexecuted. (Each exchange determines its own rules regarding the treatment of market orders where no other side exists.)

One particularly interesting type of purely electronic network is what is referred to as a *dark pools*, which are crossing networks in which all parties remain anonymous and all bids and offers hidden. Limit orders can be submitted into a dark pool and, if there exists an offsetting order in the pool, the two are paired off and a trade is completed. It is not, however,

possible to see what is in the pool, which can be a very attractive feature for traders looking to execute illiquid orders (i.e., orders that are large relative to the typical trading volume in that stock). In a transparent market, traders must be very careful about the size orders they display because of the risk that other market participants will see a big order on the screen and either jump in front of it (if they are on the same side of the market) or back away (if they are on the other side). In an opaque and anonymous dark pool, traders can submit their entire order to try to find the other side of the trade without disclosing any information to the market about their intentions and possibly jeopardizing their execution.

Some European exchanges use a combination of models in which the stocks where trading is most active (and the natural liquidity is sufficient to ensure a smoothly functioning market) are left to operate without market makers while those where liquidity is less consistently available are facilitated by market makers. In the United States, the pure electronic exchanges have historically been perceived as secondary venues for trading in stocks that are already listed on other exchanges. In recent years, however, many ECNs have begun to show levels of trading activity that are comparable with the primary exchanges.

Competition between Models

The specialist system is a natural means of centralizing order flow and ensuring fair dealing in a market where orders are transmitted verbally and documented on paper trade tickets. As such, most of the oldest stock exchanges began with this model. However, with the passage of time and the evolution of technology, the specialist model—particularly where this represents a physical person who manually oversees the order book—has given way to formats in which the centralization of order flow is electronic and the rules for fair dealing are monitored via sophisticated trade surveillance systems. Additionally, the massive increases in trading volume caused by electronic trading have simply overwhelmed the old manual order pairing and trade entry models of the specialist system of the past. Even the NYSE, the last major market in the world to use both a specialist system and a physical trading floor, has begun to make the transition to electronic making as underscored by the purchase, in 2006, of Archipelago Holdings, one of the largest ECNs.

ORDER TYPES

Regardless of the exchange structure, when investors wish to trade they must communicate the order to the exchange in some way. Investment banks and

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broker-dealers establish the necessary connections with the exchange and then offer their services as intermediary, taking client orders and submitting them to the exchange for execution. Trades executed by a broker are classified into one of three types: *agency, principal*, or *proprietary,* which is indicated on the order when submitted to the exchange (though not disclosed to other market participants).

Agency

An agency order is one in which the broker buys or sells shares on behalf of a client, in return for a commission. The broker takes no risk in executing the trade but is required to adhere to *best execution* guidelines, which are designed to guarantee that the broker works in the client's best interests to achieve the highest quality execution possible. An important characteristic of an agency execution is that the client receives exactly the price executed by the broker—the trades are effectively cleared directly between the client account and the exchange. In the event that the client is dissatisfied with the execution, the broker cannot amend the price other than to reduce the commission rate. By the same token, if the broker achieves a far superior execution price to what the client has requested, the broker cannot keep any of the outperformance. The trade belongs to the client.

The only situation in which the broker can give the client a different price from his execution is in the event of a legitimate execution error. For example, a broker forgets to submit an order where the execution was to be spread out over the day and instead executes the entire order in the last few minutes of trading. If the execution price is as good as or significantly better than what would likely have been achieved by working the order over the entire day, the client will be given the superior fill. (The *fill* is the price at which a trade is executed.) However, if the execution is significantly worse, the broker will book the exchange executions into a specially designated *error account* and then book the customer trade versus that account at a fair price given the instructions. Commonly, when a trade is run through an error account, an error form must be completed providing an explanation of the error, the trader and client involved, and the amount of the loss. This form is retained to provide an audit trail in the event of an inquiry by the exchange. (Stock exchanges will occasionally perform random screening of broker trades to ensure compliance with the exchange rules.)

While it is a requirement that the economics of an agency order be passed directly to the end client, this does not mean that the client has to receive every execution from the exchange. The wash account structure allows the broker to greatly simplify the booking process for clients by first taking all

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of the "street side" executions versus the exchange into a firm account and then booking these shares to the client at the realized average price. While technically the executions are booked versus a broker account and not the client's account, the structure of a wash account is such that it cannot hold a position or earn a profit or loss. The precise economics of what is booked into the account must be booked out as to do otherwise would create either a position or price break (discrepancy) in the account that would need to be corrected. Aside from the operational simplicity, the use of a wash account is also beneficial to clients because it allows them to submit a single order and then allocate the total shares executed between multiple accounts, with each account receiving the same average price. Particularly where the client is managing funds for multiple investors, the allocation of a single execution price across multiple accounts prevents questions from arising as to whether the client is providing preferential treatment to one of her investors over another.

An alternate means of executing an agency order is via *direct market access* (DMA). Many brokers provide electronic platforms through which clients can use the broker's connections to the exchange to execute their own orders directly. While most brokers will provide a trading interface that can be installed on the client's computer, this may prove insufficient where clients require a greater degree of integration with their own internal systems or use specially-designed algorithmic strategies, which generate high order volumes. In these cases clients may have the option to establish a direct electronic connection to the broker's infrastructure and route orders straight to the exchange from their own systems, but via the brokers "pipes." As DMA trades require no direct involvement by the broker (other than to keep the systems running properly and the clearing and settlement of executed trades) they generally carry much lower commission costs.

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Although in an agency execution the broker is working purely on the behalf of the end client, this does not exonerate the broker from all responsibility. If the strict adherence to the instructions given by the client would significantly disrupt the market or if the order has been given for the purposes of manipulating the stock price, the broker must refuse to execute the order as directed. If not, both the client and the broker can potentially be held liable for improper trading. The same applies to DMA flow and brokers have thresholds and checks that prevent abusive trading practices by clients.

Types of Agency Orders When a client gives an order to a broker, she must provide instructions as to how she wants that order to be executed. This is a delicate point because it is impossible for the client to specify a particular action the broker should take in each of the infinite possible

scenarios that could occur. The client must choose between giving rigid instructions, which may or may not achieve her desired goal, or providing general guidance regarding those objectives and relying on the discretion of the trader to execute the order in the best way possible. Clearly there is a certain risk of misunderstanding when using loosely defined, qualitative instructions. To minimize this, traders and salespeople have developed a number of standardized execution instructions used for communicating orders that have well-defined meanings. While this does not entirely eliminate disagreements, it plays an essential role in reducing them and one of the first requirements of a new trader is to learn this rather particular vocabulary. What follows is an explanation of some of the most commonly used instructions with examples of how they are communicated in real-life situations. Commonly used written abbreviations for some of the trading instructions are included for reference.

- *Market (MKT) or limit (LMT):* As discussed previously, an order submitted with a *market* instruction will be filled at whatever price is available in the market while a limit order can only be filled at the limit price or better. Buy limits are often referred to as having a "top" while sell limits have a "low." Example: "Sell 25,000 XYZ with a 22.50 low." "Buy 10,000 ABC with a $14.10 top." "Sell 5,000 PQR at market."
- *Not held (NH):* Most orders are given to brokers on a *not held* basis, which means that the broker is given discretion in how to best execute. If the order is submitted as *held*, the broker must exactly represent the client's instructions in the market. A simple example is a market order to buy shares. If the instruction is *market, not held* (MNH), the client is indicating that they are willing to pay as high a price as necessary to complete the order but give the broker permission to use his discretion as to how to achieve the best price. If the order is large, the broker might execute only a portion at current prices and then wait to see how the market reacts, looking for additional sellers to arrive to reduce the impact he has on the price. Clients will sometimes include qualitative instructions such as *careful discretion* to indicate that, while the order is a market order, the trader is expected to work the order carefully and not just "bang it out" all at once. By comparison, if the order is given as *market, held,* the broker has no choice but to submit the entire order to the exchange at market, regardless of the advisability of that decision (so long as it would not be disruptive to the market). Held orders are very rare and all of the subsequent order types are assumed to be not held.
- *Percentage of volume (POV):* Rather than decide a priori the time interval over which the order is to be executed, a client may instruct the

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broker to participate with trading at a certain percentage of the volume. In this case, the broker will not buy shares unless others are buying shares and will do so only in the percentage specified by the client. Percentage-of-volume orders generally range from a conservative 10 percent to a relatively aggressive 33 percent of the volume. As the broker has no ability to guarantee participation in all trading activity that occurs on the exchange, the percentage of volume can only be taken as a target, subject to the broker's best efforts.

- *In line:* An instruction to execute an order *in line* indicates that the client is happy to complete the order at current market levels—effectively a loosely defined limit order. If the broker cannot complete the order at the levels prevalent at the time the order is submitted (or better) the order will remain incomplete and unless specified otherwise, the broker will not participate in trading at less attractive prices.
- *Work:* To *work* an order means to spread out the execution over a period of time and can be loosely interpreted to mean participation at around 25 percent of the volume. A limit order with a *work* instruction indicates that the client does not want the order immediately completed simply because the price is better than the limit. For example, if the instructions are to "Buy 25,000 XYZ with a $25.10 top, work," the broker will not pay above $25.10 for stock and, when the price is below that limit, will not look to immediately complete the entire order but to participate at approximately 25 percent of the volume. In this way, if the stock price is moving lower the buyer will participate in the progressively lower prices rather than being "plugged" at the $25.10 limit. The risk is that the stock trades back through the limit and only part of the order is completed due to the lower participation percentage.

  A client may also instruct a broker to work an order with an *ultimate* limit. The addition of the word "ultimate" indicates that the client considers the limit to be fairly far away from the current levels and does not expect that, by executing his order, the broker will push the stock to that price. Traders eager to complete an executable order sometimes need to be reminded that, as the saying goes, "It's a limit, not a goal."
- *Would:* "Would" indicates a willingness to complete the entire order at a given level. For example, if the client submits an order to "Buy 25,000 XYZ with an $18.50 top, would" he is indicating that if the entire order could be completed at the limit price, he would be willing. If the stock then subsequently trades lower, the broker cannot be held accountable for not participating in the lower prices because the instruction was that the client "would" at the limit, and not to "work" the order.
- *Combinations:* It is common to combine the above instructions in a single order. For example, a client might instruct the broker to "Buy

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25,000 XYZ—would in line, otherwise work." In this case, the client would be happy to complete the entire order at current levels if possible but, if not, would like to participate at approximately 25 percent of the volume at higher levels.

- *Descriptive:* Depending on the relationship and the level of confidence between the client and broker, it may sometimes be more effective to simply describe the situation and leave the specific trading decisions to the broker. A useful example is the trade-out (liquidation) of a position that results from a broker error. Every trader has made errors and understands the sensitivities associated with trading out of the position. There is the well-established Wall Street protocol that "You don't trade an error," which is to say, a position that results from an error is an unintended and uncalculated risk and should be closed out as quickly as possible. No one will ever be commended or receive a bigger bonus because they made money on an error, and a large profit serves only to underline the magnitude of the risk taken. However, as adverse moves in the stock price will result in losses to the broker, the person unwinding the position will want to make every effort to minimize any loss.
- *Volume-weighted average price (VWAP—"vee-wop"):* Rather than specify a particular level at which to trade, many clients will request that their order be worked targeting the average trading price during a given time period, often over the full day. The instruction is equivalent to asking that the broker "trade when everyone else trades" and is common for investors who do not have a strong view on the market direction themselves and do not want to give discretion to the broker to try to add value through subjective judgments about when to trade. VWAP is a particularly popular instruction for overnight orders from clients in other regions who will be sleeping while their trade is executed.

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The *VWAP* computes the average of all executed trades during a period of time applying a weighting factor to each trade based on the number of shares exchanged. This is done by first computing the notional amount of every trade during the time period by multiplying the shares traded by the trade price. The sum of these is equal to the total notional traded in the period, which is then divided by the total number of shares executed to arrive at an average price at which all shares traded, weighted by the quantity executed at each price. If we number the trades from 1 to n, the VWAP would be calculated as:

$$VWAP = \frac{\sum_{i=1}^{n} Shares_i \times Price_i}{\sum_{i=1}^{n} Shares_i}$$

The VWAP serves as a guideline for the execution level that can be expected from participating with volume during the entire day. It is not, however, an easy thing to match or, as clients often request, beat the VWAP. The difficulty comes from two facts. The first is that it is not possible to know at what times and price levels more or less volume will trade. While brokers will generally use statistical analysis of historical volume data in order to identify general patterns and bias their trading accordingly, this is only an estimate and the actual percentage of the total day's volume that is traded at any particular price can only be known once the day's trading is complete. Particularly when important news arrives late in the day, causing significant price movements on heavy volume, the broker is often unable to replicate the VWAP very closely because, by that point in the day, he has already executed too much of the order and is left with insufficient ammunition to participate in the late day moves in the proper proportion.

Abnormal volume profiles can either help or hurt the broker. For example, if a negative announcement is made late in the day that causes a stock to trade down on heavy volume, this will pull the VWAP significantly lower. In this case a seller targeting VWAP will tend to outperform the benchmark since, relative to the actual day's trading volume, he will have sold proportionally more of the order at the more attractive levels early in the day. While this may be entirely due to chance, as the old Wall Street maxim says, "Better lucky than good." However, if the broker is buying stock targeting VWAP he will perform poorly since he will, on a relative basis, have traded too much early in the day at the higher prices. In absolute terms, the client benefits from the late-day sell-off as this produces a lower execution price (he bought stock cheaper). However, because the amount purchased at the lower levels is insufficient when compared with the day's trading pattern, the performance versus VWAP looks poor and the client is likely to be disappointed.

The second challenge in meeting (or beating) VWAP is the fact that the VWAP is a function of all trades during that period, some of which will occur on the bid side of the market, some in the middle, and some on the offer. The average execution is therefore likely to sit somewhere near the middle of the bid-offer spread. However, when the broker goes to the market with an order, the only price at which he can be guaranteed an execution (and a partial one at that) is the far side of the market—the offer side if he is a buyer and the bid side if he is a seller. As a result, even if the broker matches the intraday volume profile perfectly, if he only uses market orders, he will on average miss the VWAP by one-half the bid-offer spread. Depending on the particular stock, this can be a significant amount. In targeting the VWAP benchmark, the broker must

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balance the dual objectives of completing a certain amount of the order during each time interval, and having the patience to sit on the near side of the market (buying on the bid, selling on the offer) to avoid paying away the bid-offer spread.

The choice of VWAP as a benchmark is, in many ways, an expression of view that markets are efficient and that the broker cannot add value by making subjective assessments of when and how to execute the order. While this may often be the case, it is important to recognize that VWAP is a relative benchmark for assessing the quality of the broker's execution, but not a measure of any real economic benefit that has been captured. Investors make money by buying low and selling high, not by beating VWAP.

The VWAP data are available on Bloomberg using the **AQR** (*Average Quote Recap*) and **VAP** (*Volume At Price*) functions. To better understand the relationship between the traded price of the stock and the volume profile through the day, the **IGPO** (*Intraday Hi-Lo Graph*) function provides an enhanced intraday **GIP** graph with an associated graph of the traded volume during each five minute (or other customizable) time interval.

- *Time-weighted average price (TWAP):* The alternative to the VWAP is the *TWAP* ("*tee-wop*") in which the average is computed by snapping prices at regular time intervals over the time period and taking a simple average of those prices, irrespective of the number of shares traded at each price. While not a particularly sophisticated strategy—the broker trades the same number of shares in each time interval—the TWAP has the appealing characteristic that the client can quickly judge the quality of the execution by "eyeballing" the graph of the stock price and estimating an "average" level at which the stock traded during the time period. VWAP can be a difficult benchmark for clients to "see" on the graph because it requires the simultaneous consideration of both the price at which the stock traded and the shares that traded at that price.
- *Course of day (COD):* Orders are sometimes submitted with a *course of day* instruction that sits somewhere between a "market, not held" and a TWAP instruction. The client is indicating that they do not have a clear view on the direction of the stock over the session and therefore do not want to complete the order at current levels since there is the possibility that more attractive levels present themselves later in the day. However, by not specifically referencing the TWAP or VWAP, the client is giving a certain amount of discretion to the broker to choose how much of the order to execute at different times of the day. While the expectation is that the broker will not simply punt the entire order in one go and hope to have picked a good time, there is room to add value through

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timing decisions rather than being forced into a slavish adherence to a time-slicing model for a TWAP or VWAP. It is, however, common for clients to compare a course of day order to the VWAP to get a sense of performance.

- *Stop* or *stop-limit:* A *stop order* (short for *stop loss*) is used to limit the potential loss of an existing position by setting a trigger price at which the position is closed out. Particularly when a position cannot be watched as closely as is desired, stops are used both to protect against large losses as well as to enforce good trading discipline. The trader takes a position with the expectation of making a profit but also specifies a level at which they must concede that the view was wrong and the trade should be cut before additional losses are incurred. It is human nature to hold onto losing positions for far too long because of our unwillingness to admit we are wrong and the hope that it will turn around and we will recuperate our loss. Everyone does it; smart traders realize it and set stops accordingly.

  As an example, let us assume a trader pays $25 for 10,000 shares of stock on the view that the stock can easily go to $30, a 20 percent rally. However, the trader also submits a sell stop order 5 percent below the market, at $24. If the stock price drops to $24 the trigger is hit and the shares are sold at market. To ensure that the liquidation of the position is not overly costly, a *stop-limit* order can be submitted in which two prices are specified, a trigger price for the stop, and a limit price for the subsequent liquidation order. Using our example, once the $24 stop is triggered, the order submitted could be a limit order with a $23.75 low. If there are bids in the market between $23.75 and $24, the order will be executed. Any residual balance will remain as an offer at $23.75. It is important not to set the limit of the stop loss order too close to the trigger price as this increases the probability that the trigger price is hit, but the stock is not executed due to the close limit, effectively undoing the loss-limiting benefits of the stop order.
- *Good till canceled (GTC):* The default is that all client orders are cancelled at the end of the trading session. If a client wishes for an order (usually a limit or stop) to be left in the market for multiple sessions the order is flagged as a *good till canceled* order and will be resubmitted each session until cancelled. In some markets the GTC order can be submitted to the exchange while in others the broker takes on the responsibility of resubmitting the order each session. When he does this, it is important that he check all GTC orders for corporate actions, which may require changes to the order instructions. For example, with shares of XYZ stock trading at $26, a client submits a GTC order to pay $25 for 10,000 shares. If shares of XYZ were to split 2-for-1, the stock price

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would immediately drop to $13. If the GTC limit order is not updated to the equivalent post-split terms (a $12.50 bid for 20,000 shares), the order would be executed as soon as the stock began trading but would not represent the same economics as the original order. This would also occur with a sufficiently large dividend. In general, GTC orders are cancelled and given back to the customer to be updated when a corporate action occurs.

Two special types of agency orders are those that target the opening and closing prices, referred to as a *market-on-open* (MOO) and *market-on-close* (MOC), respectively.[3]

- *Market-on-close (MOC):* The closing price of the trading session has particular importance because it serves as the day's final reference price for the stock and is used for all end-of-day position marking and profit and loss (*p&l* or *pnl*) calculations, margin adjustments, collateral valuations, and the like. For mutual funds, pension funds, and other collective investment vehicles, the closing price is the point at which the customer deposits received on the day are invested into the fund (or removed from the fund, in the event of a withdrawal). Under *mark-to-market accounting* (which is what all investment banks and broker-dealers use to monitor the value of trading positions), the profit or loss from a position is computed as though it had been liquidated at the closing price and the day's performance is recognized as though it were an actual gain or loss.

  In order to ensure fair treatment for all investors, the official closing price of a stock is not determined in the regular trading session but through a closing auction in which all participants receive the same price. An investor who wishes to execute an order in the closing auction can attach the "close only" condition to their order. Regardless of the time the order is sent, the participation is limited exclusively to the closing auction. A market-on-close order will be executed in the closing auction, regardless of price, while a *limit-on-close* (LOC) order will only be executed if the closing auction price is better than the limit.

  While the specific mechanism of the closing auction differs from one market to another, the general structure is similar. At the end of the session, an auction period begins during which regular trading may or may not be halted. During this time, all market-on-close orders are pooled together to determine a net buy or sell, which is then matched up against buy and sell orders on the book from the regular trading session, as well as any limit-on-close orders, to determine an equilibrium liquidating price at which all market-on-close orders can be completed.

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In some markets, prior to completing the closing auction an indicative closing price is disseminated. This is particularly useful in cases where there is a large imbalance between orders to buy and sell on the close and the resultant equilibrium price is at a significant premium or discount to the last traded price before the auction. By advertising this information, the exchange invites offsetting orders to be submitted to reduce the imbalance and therefore minimize the price deviation necessary to complete all orders. In some markets (NYSE, for one) there is a cut-off time well after which on-close orders are no longer accepted. When a significant imbalance is published, however, this reopens a window of opportunity for the submission of offsetting orders. A trader looking to sell stock who sees a significant buy imbalance may want to take advantage of the opportunity to make a sale by submitting an offsetting limit on close order at a level he considers attractive.

- *Market-on-open (MOO):* The functioning of the market-on-open order is structurally similar to that of the closing auction except for two points. The first is that, with the exception of those days where significant overnight news events or the expiration of derivatives at the opening price results in heavy trading activity, there is generally much less focus on the opening auction than on the close. The second is that the urgency to participate in the opening print is smaller because there is still the entire trading day ahead and excessively large movements on the open are likely to correct themselves in subsequent trading. There is also much greater flexibility to delay the opening print, sometimes for hours, to allow for additional orders to be submitted in the event of a large order imbalance in the opening auction.

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Auctions and Exchange Structure

The handling of the opening and closing auctions provides a useful framework for comparing the benefits of different exchange structures. Looking specifically at the closing auction, the two principal concerns of most participants is that their order be completed—as a residual position would create unwanted risk overnight—and that where imbalances exist between buyers and sellers, the auction price does not represent an excessive dislocation from where the market was trading immediately prior to the closing auction.

Specialist: Under a single market maker specialist system, all market-on-open and market-on-close orders are guaranteed to be completed because it is the specialist's obligation to take the other side of any order imbalance. While this completely satisfies the first

requirement, the model can come up somewhat short in regard to the second. Many specialist firms are small operations with limited capital, and taking the other side of a large closing imbalance can often represent an investment of a significant portion of the firm's assets. As a result, specialists needed to balance the exchange requirement to make a "fair and orderly" market with the need to protect their businesses interests by pricing the risk conservatively—that is, buying (selling) at a significant discount (premium) to the last traded price in order to have a sufficient cushion to trade out of the position the next day and hopefully make a profit or, at the very least, not suffer a loss.

While the facilitation of the closing auction imbalance creates a risk for the specialist, it is also an opportunity, particularly considering that, within reason, the specialist has discretion to fill the order wherever he likes. In order to reduce both the risk to the specialist and the potential for abuse, the NYSE requires that whenever the imbalance between buy and sell orders exceeds 50,000 shares, an "MOC Auction Imbalance" alert be disseminated to advise potentially interested traders of the possibility of a disconnect in the closing auction and give them the chance to participate.

Multiple market maker: In a multiple market maker system there is no single person responsible for guaranteeing that all orders in the closing auction are completed and there exists the possibility that market-on-close orders are left incomplete. In practice, however, this rarely occurs because, where the indicated auction price is at a sufficient premium (discount) to the current price level, traders will see the opportunity to sell (buy) stock at an attractive spread to current market levels and will usually provide the necessary liquidity. This system allows multiple parties to take a piece of what would, under the specialist system, be the responsibility of a single person. This broader distribution of the risk among multiple parties would theoretically tend to reduce the spread at which the auction is priced since the smaller size of the position taken by each individual requires a smaller risk premium.

No market maker: The functioning of a purely electronic exchange is similar to that of the multiple market maker model. While execution is not guaranteed, the existence of countless broker-dealers, hedge fund traders, arbitrageurs, and day traders looking to take advantage of a short-term liquidity mismatch means that, in general, there will be sufficient liquidity to complete most orders. While the pure electronic venues in the United States (ECNs) do not generally have

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closing auction facilities, this model does operate in other countries, though it works best in stocks where trading is quite active and the risk of either a major dislocation or incomplete auction (i.e., not all orders completed) is low.

Principal Trade

The other type of client order, called a *principal trade,* is one in which, rather than executing on the client's behalf, the broker acts as counterparty, buying from, or selling to the customer at an agreed-upon price. In doing this, the client transfers the entire execution risk to the broker who must then attempt to achieve an equal or better price in the market himself or, as is more commonly the case, minimize the shortfall of the actual execution versus the price traded with the client. In practice, a principal order actually results in two trades being executed: the broker's trade versus the client, which must be reported to the exchange as an *upstairs* execution (i.e., not through the exchange floor), and then the broker's trade-out in the market. Because they are the direct consequence of a client order, principal trades are often referred to as *customer facilitation* trades.

Risk price: In the simplest case, the client wishes to buy or sell a particular number of shares and asks the broker for the price at which he is willing to take the other side of the trade. The broker quotes a price and the client has a couple of seconds to either accept the price or refuse. This is generally a very quick process and, in the case that the client is slow to respond, the broker will likely inform him that the price is now *subject,* meaning that the broker reserves the right to quote a new price if the market has moved while waiting for the client to respond. In general, risk prices are always executed *on the wire,* meaning that the client is on the phone while the price is being made.

The client may indicate which side of the market he is on by requesting either a *risk bid* (if he is selling) or a *risk offer* (if he is buying). Alternatively, a more aggressive approach is for the client to ask the broker to make a *two-way market* in the stock for an indicated size. In this case the broker must provide both a bid and offer price at which he is willing to deal and the client can then decide, subject to the same few seconds of validity, whether he wants to trade at the indicated price. If so, he tells the broker that he agrees to trade and indicates whether he is a buyer or a seller.

Many clients are highly sensitive to divulging any information about their positions or intentions for fear that the broker might use

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that information against them. The advantage of a two-way price is that, in the event that he decides not to trade, the client discloses much less information and the broker has no knowledge of what his intention was (i.e., opening a new long or short position or either adding to, or closing out of, an existing position). There is also a perception that by requesting a two-way market, the client pushes the broker to be more aggressive in his pricing. By showing both bid and offer prices, the broker implies a bid-offer spread that he considers appropriate for the given size. If the broker prices his bid and offer too conservatively, the spread will be very wide making the broker look uncommercial.

It is common for brokers to provide clients with more aggressive risk prices than what they are actually able to achieve in the market and to take a small loss on the trade-out in the position. While brokers will closely monitor the profitability of trading with a particular client, some amount of loss on risk trading is considered acceptable and assumed as part of the service provided. In exchange for providing aggressive risk pricing when necessary, clients will pass a certain amount of riskless, agency execution business to the broker, effectively paying the broker back for the service. The percentage of total commission dollars lost through risk trading is called the *loss ratio* and, depending on the client, commonly ranges somewhere between 5 and 25 percent, with extreme cases of negative ratios—representing the very rare case where the broker has actually made money through risk pricing—to greater than 100 percent—where the broker is losing more on trading than the sum of all commissions paid. Clients often request a risk price with the agreement that there is additional agency flow behind it. For example, a client might ask for "a bid on 100,000 to work 100,000," meaning he wants the broker to buy the first 100,000 shares on risk with the agreement that, once the broker has traded out of the position, the client will leave another 100,000 to sell as an agency order. The fact that a riskless agency order is explicitly offered behind the risk order will often encourage the broker to be more aggressive in his risk pricing.

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When a risk price is agreed between a broker and the client, the trade does not need to pass through the centralized order book of the exchange because the buyer and seller have already found each other. This type of off-exchange trade is called a *cross*. So that all market participants can trade based on the same information, in most countries the cross

must be *printed* or *reported to the tape*; the details of the trade are sent to the exchange and disseminated publicly like any other trade, though often with an indicator showing that the trade was executed off-exchange.

The specific rules for printing cross trades differ by country; there are some more lenient markets where a print is not required at all, while others have an outright prohibition of off-exchange executions. In some cases, the cross can only be executed if it is inside the bid-offer spread on the screen at the time of the trade. There is also a general prohibition in all markets against *"painting the tape,"* which is the act of printing trades to the tape for the purpose of creating the impression of trading activity when there is in fact none. When a trade is printed it must represent a true change of beneficial ownership (i.e., a transfer of a position between two trading books at the same broker dealer would not be printed.) Back and forth trading between two brokers ("I'll buy it from you and then you buy it from me") to manipulate the price or create a false perception of activity is also prohibited.

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Block trading: While many risk trades are priced "on the wire," there are some cases where the quantity of shares for which a client wants a bid is so large, either in absolute notional or in comparison to the average daily volume in the stock, that the trader will make a price based less on the liquidity available in the market (how long it will take to trade out of the position and how much impact will be had in the execution) than on the firm's ability to utilize its network of clients and contacts to find buyers that would be interested in the opportunity to purchase shares, particularly if they were offered at an attractive discount to the current market price. This type of trade, called a *block trade* can come from an institutional client, a large private holder, or, as is often the case, from a corporate seller, often the company itself. Block trades are almost exclusively bids—most clients tend to build up into positions slowly and then ask for a bid on the way out.

Block trades can be extremely large, frequently into the hundreds of millions of dollars, and the specific pricing of any trade is a function of many different factors including the relationship with the client, the size of the block, the recent performance of the stock, the identity of the seller and his motivation (if it is disclosed), the current market environment, and whether there have been other recent blocks, particularly from the same sector, which may have exhausted the risk appetite of potentially interested clients.

In general, the broker will guarantee a price to the seller and then take one of two approaches to selling that stock to their clients. One option is for the firm to offer the stock to its clients at a specific price, usually a significant discount to the current market price to entice buyers to participate, on a first-come, first-served basis. For an attractive deal, this creates a certain sense of urgency with clients and trades can often be completed very quickly. Another option is to set a range in which the stock will be sold and offer clients the opportunity to participate on a *book-build* basis. In a book-build, clients submit nonbinding indications of interest in the stock—how many shares they would be willing to buy and at what price—but do not receive an immediate fill. Rather, the broker gives all clients the opportunity to submit their orders, subject a specified cut-off time and then prices the trade based on the level of demand. A highly attractive block (either because the stock is well-liked or the discount is significant) may be oversubscribed (more demand than shares) and priced at the top end of the range with clients receiving a fractional allocation of their desired size.

The important fact in both cases is that, if client demand is insufficient to place the entire block, the broker will end up owning the stock—the client, who is selling, is always given a fill. The substantial risk in a block trade is that, unlike a typical risk bid, where only the seller knows that the broker is long the stock, in a block trade, the broker has advertised to all its clients that they are offering stock. If the trade goes poorly, the entire street knows the broker is stuck long a huge block of shares and will need to sell. This puts the broker in a very uncomfortable position. Given the enormous risks involved, the pricing of a large block will be escalated to the most senior traders and risk managers of the equities division to ensure that the trade is priced appropriately.

Guaranteed VWAP (GVWAP): Another type of principal trade is a *guaranteed VWAP*, in which the broker gives the client an execution price equal to the VWAP over a previously defined time period, regardless of his actual execution. Unlike a risk bid or offer, the specific price at which the broker agrees to fill the client order is not agreed upon prior to the trade, since it cannot be known. Instead the broker and client agree on the characteristics of the fill that will be received—the volume weighted average price of all trades between a preset start and end time, usually including only those trades that occur on the primary exchange where the stock is listed—and then once the time period is passed, provide the numerical fill.

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"Beat the close": Mutual fund inflows (outflows) are added to (removed from) the fund's assets at the closing price of the day. As a result there are substantial flows that target this price and it is common to ask brokers to guarantee that the execution will match the closing price. While an MOC execution is guaranteed by the exchange and the broker can execute as agent, if the order is particularly large, or the stock illiquid, sending the whole order MOC could have significant impact on the market. One way to reduce this impact, and simultaneously improve the execution, is to trade a portion of the order early, prior to sending the remainder of the order MOC. The portion of the order traded early will depend on the relative size of the order and the liquidity in the stock and can range from a few shares to the majority of the order. By trading early, the broker takes advantage of liquidity other than just that available at the close, and also reduces the size of the market-on-close order—both of which benefit the customer. He must, however, be careful to leave enough stock for the MOC order to ensure that his average execution price is better than the close or he will end up taking a loss on the trade. Because the order is a guaranteed MOC the broker must trade as principal since he is assuming the risk of underperforming the close.

Exhibit 3.1 shows a hypothetical example of how working a portion of a large buy order early can not only reduce the total impact on the closing print (the stock closes at $40.36 as opposed to $40.73), but also achieve a better execution price than the close due to the participation in trading prior to the close (average price of the execution is even lower at $40.23, which is $0.13 or 32 bps better than the close).

It is important to be aware that a "beat the close" order, even if well-executed is by no means a sure winner. The trade is a bet on a short-term liquidity imbalance and corresponding price impact. It is not a directional view on the market and abrupt changes in overall market conditions can easily overwhelm the effects of market impact. There is always the risk of a larger order on the opposite side of the market in the same stock at another broker, which results in the stock price moving in the opposite direction to what was expected, precisely in the closing auction. In the context of Exhibit 3.1, this would mean the stock price, instead of spiking upward in the closing auction, would actually drop sharply. If the closing price were $39.80, the broker would have achieved an average execution of $39.90 (or so) on his purchases. However, since the client is guaranteed the closing price or better, the broker would

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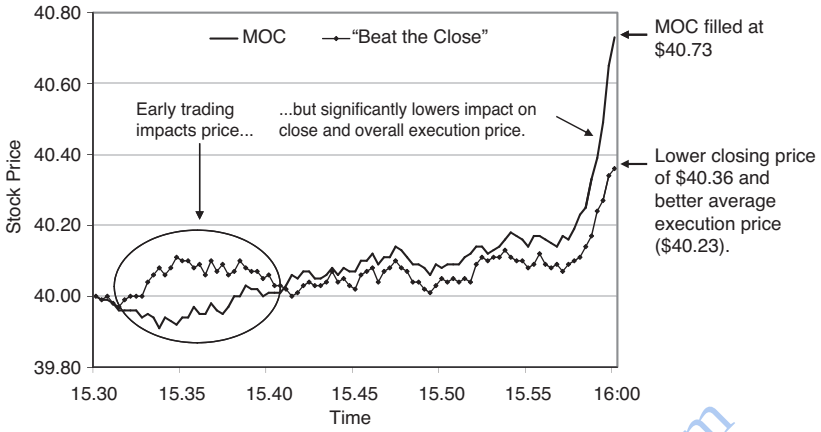

EXHIBIT 3.1 Stock Price Movement Associated with a Large Buy Order Executed as MOC and "Beat the Close"

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then have to sell the stock to the client at the closing price of $39.80 for a $0.10 loss per share.

Limit-price stop order: When requesting a principal bid or offer, the client transfers to the broker all the risk associated with the ability to achieve that price in the market. Compared with the agency execution, this transfer of risk benefits the client whenever the execution price achieved by the broker is worse than the price given to the client. However, if the market moves in the broker's favor and he gets a better price in the market than the risk price shown, the client would have been better off with an agency execution. This is the trade-off between risk and agency executions; the person taking the risk has the upside as well as the downside.

An alternative is a *limit-price stop* order (not to be confused with a stop-loss order), in which the broker guarantees that the client's fill will be no worse than a particular price. In this case the broker works the trade in his own account but agrees to pass on the realized execution directly to the client so long as it is better than the price at which he has "stopped" the client. In this case, the client gets the best of both worlds—protection in the event the price achieved by the broker is worse than the limit price, and full participation if the stock acts well and the execution is better than the limit. For the broker there is no upside; the client receives the better price in all cases. With a stop order, the broker takes on risk but receives only the execution commission and has no opportunity for trading profits.

It is important to distinguish between the pricing of a risk bid or offer and a stop. When quoting a risk price to a client, a broker will make his best estimate of where he can trade out in the market and then, depending on how commercial he wishes to be, quote a risk price somewhere around this level. The expectation is that, while on any individual trade he may make or lose money, the average over time will result in an acceptable loss ratio. With a stop order, however, the broker can only lose money; the upside of any execution price better than the limit is given to the client while the loss from any price worse than the limit is worn by the broker. Due to the asymmetric payoff caused by stopping the client, the limit price offered as a stop will generally be further from the current market price than would the equivalent risk price. It is a common mistake for salespeople and clients alike to ask for a risk price and then assume that it can be converted to a limit-price stop, as though this were a minor detail. This indicates a lack of understanding of the asymmetry of the risks posed by stopping a client order and is a great way to irritate traders.

Agency versus Principal An important distinction between agency and principal orders is that, while they are both executed in response to a client request, in the agency case the orders are represented on the exchange as "client" while a principal order is represented as "firm." The difference is not merely semantic; where two equivalent orders arrive simultaneously to the market, a client order will receive precedence over a firm order. A consequence of this is that, where a client's agency order can be better serviced via a principal execution, the broker must first obtain the client's permission to do so as the conversion of the order type identifier from "agency" to "firm" would technically disadvantage the client's execution. For example, an agency MOC order cannot be traded as a beat-the-close principal order without client consent.

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Proprietary

The last type of trade is a proprietary trade, which is an order executed by the firm for its own benefit and with its own capital and is not related to any client order. It is common for most large firms to have a dedicated proprietary trading division, separate from the client business, which invests the firm's capital. Because of the responsibility entrusted to these groups to invest the firm's capital, "prop" desks are generally perceived as somewhat exclusive as the traders are freed from the day-to-day work of servicing client requests and can focus exclusively on trading "for the house."

In recent years, however, there has been a significant push across most Wall Street firms to increase the amount of proprietary trading done by the

client traders, in an effort to monetize the knowledge gained through client interaction. The logic is simple—a trader who spends his day studying the *price action* (stock price movements), news flow, and published research of a small universe of stocks and who, in addition, sees the trading flows of many different, highly educated clients, is likely to develop a far more educated view on the direction of future price movements in those stocks. If the trader is allowed to take positions for his own account, he should be able to convert this informational advantage into a trading profit.

When this trend began, there was a considerable amount of skepticism and concern expressed by clients, many of whom felt they would in some way be disadvantaged if the client facilitation traders were also executing for their own books. Concerns typically centered around the idea of *front-running,* in which a trader has received a client order and, based on an expectation that the execution of that order will have significant market impact, trades shares for his own account first in order to capture a profit from the market movement he himself is about to create. Not surprisingly, this is illegal.

In reality, the concerns about client traders also taking positions for their own accounts have been dramatically overblown. Speaking from personal experience, in more than a decade of trading, I have never seen a trader deliberately take a position in front of a client order or otherwise disadvantage an agency execution for his own benefit. Aside from the fact that most strategies for benefiting from prior knowledge of a client trade are illegal, it is also an extraordinarily stupid trade from a business perspective as the risk/reward balance is simply not attractive. An investment bank caught front-running client orders would suffer a massive loss of client trust which would jeopardize the entire client business. The small profits that can be gained from stepping in front of a client order are no compensation for the massive reputational and franchise risks taken. As an additional safeguard, to ensure that the pressure put on traders to earn profits does not result in behavior that is inconsistent with firm policy on best execution and fair order handling, firms closely monitor proprietary trading and cross-check proprietary activity against client activity and investigate any abnormal patterns.

While concerns about improper broker activity were overblown, even more confused was the view, frequently espoused by retail investors, that clients were somehow disadvantaged if their broker was trading "against" them—that is, selling when the client was buying, or vice versa. Some smaller brokers went so far as to claim that they provided a superior service because they "never trade against your order." This argument does not make sense. If the broker wishes to take the other side of a client agency order (i.e., trade "against" the client) he must do so according to the "best execution"

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guidelines that require him to provide a price that is as good, or better, than what is available in the market—it can only benefit the customer.

Algorithmic Execution and Electronic Trading

A significant advance in cash trading in recent years has been the development and implementation of sophisticated electronic algorithms for executing many types of trades. The underlying concept is that many of the standard trading strategies used by brokers can be reduced to a simple set of trading rules, which can be codified into a well-defined series of instructions and implemented by a computer. The massive increases in trading volumes since the late 1990s, and the corresponding decrease in trading costs, have been possible because many types of orders can now be managed as well, or better, by a computer than by a human trader.

A simple example is an order to work a trade over the day targeting VWAP. Barring specific indications to the contrary, such as a major overnight event or an impending intraday news release, the best approach to working a VWAP order is to spread the execution over the entire session, in line with the volume "smile" that is typical of U.S. stocks.[4] A typical VWAP algorithm will begin with a statistically-determined volume profile and then apply an implementation strategy that attempts to balance the costs of crossing the bid-offer spread with the risks of deviating too significantly from the target volume profile. For example, the algorithm may initially submit orders on the same side of the market (i.e., buying on the bid/selling on the offer) and leave them there for a given period of time before becoming more aggressive to avoid lagging behind on volume. Smarter algorithms may include more sophisticated monitoring logic that looks to see how the market is trading and become more aggressive where stocks are moving in the wrong direction and less aggressive when stocks move favorably. While monitoring the costs associated with doing so, trading engines may submit, cancel, amend, and execute hundreds or even thousands of individual executions throughout the day on a single trade.

If the trader decides to work the order manually, he will need to constantly monitor the stock and trade many small orders throughout the day in order to reduce the risk of realizing a significantly different price than the VWAP. This is a time-consuming process and, particularly in the case of large, actively traded stocks, the value added by active trader involvement is limited, particularly when the higher costs of broker involvement are factored in. Additionally, it is physically impossible for a human trader to make the number of small adjustments of which a computerized algorithm is capable.

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Another reason for the popularity of algorithmic strategies among clients is that, compared with the more subjective approaches used by traders, electronic algorithms tend to have much less variation in their performance versus the VWAP. While some traders may be able to add value by calling the market direction and appropriately skewing the volume profile of the execution, the results of deviating significantly from the historically defined volume profile is that the performance versus VWAP is likely to be much more broadly distributed, beating by a large amount on some days and missing by a mile on others. Even where the trader, on average, adds value, many clients give a significant premium to the consistency of the performance and are actually more comfortable with an electronic system whose average performance versus VWAP is less impressive, but whose distribution of performance is narrow.

Execution targeting a VWAP benchmark is only one of the many strategies where electronic algorithms can produce equivalent or superior performance to human traders. Other common trading instructions, such as targeting the TWAP, working as a percentage of volume or even minimizing the implementation shortfall from the time the order is received, can be codified into a series of trading rules and implemented en masse across thousands of securities simultaneously. The speed, scalability, and low cost of electronic execution have all contributed to the dramatic decreases in the number of physical traders required on a trading floor, despite the massive increases in trading volumes.

This does not mean that traders have become obsolete. What has changed is that the responsibility of the trader has shifted as the more mechanistic portions of the job have been solved through technology, allowing the trader to focus on the subjective, circumstance, and client-dependent scenario analyses that cannot be decomposed into a series of "if X then Y" trading rules. In the extreme volatility that surrounds a major news announcement in a stock, no computer will ever be able to make the nuanced decisions between protecting the firm's interests in the short term (not taking a trading loss) and the long term (maintaining a relationship with an important client) that are required of a trader. There are also many circumstances, such as trading in highly illiquid stocks, where the outcome achieved through active involvement by the trader is significantly superior to what can be achieved with a machine.

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HOW THE CASH TRADING BUSINESS WORKS

Given the basic understanding of the functioning of the cash market developed so far, we can now examine how the sales and trading business of a

typical large investment bank is structured in order to best respond to client demands for information, execution services, and capital commitment.

Exhibit 3.2 shows a schematic diagram of the life cycle of a typical client order. In recognition of the fact that different steps in the investment process require very different skill sets, investment banks divide the responsibility for servicing clients between three distinct groups: *sales, sales-trading,* and *trading.* Our goal in this section will be to understand the roles and responsibilities of each of these groups and how they interact to service the client business.

Sales

In broad terms, equity salespeople are responsible for delivering the firm's knowledge, insight, and services to external clients. This can mean many different things, depending on the specific characteristics of each client. Some may want little more than a quick summary e-mail or voice mail each morning to update them on any interesting insights on the market or newly published research. Other clients will expect their sales coverage to maintain a much more active dialog about market conditions and trading ideas, as well as providing other services such as arranging meetings with analysts, traders, and corporate management, assisting with quantitative analyses or the opportunity to participate in *initial public offerings* (IPOs) of stock. A good salesperson not only knows which clients want a bullet-point e-mail summary and which prefer to chat about markets on the phone for hours, but can provide them both with what they need.

The objective of a salesperson is, of course, to bring the client's business into the firm. In some cases a particular broker may offer a product or service no other firm can provide (such as access to an IPO or a particularly innovative trade idea) and will receive orders based on the attractiveness of the investment opportunity or quality of the product or service provided. However, in highly commoditized offerings such as agency stock execution, the ability of the broker to differentiate itself is limited and what often leads a client to direct orders to one broker over another is the quality of the sales coverage provided.

A challenge arises when dealing with clients who have very narrowly focused interests, for example, a fund that only invests in utility companies, or specializes in trading "special situation" arbitrage relationships. A salesperson responsible for covering a wide variety of different clients (often referred to as *generalist salesperson*) cannot possibly provide the detailed knowledge necessary to properly service this type of investor. As a result, many firms have *specialist salespeople* who focus exclusively on a particular sector or group of stocks.

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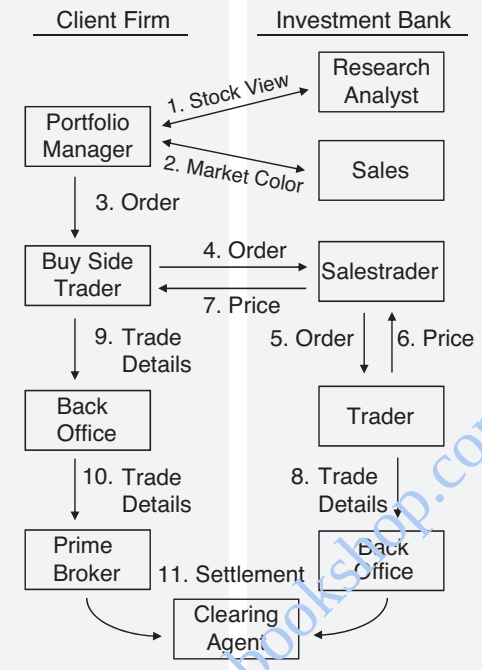

1. The portfolio manager (PM) discusses a stock view with the research analyst.
2. The salesperson, either generalist or specialist, can add additional insight as well as market color from the trading floor.
3. Having decided on an investment, the PM passes the order to his dealer who is responsible for managing the broker relationship.
4. The dealer passes the order to the sales-trader along with his instructions for how it is to be executed, either as agency or risk.
5. The sales-trader passes the instructions to the trader and puts the details of the order (ticker, side, shares, client name, commission rate) order into the firm's order management system.
6. Once executed, the trader puts the fill price on the order ticket for the sales-trader.
7. Sales-trader reports the execution price to the client
8. The trader's system will automatically pass the trade downstream to the back office for booking. If all details provided by the sales-trader are correct, and match what is booked by the client, the trade should clear with no additional manual involvement.
9. The buy side trader passes the details of the order to his back office.
10. Details of the trades are passed to the prime broker who maintains the client's positions and insures proper settlement of all trades.
11. The prime broker settles the trades for the client account with the clearing agent, who will have received the details of the trade from the broker back office and be looking to settle these against the prime broker firm.

EXHIBIT 3.2 Life Cycle of a Client Order: The Broker-Client Relationship

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The specialist salesperson acts as a trading floor authority in the stocks in her sector. Where these are covered by the firm's Research division, he will have a detailed knowledge of the analyst's recommendations and views on the stocks. However, the universe of stocks covered by a specialist salesperson is not limited to those stocks covered by the research analysts and an important contribution of the specialist sales team is their knowledge of those stocks where the firm does not have a published view. Additionally, a salesperson sits on the trading floor and is in constant contact with both clients and the firm's own traders and combines her fundamental understanding of the companies with information on the price action in the stocks, client sentiment, and trading flows.

In addition to an external client base of sector-specific and general funds that they cover, specialist salespeople also service the internal audience of traders and sales-traders by providing information on upcoming events of significance as well as analysis of news announcements and their likely impact on the stock price. Because of their detailed knowledge of the companies in the sector and the most active investors in those stocks, specialist salespeople are sometimes brought "over the wall"[5] and consulted by the investment banking arm of the firm for their opinion on the appropriate pricing for corporate deals (secondary share issuances, IPOs, etc.).

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Sales-Trading

Exhibit 3.2 shows how the investment process at a typical buy-side[6] firm is divided between two distinct roles. A *portfolio manager* (PM) makes the investment decisions for the fund based on his views on the market, which he develops through independent research as well as conversations with research analysts and salespeople. The PM then passes the instructions to a *dealer*, also known as a *buy-side trader*, who is responsible for executing the trades required to express the view. This distinction between idea generation and trade execution is reflected within the sales and trading business of the broker as well. The salesperson, as we have discussed, provides information and opinion to the PM to assist in the development of the investment thesis. There is then a *sales-trader* who, as the name would imply, sits between the salesperson and the traders and is there to coordinate the practical aspects of executing the trade.

While distinct, these roles are not mutually exclusive; in practice, the best salespeople are those that have an understanding of how the trade can be implemented (since there's no use in pitching an idea if you can't actually execute on it), and the best sales-traders are those who understand the investment thesis.

The sales-trader manages the execution of the client's trade from start to finish, a process that involves a number of different responsibilities. One of the most important of these is to act as an intermediary between the client dealer and the internal trader, representing the interests of each to the other so that, insofar as possible, both parties come away satisfied with the results of the trade. This can be particularly challenging when the broker is asked to commit capital by providing a risk price for stock as the economic interests of the two parties are then directly opposed. Once the trade is executed, the sales-trader is also responsible for coordinating the efforts of the various groups involved in the downstream processing and settlement. This includes checking that the client's account is set up properly, that the trade is booked with the correct details (price, commission rate, allocation between subaccounts) and that any post-trade settlement issues are resolved quickly.

Just as important as the sales-trader's skill in executing an order is his ability to bring in new orders. While the PM may direct the dealer to trade with a particular broker to compensate them for sales coverage and research services, in many cases, it is left to the discretion of the dealer to decide with which counterparty to execute a trade. A sales-trader's responsibility, therefore, is not simply to wait for the phone to ring with an order, but to make sure the phone *does* ring by staying constantly in front of his clients, providing them with market color and updates on trading activity in stocks where they have an interest.

The responsibility of a sales-trader to provide his clients with information is taken very seriously. When there is a sudden move in the market, a good sales-trader will find out the reason (if there is one) and then proactively call his clients with a quick "Hey, market just ticked lower because XYZ said holiday sales were weaker than expected." If the move cannot be attributed to a particular piece of news, he may still acknowledge the movement and the client's potential interest in an explanation with a call saying, "The market's ticking lower here but we're not seeing any reason for it—flows are light and we're actually a better buyer into this weakness." This shows the client that his sales-trader is "all over" the market and wants to keep his client informed because he values his business. If the client doesn't receive a phone call and has to dial the broker and ask if there is any news out (and worse yet, if the broker doesn't know), it shows a lack of attention to markets and a poor level of service.

Sales-traders are rewarded, in the end, for "hustle"—being very quick to get things done and thinking about their client's needs. A good sales-trader knows his client's interests and will selectively advertise to him activity and trading opportunities in those names where he would want to be kept informed. It is important that the sales-trader use good judgment in selecting

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what information to reflect to the client. While it would be poor sales trading to not advise a client of an important news announcement or trading opportunity in a stock of interest, it is just as bad to inundate a client with lots of irrelevant information as this not only wastes time and causes annoyance, but dilutes the value of the service.

In addition to providing color on what is happening in the market, dealers will expect to be made aware if one of their brokers is going to make a large trade in a stock where they have an interest, and, where possible, to be given the opportunity to participate. For example, if the client has been buying a stock, then the sales-trader should know that if a significant sell order is received, before selling those shares to anonymous strangers in the market, this particular client should first be given the opportunity to take the other side. If the client trades, this is a triple win: the seller gets his trade done quickly and with little impact, the buyer takes advantage of the opportunity to purchase more stock at an attractive price and feels well-serviced by the broker, and the broker gets a commission on both sides of the trade.

At the other end of the spectrum is the worst-case scenario where the sales-trader is unaware of the sell order, which is then executed in the market with sufficient impact to draw an incoming call from the client asking for color on why a stock he owns is trading lower. In this case, the sales-trader responds initially with "I don't know, let me find out" and then has to call back with "Oh, it was us selling it." The triple-win is now a quadruple-loss as the execution price for the seller was worse than could have been achieved, the buyer missed the opportunity to participate and a commission-paying ticket was lost, the sales-trader looks sloppy, uninvolved, and unaware of what is going on in his own firm (much less the market in general) and the client feels under-serviced and is likely to direct flow to other more attentive brokers. The difference between the triple-win and quadruple-loss outcomes all hinge on the sales-trader simply being aware of what was going on around him. There is much to be gained through good sales trading, and even more to be lost.

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Trading

While many people use the word "trader" to describe their work, the word means very different things in different contexts. The word can be used to describe the most senior risk-taker at a multibillion-dollar hedge fund who actively takes large directional bets on the market and moves in and out of positions in an effort to achieve superior returns. Alternatively, it can refer to low-level order processing clerk who simply pushes client trades into the electronic trading engines, taking no risk on the execution and having no input in the decision of what is bought or sold.

In the context presented here we will focus on the role of an institutional *flow trader,* who is the person ultimately responsible for executing orders in the market, determining the appropriate price at which to commit capital in principal trades, and managing the risk associated with trading out of the positions taken. A flow trader may also take on a significant amount of proprietary risk in order to extract further value from his knowledge of the markets though, for our purposes here, this will be a secondary responsibility.

When working orders, either on behalf of a client or trading out of risk for his own book, a flow trader utilizes two types of knowledge: precise, factual information about the stocks he trades, and a subtle, intuitive understanding of how markets work and the unwritten rules of the client service business.

The first of these is quite straightforward and is the part that a new trader can most quickly acquire. Most traders will usually focus on stocks from one or two sectors and, in order to properly understand the drivers of daily price movements, will develop a detailed knowledge of all aspects of those stocks. This includes details of the company's business activity, financial ratios, timing of dividends and earnings announcements, recent price movements, and historical performance as well as any unique issues or circumstances faced by particular companies (pending lawsuits, new drug approvals, and the like). In addition to the stock-specific information, the trader must also have a complete understanding of the relevant laws, exchange regulations and firm policies that govern the behavior of traders servicing client orders and how those orders can be executed.

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The second type of knowledge is more nuanced and takes time and experience to develop. By actively participating in the markets day after day, traders develop a "feel" for how stocks trade, which greatly improves their ability to determine the best way to work an order. One of the reasons clients utilize the full-service trading model, as opposed to the low-cost DMA approach, is because they can benefit from the trader's knowledge and experience to improve the quality of the execution. Specifically, a trader uses his experience as a guide to strike a delicate balance between the two primary risks associated with a stock execution: market risk and market impact.

Market risk refers to the possibility of adverse market movements occurring prior to an order being completed, where those movements are unrelated to the act of executing the shares. For example, if a client submits an order to buy a single share of stock at market when the offer price is $22.35 and, by the time the order has been sent to the exchange and executed the offer side has moved to $22.45, the clients fill will be $0.10 higher than expected. The change in market conditions between the time the

decision was made to take a position and the time it is actually executed—in this case the move of $0.10 against the client—represents the market risk. Market risk is symmetric—the stock price could move favorably during the time period (for example, if the offer price had decreased to $22.30 resulting in an execution price $0.05 better than expected).

The degree of adverse price movement that is actually created by the act of executing the shares is called *market impact,* and is, by definition, always negative. While conceptually simple, it can be difficult to accurately assess the market impact of a trade because it requires the distinction between price movements in the stock caused by the execution from what the market would have done had the order not been there. If the order is executed in a very short period of time, it is often reasonable to assume that the stock price would have remained roughly constant over that time and therefore the market impact can be measured as the deviation of the execution price from the last sale (or alternatively, the midpoint of the bid-offer at the time the trade was submitted).

For example, using the screen market in XYZ stock from earlier in the chapter, if a client were to submit a "held" market order to buy 20,000 shares, the order goes directly to market and is executed at an average price of $25.4448. In this case, it is clear that the entire price movement is due to the act of purchasing the shares since the market order was executed immediately and went through three levels of market depth to be completed. The entire deviation between the market price and the execution price is therefore due to market impact, which can be calculated as $0.0348 = $25.4448 – $25.41, or roughly 14 bps.

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Ticker	Last	Last Size
XYZ	25.41	12

Bid Size	Bid	Ask	Ask Size
45	25.40	25.42	61
112	25.38	25.45	100
95	25.30	25.47	82

Where market impact becomes more nebulous is when an order is executed over a longer period of time. In this case, in order to differentiate market risk from market impact, there must be an estimation of what the stock price would have done had the order not been in the market. A common method for doing this is to use the performance of a benchmark equity index, such as the S&P 500 or an index of stocks from the relevant sector of the market, as a proxy for what the stock would have done during the time period. For example, if a relatively large buy order is worked over an

hour during which time the stock price rises 50 bps while the relevant sector index rises only 20 bps, the estimate of the impact of the execution would be 30 bps. The market impact would be the same if the stock price remained flat during the time period while the relevant sector index fell by 30 bps. In both cases, the estimation is that, were it not for the presence of the buyer, the stock would have been 30 bps lower at the end of the time period than it was.

Another means of determining the degree of market impact of a trade is to compare the total number of shares traded during the time period the order was executed and compute the percentage of the traded volume the order comprised. For example, if an order to buy 50,000 shares is executed over an hour in a highly liquid stock that trades two million shares in that time period, it is likely that the 50,000-share order had little or no market impact given that it was only 2.5 percent of the traded volume in the time period. However, if the same 50,000 shares were executed during a time period in which only 100,000 shares traded, the executed order would represent 50 percent of the traded volume and would likely have had significantly more impact.

To estimate the likely impact of a planned stock trade, the shares to be executed are compared to the *average daily volume* (ADV) in the stock, which measures the average number of shares of the stock that have traded each day over a given number of trading sessions. For example, the 30-day ADV would measure the average number of shares traded during the last six weeks of trading. While ADV can be calculated over any number of sessions it is common to use calculation based on the 20- or 30-day average as this will generally give the best estimate of current conditions as well as capturing seasonal effects. Assuming the trading volume in the session is similar to recent levels, an order that is a small percentage of the 30d ADV will likely be able to be executed quite quickly. An order of greater than 25 or 30 percent of ADV will likely have some amount of impact even if it is executed over the entire session.[7] Orders for very large percentages of ADV (i.e., >100%) can certainly be executed but will need special attention and can have more significant impact unless an investor interested in taking the other side of the trade can be found.

Given the client's instructions, it is the trader's responsibility to determine the appropriate balance between trading aggressively to complete the order quickly, which will imply greater market impact but less market risk, and working the order over a longer period of time to reduce impact but exposing the client to adverse market movements. The trader must also understand the characteristics of the stock in question to determine the best method of executing the shares with the lowest impact. Two stocks may be similarly liquid but trade very differently. In some very liquid stocks, many small orders trade with very high frequency but the bid and offer size

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showing in the market remain quite small. In this type of stock, even an order that is a small percentage of ADV can have significant impact if the entire size is shown in the market because it stands out from the crowd and advertises the presence of a buyer or seller of larger size than what is typically shown. Alternatively, in a relatively low-priced stock very large size may be shown on the inside quote, both because a larger number of shares of a low-priced stock is necessary to achieve the same notional value, and because the minimum price increment (the tick size) of $0.01 represents a significantly larger percentage move in the price.

For example, a broker working an order to purchase $1 million of a $100 stock only needs to execute a total of 10,000 shares and may do so by placing many small orders at multiple limits in order to achieve an execution price that is within, say, 20 bps of where the stock was when received. The same order in a $5 stock requires that 200,000 shares be traded, and due to the low price of the stock, a single tick represents a 20 bps move. The lower price stock is likely to show a much larger bid and offer size and the broker will need to decide whether to cross the bid-offer spread and pay the 20 bps to complete the order, or place the 200,000 at the back of the queue on the bid side and take the market risk that the stock price moves up and the order remains unexecuted. If both the bid and offer move up by $0.01 then the new offer side will be 40 bps away.

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While a cash trader's primary responsibilities are to execute trades, price principal orders, and work out of risk positions, equity sales and trading is a client service business and traders must balance the short-term requirement to protect firm capital by pricing risk appropriately with the long-term need to ensure that clients are happy with the service they receive and keep giving business to the firm. While different roles within the organization may be more focused on the internal risk management and pricing issues, every employee contributes to the commercial success of the business.

This requirement to focus on client service manifests itself in many ways. For example, when pricing a risk trade, many times the trader will know the "right" price to quote, given the liquidity of the stock and the market conditions, but offer the client something much more aggressive to ensure he feels well treated. Particularly in the case of the larger, more important clients of the firm, it is often necessary to knowingly take a loss on a particular trade in order to preserve or potentially strengthen the client relationship.

Traders must also be aware of how their actions affect clients and, whenever possible, advise the sales-traders of opportunities in which their clients might have an interest to participate. While essential to the client business, this cooperation between traders and sales-traders is not always easy. For example, if the trader has a large sell order, sales-traders will expect to be given the opportunity to reflect that information to other clients who

may have an interest in buying stock before the trader executes. While pairing off with another client is the optimal situation for the trader as well, in giving the sales-traders the time to "shop the order" to get to the other side, he deliberately holds back on executing and in doing so takes on market risk that the stock price moves lower without his participating. While individual situations can cause friction and encourage the stereotype of traders and sales-traders at each others' throats, in practice, it is extremely important for traders and sales-traders to work together amicably. The success of the business depends on striking the proper balance between the conflicting goals of maintaining and strengthening the client relationship and running a profitable business within appropriate risk limits.

COMMUNICATION

In the fast-paced world of a trading floor, clear communication and efficiency are essential. As a result, certain linguistic standards have evolved to which all trading floor personnel must adhere to avoid confusion. Provided here is a list of some of the most commonly used expressions along with translations and examples. In all cases, we reference the following screen quote in stock XYZ.

Ticker	Last	Last Size	Bid-Ask	Bid-Ask Size
XYZ	25.09	12	25.08 / 25.12	45 × 41

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Bid for/Offer at. The prepositions *for* and *at* are inextricably linked with the buy and sell side of the market, respectively. Whether communicating an order to buy, or reflecting a risk bid to a client, the language is always the same: you *"Bid $X for Y shares."* Similarly, with a sell order or risk offer: you *"Offer Y shares at $X."* While other verbs are sometimes used besides "bid" or "offer," or sometimes omitted altogether, the prepositions remain constant. A few examples will illustrate this. (*Note:* Each bullet-point is an independent comment or dialog.)

- *Trader:* "I'll bid you $25.10 for 35,000 shares."
- *Sales-trader:* "Can you offer me 10,000 XYZ at $25.12?"
- *Sales-trader:* "Where can I buy 15,000 XYZ?"
  Trader: "At $25.12."
- *Sales-trader:* "In XYZ—can I pay $25.12 for 25,000?"

Make a market for X shares: When "making a market," the sales-trader (or client) is requesting an indication of the price at which he could buy or sell X shares. Where the number of shares is not specified the trader may ask for clarification or simply choose a number he considers commercial. If the bid and offer sizes are the same, this is indicated by saying *"up."* Another way of requesting a market is to ask the trader "where he is" for a given size.

- *Sales-trader:* "Can I get a market in 100,000 XYZ?"
  Trader: "$25.07 at 14." (Understood to mean $25.14.)
- *Sales-trader:* "Can you show me a market in 50,000 XYZ?"
  Trader: "The touch" (i.e., the screen bid and offer, in this case $25.08 at $25.12).
- *Sales-trader:* "Where are you in XYZ?"
  Trader: "$25.07 at 14; 100,000 up."

Decimal quoting: Particularly where both trader and sales-trader (or client) are looking at the screen quote in a stock, it is usually not necessary to specify the integer value when quoting a stock price, and only the decimal is used. Where it requires specification, the integer value is often referred to as the *"big figure."* Alternatively, *the figure* is used to refer to the nearest whole integer value (since there is nothing after the decimal place to quote).

- *Sales-trader:* "Where can I buy 50,000 XYZ?"
  Trader: "At 14."
- *Sales-trader:* "What's the big figure?"
  Trader: "25—I'll sell you 50 at $25.14."
- "I'm a figure bid for 250,000 XYZ." (In this case, a "figure" bid would imply a bid price of $25.00.)

Hit and lift: A bid is always *"hit"* and an offer is always *"lifted."* If a client has just "hit" the trader, the trader is now long. If the trader has just been lifted, he is short.

A senior prop trader with whom I worked some years ago described himself as a "hit 'em and lift 'em kinda guy." That is to say, rather than working an order to try to get a price that was a few cents better on the execution, he preferred to simply get the trade done quickly (hit bids and lift offers) and then move on to the next thing. An analogous expression is the trader admonition "Don't be a dick for a tick" which is a reminder to traders to keep perspective. In general, traders tend to be extremely focused on the minute price fluctuations intraday and, particularly with proprietary trades, want to see the market "come to them" rather than just lifting offers or hitting bids. However, an order submitted at a limit runs the risk

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of not being executed. Traders too often make the right call on a movement in a stock and then end up not participating in that movement because they tried to be a bit too clever and refused to cross the bid-offer spread to get the trade done. The excessive focus on the value of one "tick" means they have missed out on an opportunity to capture a big move.

Mine, yours, sold, done: When a broker is asked to quote a market, various expressions are used to indicate that the client wishes to trade at the indicated price. Where the broker has communicated a two-way price, the response must indicate not only that the client wants to trade, but whether the client has bought or sold at the indicated price. Assuming the trader is asked to make a market in 100,000 shares of XYZ and quotes a price of "$25.05 bid, at $25.15," the sales-trader, speaking from the perspective of the client, might respond with any of the following:

Client Buys/Broker Sells 100,000 Shares at $25.15

- "I buy 'em."
- "Mine." (From the client's perspective, the shares are now "his"—bought from the broker.)
- "I'll lift you."

Client Sells/Broker Buys 100,000 shares paying $25.05

- "Sold."
- "Yours." (From the client's perspective, the shares are now "yours"—sold to the broker.)
- "I'll hit you."

If the broker has quoted a one-sided market, the sales-trader needs only to say *"Done"* to indicate that the client wishes to deal at the quoted price for the indicated size.

Subject: The trader will announce that a price has become *"subject"* if the client takes too long to decide whether to trade. A price being subject indicates that the broker reserves the right to not trade at the price indicated to the client. If the broker wants to make clear that the previously quoted price is no longer valid he can simply say he's "*off*" the price and if the client wishes to trade, he must re-quote.

- "$25.10 bid for 100,000 XYZ." <5 seconds pass> "That's subject." <The stock now drops to $25.02 offer.> "I'm off that. Figure bid for 100."

Choice price/Locked market: When a broker quotes a *choice* price, he indicates a single price at which he is willing to buy or sell. This is

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also called a *locked* market and is the most aggressive price a trader can show—he makes no bid-offer spread for taking the risk and relies entirely on the commission to cover any losses on the trade-out of the position.

- *Sales-trader:* "Where are you in XYZ in 100?"
  Trader: "$25.10 lock on 100." (assumed 100,000)

An axe: When a broker is in a position to provide superior price, liquidity, or both in a particular trade, as compared with what would likely be available from another broker, he is said to "*have an axe*" or to "*be axed*" in the name. This is frequently the result of the broker having taken on a position as part of a risk trade.

- *Trader:* "I'm axed to sell XYZ—I can offer 250,000 mid-market."

Cans: If a sales-trader is working an order in a particular stock with the trader and giving him multiple orders, it must be made clear whether the new orders are in addition to existing orders or replace them. For example, if the sales-trader has instructed the trader to bid $25.05 for 10,000 XYZ and then says "bid 10 cents for 10,000," he should specify whether this order cancels the existing $25.05 bid he is already working or if it should be submitted in addition to that (i.e., pay $25.10 for 10,000 *and* keep bidding $25.10 for another 10,000). This would usually be said either as *"10 cents cans the nickel bid,"* which means to move the $25.05 bid up to 25.10 and continue to work a total of 10,000 shares, or *"$25.10 bid for 10,000, no can,"* which means that the existing order is still in effect and the trader should put another 10,000 share bid into the market with a $25.10 top.

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As a final observation about communication, it should be observed that, while *instant messaging* (IM) applications have greatly increased the ability of traders to quickly communicate with large numbers of clients, live markets are traded on the phone. IM chats lack the immediacy and clarity of a real-time phone conversation and introduce too many possible additional sources of error and miscommunication (typos, overlooked messages, computer hanging). Where a trader has quoted a live price, the latency associated with anything other than a live phone conversation is too great: a market sent via IM is almost by definition, subject.

PURCHASING A STOCK IN A FOREIGN CURRENCY

When buying and selling securities denominated in a currency other than their home currency, investors assume additional risk related to exchange

rate movements that, depending on how the purchase or sale is financed, can be relatively small or quite significant. Surprisingly, despite their central role in international investing, the currency considerations of a foreign security purchase are widely misunderstood.

The two ways to pay for a stock denominated in a foreign currency are either by borrowing the foreign currency or by purchasing it. The exposure to exchange rate fluctuations in the two scenarios is very different and is best be demonstrated through a concrete example.

Funding in the Foreign Currency

Let us assume a U.S. dollar (USD)–based investor borrows 1 million euros (EUR) and uses them to purchase 10,000 shares of XYZ for a price of 100 EUR per share. Assuming that there are no other positions in the account, the investor's holdings are summarized in the table that follows. There are two positions: a long equity position and a short currency position, each worth 1 million EUR. The initial exchange rate is assumed to be 1.5 USD/EUR.[8]

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Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	100.00	1,000,000	1.50	1,500,000
EUR	–1,000,000	1.00	–1,000,000	1.50	–1,500,000

We will now consider what happens when the stock price moves, when the exchange rate moves, and when both of them move. We begin by assuming that the stock price moves from 100 to 110 EUR per share. Since the client is holding a long position of 10,000 shares, he earns a profit of 10,000 shares × 10 EUR/share = 100,000 EUR, which, at current FX rates, is equal to $150,000. The movement in the equity price does not affect the short currency position. Absent any movement in the exchange rate, the USD value of the position has experienced exactly the 10 percent return of the underlying equity.

Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	110.00	1,100,000	1.50	1,650,000
EUR	–1,000,000	1.00	–1,000,000	1.50	–1,500,000
		EUR P&L =	100,000	USD P&L =	150,000

In the case where the stock price remains constant at 100 EUR but the EUR weakens against the USD, dropping from 1.5 USD/EUR to 1.4

USD/EUR (it takes fewer USD to buy a EUR). The currency move impacts the USD value of the long stock position, causing it to drop by $100,000 despite the fact that the stock price has not moved from its initial value of 100 EUR. However, the USD value of the short currency position of 1 million EUR has also decreased by an equivalent amount (the borrowed EUR that must be returned are now worth less in USD terms than they were when borrowed). The currency move impacts the long and short sides equally, resulting in no net gain or loss.

Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	100.00	1,000,000	1.40	1,400,000
EUR	–1,000,000	1.00	–1,000,000	1.40	–1,400,000
		EUR P&L =	0	USD P&L =	0

Let us now examine the impact of a combination of a stock price appreciation from 100 EUR to 110 EUR and a simultaneous weakening of the EUR from 1.5 USD/EUR to 1.4 USD/EUR. In this case, the weakening of the EUR impacts the long and short positions equally on a percentage basis, but because the long equity position has generated a profit, the long and short positions are no longer the same size and therefore the equal percentage moves do not result in equal and offsetting profits or losses. The investor has earned a profit of 100,000 EUR and, until the position is closed out and these euros converted back to USD, he will have currency exposure on that profit. In this case, the weakening of the currency has reduced the USD profit from the rally in the stock price from $150,000 to $140,000. (A 9.4 percent return in USD instead of 10 percent.)

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Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	110.00	1,100,000	1.40	1,540,000
EUR	–1,000,000	1.00	–1,000,000	1.40	–1,400,000
		EUR P&L =	100,000	USD P&L =	140,000

An easy way to visualize this is to think of the investor as holding a long position in a combined equity-and-currency asset (the foreign stock) and a short position in a pure currency asset. The investor has complete equity exposure but the long currency exposure is offset by the short currency exposure in the amount of the initial purchase price of the stock. The only currency exposure on the position arises when the long and short notional values differ—that is, when there is a profit or loss on the equity: a profit on

the foreign equity position produces a long position in the EUR while a loss on the equity leaves him short the EUR.

Funding in the Home Currency

The other alternative is for the client to borrow USD and use these USD to purchase EUR, which can then be used to pay for the long stock position. In this case, the client will have a long position in the equity but no offsetting short position in the EUR. The positions in the investor's account are then:

Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	100.00	1,000,000	1.50	1,500,000
USD	–1,500,000				1,500,000

The difference is that to a USD investor the value in USD of a USD position is constant and will not be affected by movements in either the currency or stock prices. If we now consider the same three cases—an equity move, a currency move and a combined equity and currency move, the results are very different from what we saw in the previous section in those cases where the currency moves because the offset that was previously provided by the short currency position is no longer there.

In the case of an equity move with no currency movement, the result is the same. This is hardly surprising—if the exchange rate does not move then it does not really matter that the trade was in a foreign currency. The investor makes a profit of 100,000 EUR that, at current rates, is worth $150,000.

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Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	110.00	1,100,000	1.50	1,650,000
USD	–1,500,000				–1,500,000
		EUR P&L =	100,000	USD P&L =	150,000

The difference between funding in the local currency, and funding in the home currency, is clearest in the case where the stock price is constant and the currency weakens from 1.5 USD/EUR to 1.4 USD/EUR. If the position is funded in the local currency, as shown in the previous example, there is no exposure to the movement in the currency. By funding in the home currency, the investor takes on currency exposure on the entire notional value of the

position which, in the case of a weakening of the foreign currency, results in a $100,000 loss.

Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	100.00	1,000,000	1.40	1,400,000
USD	–1,500,000				–1,500,000
		EUR P&L =	0	USD P&L =	–100,000

In the third case, the combination of a favorable equity movement and an adverse currency movement, what was previously a small loss due to currency exposure on the profit on the trade is now a significant offset of the equity profit with a currency loss, resulting in a net profit of $40,000, versus the previous gain of $140,000.

Asset	Position	EUR Price	EUR Value	USD/EUR	USD Value
XYZ	10,000	110.00	1,100,000	1.40	1,540,000
USD	–1,500,000				–1,500,000
		EUR P&L =	100,000	USD P&L =	40,000

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There is not a "correct" answer to whether positions should be funded in the local currency or the home currency of the investor. In the previous example, the weakening euro produced a loss for the USD-based investor, but it could just as easily have been a gain. The key point to understand is that by funding in the local currency of the stock, the investor limits his exchange rate exposure to the profit or loss on the trade, while by funding in his home currency he is expressing a double-barreled bet on both the equity performance and the exchange rate. An easy way to remember this is that, when funding in the home currency, the first thing the investor did was buy EUR to pay for the stock—the investor is now long EUR for the full notional amount of the trade.

Currencies

For reference, Exhibit 3.3 contains a list of some of the most actively traded currencies. All currencies globally are quoted against the USD using a three letter symbol. The majority of foreign currencies are quoted as the number of foreign currency units per USD (e.g., 110 JPY per USD). However, a few

Americas	
USD	U.S. dollar
CAN	Canadian dollar
MXN	Mexican peso
BRL	Brazilian real
ARS	Argentine peso
Middle East and Africa	
AED	UAE dirham
QAR	Qatari riyals
KWD	Kuwaiti dinar
EGP	Egyptian pound
ZAR	South African rand

Europe, Africa and Middle East	
EUR*	Euro
GBP*	British pound
CHF	Swiss franc
SEK	Swedish krona
NOK	Norwegian krone
DKK	Danish krone
ISK	Icelandic krona
RUB	Russian rouble
PLN	Polish zloty
CZN	Czech koruna
TRY	Turkish lira

Asia	
JPY	Japanese yen
AUD*	Australian dollar
CNY	Chinese renminbi
HKD	Hong Kong dollar
KRW	South Korean won
INR	Indian rupee
SGD	Singapore dollar
TWD	Taiwan dollar
NZD	New Zealand dollar
THB	Thai baht
MYR	Malaysian ringgit

EXHIBIT 3.3 Global Currencies
Note: Currencies indicated with an ∗ are quoted in units of USD/Foreign.

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of the most important currency rates—euros, British pounds, and Australian dollars—are quoted as the number of USD per foreign currency unit (i.e., 1.55 USD per EUR).

ADRs and Dual-Listed Securities

Investors are naturally inclined toward trading in their home currency and on their domestic exchange—it is easier, more familiar, and usually less expensive, and the market is open during hours when they are awake. However, there are significant benefits to international diversification in an investment portfolio and many foreign companies provide attractive investment opportunities. For investors in the United States, *American depositary receipts* (ADRs) provide an attractive solution to this problem: they are U.S.-listed securities that trade in U.S. dollars on a U.S. exchange but represent claims on shares of foreign stocks.

The structure of an ADR is simple: a depositary bank purchases shares of a foreign stock and then issues receipts (claims of ownership) against those shares, which are then listed. The holder of an ADR has the option of exercising this claim and delivering ADRs to the depositary bank and receiving in return the equivalent number of foreign securities, subject to a nominal ADR conversion fee. The ADR issuance process is open ended—new ADRs can be created almost without limit to meet the demands of investors (subject only to the availability of local shares). If the foreign security has a very low price in USD terms, ADRs will sometimes be constructed such that one ADR represents a claim on several shares of the foreign security.

ADRs are an extremely popular way to invest in foreign equities without ever leaving the comfort of the U.S. markets and exchanges. In many cases,

because of the enormous liquidity of the U.S. markets, the ADR actually has superior liquidity to the local share, particularly where trading in the local markets is hampered by currency restrictions or, as is the case for ADRs on Asian stocks, occurs at inconvenient hours for U.S. investors. The easy convertibility between ADRs and local shares guarantees that ADRs rarely trade at a significant premium or discount to the local shares because traders with the ability to trade both ADRs and local shares can easily trade one against the other. Because ADRs provide easy access to foreign markets for U.S. investors, they frequently trade at a slight premium to the *parity value* implied by the local share price and FX rate, even after factoring in the frictional costs of the execution costs in both regions, bid-offer in the FX and ADR conversion fees. In the cases where there is a significant gap in the exchange hours of the local share and the ADR, the arbitrage can be more difficult to capture without a significant amount of market risk and the ADR price can deviate more significantly from its parity value.

In terms of the exposure to the exchange rate, an ADR is equivalent to purchasing the foreign security directly and funding in USD. An investor can pay USD to buy an ADR and then convert the ADR into local shares, which leaves him long the foreign stock and short USD.

An alternative to issuing an ADR is to actually list the local security on a U.S. exchange. This is particularly popular with many Canadian stocks that trade on both the Toronto Stock Exchange, in CAD, and the NYSE or NASDAQ, in USD. The important feature of a dually listed security is that it is *fungible* which means that the only difference between the local shares and the U.S. listing is the currency of settlement; a share purchased on Toronto can be sold in New York with no additional processing fees. As a consequence, the arbitrage opportunity, should the relative prices of the two listings get out of line with the exchange rate, is even easier to capture than with an ADR, and therefore appears less frequently (particularly since Canada and the United States have the same trading hours.) In stock where there is a significant level of interest in a Canadian company by U.S. investors, the U.S. listing can actually have superior liquidity to the Canadian listing.

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SUMMARY

An understanding of the structure and functioning of the markets for trading in individual stocks is the most basic part of the knowledge set required of a trader or salesperson working in the equities or equity derivatives business. Stocks in publicly listed companies are traded on an exchange, which serves not only to centralize, organize, and match up orders to buy and

sell individual stocks, but also acts as the counterparty to all orders, which greatly facilitates the booking and clearing of trades. In fulfilling this role, stock exchanges can be structured according to several models, depending on the number of market makers (traders obligated to provide continuous liquidity) that exist in each name.

Orders submitted to the exchange are classified as one of three broad types:

1. *Agency:* The broker acts purely on the customer's behalf and all fills are passed directly to the client (often via a wash account).
2. *Principal:* The order is executed for an account belong to the broker but in response to a client order that has already occurred (a risk bid or offer) or will occur (guaranteed VWAP). Very large principal trades are called *blocks*.
3. *Proprietary:* A trade executed for the broker's own account based on a view in the underlying stock and not in relation to any client inquiry.

The instructions given by the client to direct the broker's actions in executing the trade must be clear enough to ensure that the trader acts according to the client's wishes, but general enough to allow the broker to react to the ever-changing conditions of the market. The result is a variety of standardized terminology, some of which have precise definitions (MOC, MOO, VWAP), and others that are more qualitative ("would," "work," "in line"), which are used to quickly communicate trading instructions with as little ambiguity as possible. There are also a number of very specific linguistic conventions (e.g., "bid for" and "offer at") to which traders and salespeople adhere strictly when communicating orders with each other.

The investment process involves the interaction of three different groups within the equity sales and trading division. Salespeople (generalist and specialist) focus on delivering the best ideas of the firm to its clients and assisting in the development of the investment thesis. Sales-traders manage the trade execution process and act as the primary point of contact for the client dealer. Traders are the ones ultimately responsible for executing orders, pricing principal trades, and managing the associated risk.

When a stock is denominated in a currency other than the home currency of the investor, there is an additional risk from holding the position related to exchange rate movements. The magnitude of this risk depends on whether the investor borrows or buys the foreign currency needed to purchase the shares.

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