Investment Management

S. R. Vishwanath • C. Krishnamurti
Editors

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A Modern Guide to Security Analysis and Stock Selection

Springer

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Preface

The purpose of this book is to provide students with a realistic view of the role and activities of an equity security analyst within the investment process by building a construct of how capital markets function and teaching the "thought process" involved with securities analysis. The book will focus on three aspects of securities analysis: (1) understanding the process of analyzing companies; (2) understanding the valuation process; and (3) understanding the challenges of achieving success in a highly competitive capital market.

The focus of this book is on the financial theory and empirical evidence that are useful for investment decisions. The topics covered in this book can be broadly categorized into five groups:

- *Financial Theories*: This includes portfolio theory, the capital asset pricing model, and the arbitrage pricing theory, all of which have become an integrated part of the decision-making in investments.
- *Empirical Evidence in the Equity Market*: This includes patterns in cross sections of stock returns and the time series behavior of stock returns.
- *Introduction to Fixed-Income and Credit Sensitive Instruments*: This includes default-free as well as defaultable bonds; yield curve analysis; fixed-income derivatives such as swaps, caps, floors, and swaptions; models of default and ratings transitions; and more recent development of credit derivatives.
- *Market Efficiency and "Active" Investments*: We start with the efficient market hypothesis, which is a useful framework for modeling financial markets. Like any model, the efficient market hypothesis is not a perfect description of reality: some prices are almost certainly "wrong." Hence there are reasons to believe that active management can have effective results. Topics in active investments include security analysis, active portfolio management, hedge funds, and risk management issues.
- *Introduction to Behavioral Finance*: While traditional finance assumes investors act rationally to maximize a well-defined utility function, behavioral finance tries to use other theories of behavior, from psychology, sociology, and anthropology,

to explain financial markets. This topic will be covered by just one chapter, the main purpose of which is to get you exposed to this active and fast growing field in Finance.

Book Objectives

A sound investment decision requires in-depth knowledge of the financial markets and rigorous analytical thinking. The main objective of this book is to teach you these three elements:

- *Analytical Tools*: Among others, an important analytical skill you should acquire from reading this book is the ability to transform a real life investment problem into an analytical model. This modeling skill is an important aspect of this book.
- *Quantitative Skills*: Modern finance has its quantitative aspect. Powerful mathematical techniques such as optimization, dynamic programming, probability theory, and statistical analysis pave way for many complex investment problems. In this book, you will be exposed to this quantitative aspect.
- *Empirical Knowledge*: Essential to any investment decision is the knowledge of the investment environment. Broadly speaking, the financial instruments can be categorized into equity, debt, and derivatives. Important empirical evidence from all three types of financial markets will be examined in this book.

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His most recent publications include the following:

Expansion and Diversification in Securitization, The Hague: Kluwer Law International, 2008 (with J.J. de Vries Robbé)

Secured Finance Transactions: Key Assets and Emerging Markets, Globe Law and Business, London, 2007

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He had a long career at the Securities and Exchange Board of India (SEBI), which he joined when it was set up in April 1988. As the Executive Director of SEBI, since 1992, Pratip has played a key role in the reform of the Indian securities market, framing its regulatory policy and framework as well as implementing the regulations in diverse subjects such as the primary market, disclosure norms, accounting standards, corporate governance, takeovers and substantial acquisition of shares, foreign institutional investment, mutual funds, automation and modernization of the stock exchanges, the insider trading regulations, the regulations of the stock exchanges, demutualization of stock exchanges, regulation of the equity, bond and derivative markets, risk management, dematerialization of securities, clearing and settlement systems, surveillance and investigations, and policy research. In the area of corporate governance, he was involved in the preparation of the reports on corporate governance of the two committees set up by SEBI and in the preparation of Clause 49 of the listing agreement and in its implementation.

He also has a rich experience in international regulations and has been a regular participant at the meetings of the International Organization of Securities Commissions, the OECD, and the World Bank in the areas of securities market and corporate governance.

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His main areas of research are in Corporate Finance and Market Microstructure. His secondary research interests include Emerging markets, International Finance, and Risk Management. He has conducted executive training in Derivatives and Risk Management, Investment Strategies for Individual Investors. He has published in major international journals such as Financial Management, Journal of Banking and Finance, Journal of Financial Research, Quarterly Journal of Business and Economics (USA), The ICFAI Journal of Applied Finance (India), Research in International Business and Finance (USA), and Managerial Finance (UK).

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Part I
Introduction to Securities Markets and Investment Management

Chapter 1
Introduction

S.R. Vishwanath

1.1 Chapter Introduction and Objectives

Foreign investment in emerging stock markets is at record levels. Many emerging markets are yielding fantastic returns (see the data given further). Stocks in many markets are trading at stretched valuations. At no point in time before has security analysis and stock selection been more challenging. Professional analysts and fund managers are required to be abreast of the latest research coming out of universities to construct models and trading strategies. This book provides a comprehensive review of key theories, models, and framework. In this chapter, we provide an overview of the role played by financial markets and the process of security analysis (Table 1.1).

The chapter has the following objectives:

- Highlight the role played by financial markets
- Provide an overview of the process of security analysis and stock selection

World financial markets continued to grow and become more liquid in the 2000s, as the stock of global financial assets (equities, corporate and government debt securities, and bank deposits) reached $140 trillion, more than three times the global GDP.[1] The United States, UK, the Eurozone, and Japan account for more than 80% of the total. The United States continues to be the largest market with $50 trillion worth of assets, followed by the Eurozone ($30 trillion), and Japan ($19.5 trillion). The composition of stock varies across nations. Japan, for instance, has a large government debt market, whereas China has substantial bank deposits.

In 2005, worldwide cross-border capital flows, which include foreign purchases of equity and debt securities, cross-border lending, and foreign direct investment,

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[1] Mapping the Global Capital Market, Third annual report, McKinsey & Co, January 2007

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Table 1.1 Performance of stock markets around the world (2006–2007)

Index	Annual return (%)	Country
DJ Mexico	+17.60	Mexico
DOW	+9.07	USA
S&P 500	+4.68	USA
NASDAQ	+9.08	USA
TSX	+6.73	Canada
Bovespa	+49.96	Brazil
FTSE Eurofirst 300	+4.30	Europe
DAX	+22.83	Germany
FTSE 100	+4.95	UK
FTSE 250	−3.90	UK
CAC 40	+4.17	France
Ibex 35	+10.79	Spain
JSE	+28.26	South Africa
FTSE Xinhua 200	+169.98	China
Hang Seng	+50.85	Hong Kong
S&P/CNX 500	+70.24	India
JSX	+59.28	Indonesia
Nikkei	−4.24	Japan
ASX	+20.86	Australia
NZX	+1.82	New Zealand

Source: www.ft.com

Exhibit 1.1 Total cross-border capital inflows, $ trillion

Year	% of global GDP
1980	4.6
1982	3.4
1984	3.6
1986	5.5
2000	14.2
2002	7.2
2004	12.1
2005	13.9

Source: McKinsey

increased to more than $6 trillion. Since 1990, cross-border capital flows have grown by 10.7% annually, outpacing growth in world GDP (3.5%), trade (5.8%), and financial stock (8.7%). Although most investors still show a preference for the financial assets of their home countries, roughly one in four debt securities and one in five equities are now owned by investors outside the local issuing markets. Exhibit 1.1 presents the statistics on cross-border capital flows.

1.2 Firm and the Financial Market

A financial market is a market where financial assets are traded. Financial assets are marketable financial claims issued by government and companies. Financial markets enable effective allocation of capital among competing uses. Financial markets perform four important economic functions. First, they enable individuals to choose more effectively between current and future consumption. Borrowing enables individuals to consume more whereas lending enables them to postpone consumption. The interest rate is the price of exchange. The units that have a surplus of capital invest in those that have a deficit. This provides producers with resources in excess of those generated by income. Second, the interaction between buyers and sellers in a financial market determine the price of a traded asset, say stocks, or alternatively, return demanded by investors to invest in a company. Firms can raise capital if the return on their investment exceeds the return demanded by investors. Third, financial markets provide liquidity to investors. That is, the owner of the asset can sell off the asset in the market place to realize cash whenever required. The degree of liquidity may vary according to the nature of the asset and the financial market in question. Fourth, stock markets process the opinion of all market participants and place a value on the company's stock. If you wish to find the value of GE's equity, all you have to do is take out a financial daily, note down the prevailing price of GE stock, and multiply it by number of outstanding shares. Thus, financial markets aid the process of price discovery. It would be very difficult to assess the performance of companies in the absence of active stock markets.

1.3 Are Financial Markets Shortsighted?

A manager is successful if he or she is able to raise the firm's stock price. The usual allegation is that financial markets do not react rationally to corporate actions in pricing stocks. This could be due to the following reasons:

- Nonavailability of information
- Inefficiency of the stock market

In many countries, the disclosure norms are inadequate. It is quite possible that managers may not disclose adequate information or give a biased picture. It is the job of security analysts to unearth information required for fair pricing. The usual argument is that investors and analysts are shortsighted, placing too much weight on current profits and dividends. This obliges managers to cut long-term investments. For, if managers invest in projects without an immediate pay-off, their profits and share price fall. As financial markets are myopic, managers should not pursue increase-the-stock price rule because long-term value maximization would be subordinated. If financial markets are indeed myopic, we should expect share price to fall when companies announce increase in capital expenditure. This, in general,

does not happen. On the contrary, cuts in capital investments are considered bad news. Perhaps financial markets are not too short-sighted after all. If the markets are not short-sighted, what is the real reason for under investment? Perhaps managerial short-sightedness is the answer. Most executive incentive systems link rewards to short-term profits. If managers are rewarded on the basis of current profits, they would have little incentive to invest for the long run. There is a popular belief that US companies invest too little in intangible assets and capabilities required for competitiveness because of short-termism on the part of managers, shareholders, lenders, and investment managers and the inability of the capital market to deploy capital to most productive uses (Porter 1992).

1.4 Market Efficiency and Price Discovery

News and information reach financial markets every hour of the day. Companies may report higher or lower earnings than what was expected, acquire companies, restructure assets and liabilities, and so on. Investors and market intermediaries try to digest the information and price the share consistent with what they heard and understood. But do they react rationally? The Efficient Market Hypothesis (EMH) states that the price of a stock at any given point in time fully reflects all available information relevant to the value of the stock at that time. Infosys Technologies's (a leading international software developer from India) share, for instance, according to EMH, should fully reflect at all times the prevailing prospects for India, the IT industry, as well as the prospects specific to Infosys. The share price of Infosys should equal its intrinsic value at all times. Is market efficiency a fact? If not, does this invalidate the wealth maximization rule? In other words, is maximization of shareholders wealth an operational concept? If shares are undervalued, the managers of a company, acting in the interest of existing shareholders, will not sell stock cheaply. If the company has exhausted its borrowing capacity, the company may have to forgo profitable projects. Likewise, if shares were overvalued, managers would want to sell shares even when the project is unprofitable, thereby transferring wealth from new shareholders to old shareholders. Ask any chief executive what she/he considers the stock price. Chances are that she/he thinks the stock is under-priced. It is possible that managers may have superior information compared to outside analysts. This does not imply that stock markets do not reward value-maximizing strategies. The difference in opinion between managers and investors is not on whether the company is profitable or not but *how much profitable* and for *how long*. The increase or decrease in share price at the time of annual earnings announcements is not due to the short-sightedness of investors. It is merely an indication of revision of investor expectations. Managers will benefit from interacting with prominent analysts and eliciting their views on the company's stock market performance. Even in emerging markets, analysts do a fairly good job of price discovery. Financial markets may not be efficient at all times. It is enough if they are frequently efficient.

1.5 Types of Capitalism

Broadly, there are two types of capitalism: arm's length system (e.g., U.S, U.K) and relationship-based system (e.g., Germany, Korea). In an arm's length (market-based) Anglo–Saxon system, a financier is protected by explicit contracts as opposed to a relationship-based system, which is largely self-governing; parties honor agreements to maintain their reputation. In market-based system, relationship matters less. In a relationship-based system, the lending bank has a close long-term relationship with the borrower. The lender often belongs to the same group. The *chaebol* in Korea or the *Keiretsu* in Japan exhibits close relationship with their lenders. For long, academicians have argued whether one type of capitalism is better than the other. Until the late 1980s, the East Asian economies were relationship-based systems. The relationship-based system works well when contractability is low and the amount of capital available is low. In other words, relationship-based systems are suitable if legal enforcement and investor protection norms in the country are weak and the amount of capital available relative to opportunities is low. Financiers (banks) in these countries tend to form long-term relationships with business. Over a period of time, many of these countries (e.g., Korea) attracted large amounts of foreign capital to fund opportunities created from opening up of the economy even when the institutional infrastructure was inadequate. The businesses in these countries needed capital, which the foreign investors readily supplied. Korean companies like Daewoo funded much of their investment with debt. The debt ratios of some Korean companies were more than 300%. Most Korean companies had taken on huge amounts of debt to diversify into hi-tech businesses like computers and telecom. Since the investors from Anglo–Saxon, market-based systems do not find extensive contracting and legal enforcement in these countries, they tend to lend short so that they can pull out if there is a problem. When the East Asian financial crisis was triggered due to the depreciation of Thai Baht, Korean investors pulled out, leading to a capital shortage. Relationship-based systems are now under attack for being inefficient and corrupt and everybody is praising the merits of the arm's length system (Rajan and Zingales 1998).

1.6 Security Analysis and Stock Selection

Many fund managers' stock selection process is centered on fundamental security analysis and emphasizes companies that are industry leaders or dominate certain niches. These companies generally have certain competitive advantages or franchises. Fund managers choose a company that earns a superior return on its capital and that they believe has the potential to continue to earn superior returns over many years.

They prefer companies that are strong cash flow generators. Their focus is on companies that produce cash in excess of their capital spending and dividend payouts. This free cash can be utilized proactively on behalf of the shareholders.

Possible applications include acquisitions, share repurchases, and dividends. Fund managers expect management to be skilled with respect to the allocation of the company's capital. They take a close look at the management team, its ethical approach to doing business, as well as a track record. They expect management to display a commitment to the shareholders and own a meaningful long-term holding in their company's shares.

They typically seek to purchase stocks at a significant discount to what they judge to be their underlying, intrinsic value. The efforts to determine underlying intrinsic value are eclectic and generally based on a combination of measures, including current earnings power; cash flow; book value; assets; sum of the parts analysis; merger and acquisition pricing comparables; and other metrics common to the industry.

The most direct way to find out what professional managers do is to ask them. This is what round table discussions and academic surveys accomplish. In a round table discussion conducted by the Columbia University, professional fund managers shared their investment philosophy.

Managers at Lazard Asset Management, for instance, use standard discounted cash flow and other methodologies. They put all investment candidates into three buckets: those companies that have dominant position in their industry; those that are undergoing restructuring; and mispriced securities. These investment buckets are used to construct portfolios of stocks that outperform benchmarks with less volatility.[2]

1.7 Stock Selection Criteria

Investors are of two types: active and passive. Active investors try to analyze companies on the basis of discounted cash flow valuation/real options methodology and time the market. That is, try to pick companies that are undervalued according to some criteria. Passive investors, on the contrary, start with the assumption that the market knows best and mimic either the index or some other investor.

1.8 Benjamin Graham's Approach

Ben Graham, the legendary investor, in his Investments classic, the intelligent investor, recommends that a defensive investor should choose between two approaches (Benjamin 1973): (1) buying a low-cost index fund, which will assure market return with minimal effort, or (2) applying a set of standards to each stock purchase to improve one's odds of beating the market. He recommends the following stock screens:

[2] From Stock Selection to Portfolio Alpha Generation: The Role of Fundamental Analysis, Journal of Applied Corporate Finance, Vol 18 No 1, Winter 2006

1. Adequate size of the enterprise
   Graham's idea here is to exclude small companies, which may be subject to more than average volatility (or illiquidity, or neglect). He does note that there will often be good opportunities in smaller stocks, but this is probably not for the "defensive" investor. In 1973, he recommended not buying stocks with less than US $100 million in sales and $50 million in assets.
2. A sufficiently strong financial condition
   For industrial companies, Graham looked for current assets to be at least twice the current liabilities (current ration > 2). Also, long-term debt should not exceed the net current assets (or "working capital").
3. Earnings stability
   The company must have positive earnings in each of the last 10 years.
4. Dividend record
   The company must have paid dividends without interruption over the previous 20 years.
5. Earnings growth
   The company must have experienced a minimum increase of at least one-third (33%) in per share earnings (EPS) in the past 10 years using 3-year averages at the beginning and end.
6. Moderate price/earnings ratio
   The prevailing stock price should not be more than 15 times average earnings of the past 3 years (historical PE < 15).
7. Moderate ratio of price to assets
   Current price should not be more than 1.5 times book value. However, a PE < 15 could justify a correspondingly higher multiplier of assets. As a rule of thumb, Graham suggests that the product of the PE and (ratio of price to book) should be less than or equal to 22.5 (which again corresponds to a stock price that is 15 times earnings and 1.5 times book value).

These screens are designed to eliminate most stocks from an investor's radar screen by excluding companies that are (1) too small, (2) in relatively weak financial condition, (3) with a deficit stigma in their 10-year record, and (4) not having a long history of continuous dividends. Obviously, looking at 10- to 20-year track record is easier in the mature markets of the United States and Europe, but probably too restrictive in young markets of Asia. Nonetheless, the concept remains sound.

1.9 Stock Selection Based on Mutual Fund Holdings

Academics have investigated whether individual investors should consider the weightings mutual fund managers place on the stocks held in their funds when making stock selection decisions (Weigand et al., 1973). Specifically, they compare the performance of the stocks that are most heavily weighted in mutual funds vs. the stocks that are most lightly weighted. These studies find that the heavily weighted stocks in mutual funds perform no better than, and sometimes significantly

underperform, the most lightly weighted stocks. These results contradict the idea that individual investors can earn excess returns by following the implicit stock selection picks of mutual fund managers, particularly, short-term and momentum investors who trade large-cap stocks. These findings rather suggest that individual investors should be wary of investing in stocks that are the top holdings in general equity mutual funds.

1.10 Timing the Market: Technical Analysis[3]

The methods used to analyze securities and make investment decisions fall into two very broad categories: fundamental analysis and technical analysis. Fundamental analysis involves analyzing the characteristics of a company to estimate its value. Technical analysis takes a completely different approach; it does not care one bit about the "value" of a company or a commodity. Technicians (sometimes called chartists) are only interested in the price movements in the market. Despite all the fancy and exotic tools it employs, technical analysis really just studies supply and demand in a market in an attempt to determine what direction, or trend, will continue in the future. In other words, technical analysis attempts to understand the emotions in the market by studying the market itself, as opposed to its components. If you understand the benefits and limitations of technical analysis, it can give you a new set of tools or skills that will enable you to be a better trader or investor.

1.11 Concluding Comments

The goal of security analysis is to generate abnormal returns by identifying undervalued securities. In the chapters that follow we describe the following:

- The design and functioning of stock markets around the world
- The prominent theories of asset pricing
- The process of financial statement analysis to identify investment candidates and forecast future financial performance
- Models of valuation
- Fixed income instruments, their valuation, and derivatives
- The behavioral approach to investment management

Because of the size of financial markets, investment management attracts a lot of attention from both the academia and the industry. It would be impractical to cover every major piece of research in a book. Consequently, we have provided a small list of suggested reading at the end of each chapter for the benefit of interested readers.

[3] Technical analysis is a vast subject in itself. Interested Readers may refer to Achelis, Steven, Technical Analysis from A to Z, Equis International, 2003

1.12 End of the Chapter Questions

1. What is the role played by financial markets?
2. Explain market efficiency and short-termism.
3. What are the two types of capitalism? Explain.
4. Explain Benjamin Graham's approach to stock selection.

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Chapter 2
Introduction to Market Microstructure

Chandrasekhar Krishnamurti

2.1 Chapter Introduction and Objectives

A stock exchange or bourse is a corporation or a mutual organization that provides trading facilities for traders to trade stocks and other securities. The top 12 exchanges have a combined market capitalization running to trillions of dollars. Obviously, investors, corporations, and academics are interested in the design and the functioning of stock markets. In this chapter, we provide an overview of type and design of markets, and price formation and price discovery.

This chapter has the following objectives:

- Define market microstructure
- Discuss market structure and design issues
- Highlight how some of the top exchanges like the New York Stock Exchange (NYSE), NASDAQ, Tokyo Stock Exchange, and London Stock Exchange operate

2.2 What is Market Microstructure?

A common definition of market microstructure is "It is the study of the trading mechanisms used for financial securities." Professor Maureen O'Hara of Cornell University, an authority on market microstructure, describes market microstructure as "the study of the process and outcomes of exchanging assets under a specific set of rules."

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S.R. Vishwanath, C. Krishnamurti (eds.), *Investment Management: A Modern Guide to Security Analysis and Stock Selection,* DOI: 10.1007/978-3-540-88802-4_2,

National Bureau of Economic Research (NBER) defines market microstructure as a field of study that is devoted to theoretical, empirical, and experimental research on the economics of security markets. It includes the role of information in the price discovery process, the definition, measurement and control of liquidity, and transaction costs and their implication for efficiency, welfare, and regulation of alternate trading mechanisms and market structures.

It appears at a superficial level that market microstructure is about designing a superior stock exchange. But market microstructure is much more than that. Market microstructure has broader interest among financial economists, since it has implications for asset pricing, international finance, and corporate finance. A basic premise of market microstructure theory is that asset prices need not reflect full information expectations value due to a variety of frictions. Thus, market microstructure is related to the field of investments, which is concerned with the equilibrium value of financial assets. Market microstructure is also linked to traditional corporate finance, since difference between price and value has the potential to affect financing and capital structure decisions taken by managers. The relationship between market microstructure and other areas of finance is relatively new and is continuing to evolve.

In this chapter, we will take an information economics perspective of market microstructure and summarize current research in the following key areas:

- Market structure and design issues
- Price formation and price discovery
- Information and disclosure
- Market microstructure interface with other areas of finance

2.2.1 Market Structure and Design Issues

In this section, we describe the salient features of the different trading systems that operate in the world today. This would facilitate a critical discussion on market structure and design issues that are critical to an understanding of the price formation process in financial markets. We begin by explaining the various prices, orders, and trading priority rules that are commonly used in market microstructure parlance.

Prices: An ask quotation is an offer to sell at a specific price, the *ask price.* It is also sometimes called the ask price. A bid quotation is an offer to buy at a specific price, the *bid price*. The price at which a transaction occurs is denoted as the *transaction price*. Transaction prices usually occur at previously announced bid or ask quotations but could also occur at a price that is in between the bid and the ask price.

Orders: A public trader gives an order to a broker who acting as the trader's agent directs the order to a market where the trade may be arranged. The trader must specify the exact number of shares to be bought or sold. In addition, the trading instruction should also include the price at which the trade is to be made. Based on how the trader specifies the price of trade, orders may be classified into either *market orders* or *limit orders*.

A *market order* to buy or sell is to be executed at the best price established on the market at a given point in time. For a market order seller (buyer), the best price is the highest (lowest) bid (ask) posted by a potential buyer (seller). A limit buy (sell) order specifies the maximum (minimum) price at which the trader will buy (sell). Price limits for buyers (sellers) are normally placed at prices below (above) the current price at which shares can be bought (sold). Limit orders that do not execute when they are placed remain active on the book until they execute, are withdrawn, or expire. Day orders are automatically cancelled at the end of the trading day. Good till cancelled (GTC) orders remain in the book until they are cancelled.

Market order traders face uncertainty regarding the exact price at which they will transact, but unlike limit order traders they are assured of transacting.

Trading Priority Rules: *The Price Priority Rule:* With *price priority*, buyers posting higher bids have priority over buyers posting lower bids and sellers posting lower asks have priority over sellers posting higher asks. In addition to price priority, a secondary trading priority rule is often established to specify the sequence to be followed for orders submitted at the same price. With *time priority*, the first order placed is the first to execute. Sometimes a size priority rule is used wherein the largest order is the first to execute. A third alternative is pro rata execution of all orders tied at the same price. Sometimes a class of orders such as public traders is given priority over market professionals.

2.2.1.1 Taxonomy of Trading Systems

Trading systems can be classified on the basis of participants. Using this classification, we have (a) Dealer Markets and (b) Agency Markets. A broker is a trader's agent. A broker does not herself participate in the market but merely matches the order with a counterparty on the other side of the transaction. A dealer on the contrary participates in a trade as a principal.

Dealer Markets

As a principal, a dealer satisfies a public order by buying for her own inventory or by selling from her inventory. In a dealer market, public traders do not trade directly with each other but with a dealer who serves as intermediary. The over-the-counter (OTC) market in the United States is an example of a dealer market.

Agency Markets

In an agency market, public orders are directed to a broker's broker who matches them with other public orders. Market professionals do not participate in trading in an agency market. The Tokyo Stock Exchange (TSE) is an example of a pure agency market. The TSE is established by the limit order book. Floor officials called *Saitoris*

oversee the books and are not allowed to participate in trades as a principal. They only maintain the limit order book and monitor trading activity.

Trading systems can also be classified on the basis of when the participants are allowed to trade. On the basis of this categorization, we have (a) Continuous Markets and (b) Call Markets.

Continuous Markets: A continuous market allows trades to be made at any time during the trading day. In the United States, both the New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotation System (NASDAQ) are continuous trading systems. Both dealer and agency markets can be continuous. In a dealer market, the dealer making the market in a given stock is obligated to maintain a continuous two-sided market for the stock. In an agency market, a continuous two-sided market is maintained by public limit orders that have been entered on the limit order book and/or by floor traders in the crowd.

In a continuous market, traders can observe bid and ask quotations, transaction prices, trading volume during the trading day. This enables them to assess the market conditions before placing their orders. Furthermore, the posting of quotes in a continuous market gives traders the option of placing market orders and ensuring execution of their trades. If a continuous market is orderly, traders have an indication of the prices at which their orders will most likely execute. However, market order trades do not have complete certainty due to limited availability of information and lack of dissemination of information in a timely manner.

Call Markets: In a call market, orders are batched for simultaneous execution at points in time when the market is "called." Call markets are typically called once or twice during the trading day. Call markets are primarily agency markets and not dealer markets. All order that have accumulated over a period of time are batched and executed simultaneously at the same price. Public orders interact directly with other public orders in the batching process and therefore do not need a dealer to participate as an intermediary. Trading in a call market can be done either by written auction or by verbal auction. On the Paris Bourse, verbal auction is used for the most actively traded issues while a written auction is used for smaller issues. Verbal auctions tend to be more expensive but are more desirable for floor traders who are able to adjust their orders in response to dynamic market conditions.

Traders can submit both limit and market orders in call markets. Market orders transact at whatever prices are established at the calls. In comparison to continuous market's market order, traders do not have an indication of prices at which their trades are likely to be transacted. In fact, they are not even assured of a transaction. Since call markets normally include a provision that limits the maximum allowable difference from the previously established call price.

An auctioneer (an exchange official) is at the centre of the call. All orders for an issue are directed to the auctioneer when the stock is called. The auctioneer arrives at a clearing price that most closely matches the aggregate number of shares offered for sale with those sought for purchase. Then, all market orders to buy and sell, all limit orders to buy at the clearing price or higher, and all limit orders to sell at the clearing price or lower are executed. In a call market, all the buyers and sellers pay or receive the same price – the clearing price.

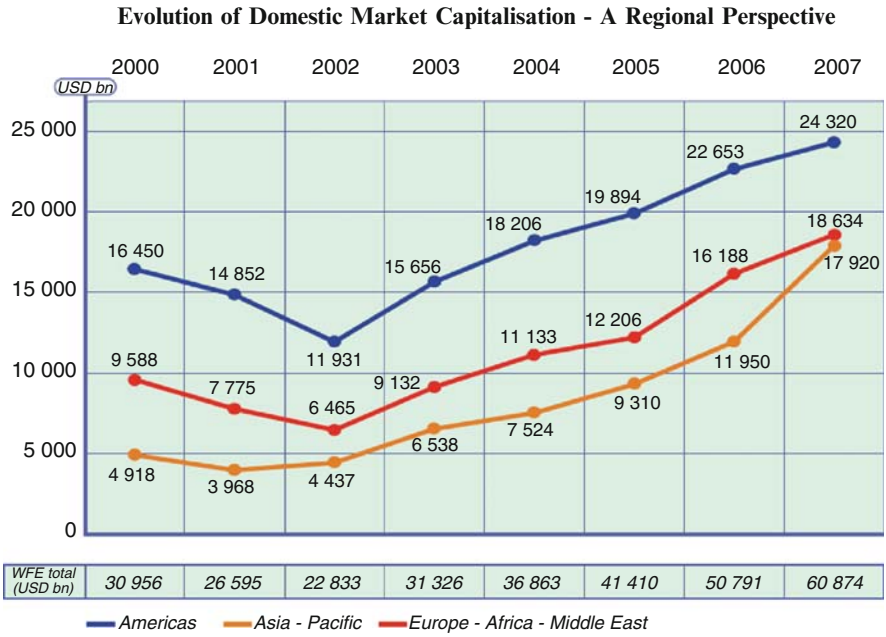
The price priority rule is strictly adhered to in call market trading. A secondary priority is also required to deal with issues such as discrete order size and minimum allowable price changes. The opening process at stock exchanges like NYSE and Amex follow a call market system at the opening of the market each day. Exhibits 2.1–2.3 provide the "league tables" of stock exchanges.

Exhibit 2.1 World's largest stock exchanges based on domestic equity market capitalization

Exchange	USD bn end 2007	USD bn end 2006	% change in USD	% change in local currency
NYSE group	15,651	15,421	1.50	1.50
Tokyo stock exchange	4,331	4,614	−6.10	−12
Euronext	4,223	3,713	13.70	2.60
Nasdaq stock market	4,014	3,865	3.80	3.80
London stock exchange	3,852	3,794	1.50	−0.20
Shanghai stock exchange	3,694	918	302.70	276.80
Hong Kong exchanges	2,654	1,715	54.80	55.20
TSX group	2,187	1,701	28.60	9
Deutsche Borse	2,105	1,638	28.60	15.90
Bombay stock exchange	1,819	819	122.10	97.80
BME Spanish exchange	1,799	1,323	361.10	22.70
National stock exchange of India	1,660	774	114.50	91

Source: World Federation of Exchanges. http://www.world-exchanges.org

Exhibit 2.2 Evolution of domestic market capitalization – a regional perspective



Source: World Federation of Exchanges. http://www.world-exchanges.org

Exhibit 2.3 Largest exchanges by total value of share trading

Exchange	USD bn end 2007	USD bn end 2006	% change in USD	% change in local currency
NYSE Group	29,910	21,789	37.3	37.3
Nasdaq Stock Market	15,320	11,807	29.7	29.7
London Stock Exchange	10,333	7,571	36.5	26.1
Tokyo Stock Exchange	6,476	5,823	11.2	12.2
Euronext	5,640	3,853	46.4	34.5
Deutsche Borse	4,325	2,737	58	45.2
Shanghai Stock Exchange	4,070	736	452.7	426.6
BME Spanish exchange	2,970	1,934	53.6	41.1
Borsa Italiana	2,312	1,591	45.3	33.6
Hong Kong Exchanges	2,137	832	156.7	157.8
Shenzhen Stock Exchange	2,103	423	397.6	374.1
Korea Exchange	2,006	1,342	49.5	46

Source: World Federation of Exchanges. http://www.world-exchanges.org

The New York Stock Exchange

The New York Stock Exchange (NYSE) is the world's largest and most liquid cash equities market in the world. NYSE provides a reliable, orderly, liquid, and efficient market place for investors to buy and sell listed common stocks and other securities. As of 30 April 2008, NYSE's domestic market capitalization exceeded US $ 14 trillion. More than 2,300 companies are listed on NYSE, including over 400 foreign companies. On an average trading day, about 2.5 billion shares are traded valued at over $ 121 billion.

NYSE blends various aspects of electronic trading and traditional open outcry, auction market trading. To trade on the trading floor of NYSE, an exchange-issued trading license is required. Only qualified and approved NYSE broker–dealer entities may acquire and hold licenses. The holders of these licenses are either floor brokers or specialists.

Floor brokers represent public orders to buy or sell shares and wish to get the best price for their customers. There are two types of floor brokers on the trading floor: house brokers and independent brokers. House brokers are engaged by brokerage firms that hold accounts for public investors. These market professionals buy and sell securities as an agent for their customers. The majority of independent brokers are "direct access" brokers who deal with institutional investors at low commission rates.

Each stock listed on the NYSE is allocated to a *specialist*, a market professional who acts as a contact point between brokers with buy orders and those with sell orders. Specialists act as auctioneers in the specific stocks they are allocated to trade at a designated location, called a trading post. All buying and selling of a given stock occurs at that location. The specialists are aided by highly sophisticated technology to facilitate their duty to provide a continuous liquid market. NYSE has the capacity

to trade up to 10 billion shares per day. The orders are electronically directed to the trading posts, booths, and hand-held computers on the trading floor in one of the following four ways:

- SuperDOT
- BBSS
- NYSE e-Broker
- NYSE Direct +

SuperDOT (Designated Order Turnaround System): It is an electronic order routing system to direct buy and sell orders to the specialist's workstation at the trading post. SuperDOT handles most of the smaller orders and accounts for more than 95% of all orders.

BBSS (Broker Booth Support System): It is a highly sophisticated computer system that is used to receive orders on the trading floor. The system is linked to the specialist's post and the broker's handheld computer.

NYSE e-Broker: It is a wireless hand-held tool that enables floor brokers to submit and manage quotes and orders. It is also used to track executions and transmit information between the brokers and the customers.

NYSE Direct+: It is a high speed electronic communication system between NYSE member firms and the exchange. It enables immediate execution of customer orders.

National Association of Securities Dealers Automated Quotation System

NASDAQ is the acronym of the National Association of Securities Dealers Automated Quotation System and has been designed as a dealer market. NASDAQ was created with the intention of enhancing the efficiency of the OTC markets for stocks. In essence, NASDAQ is a telecommunication network linking thousands of geographically dispersed market participants. A pictorial overview of the NASDAQ system is provided in Exhibit 2.4.

NASDAQ has been designed as a dealer market. By providing quotes and therefore liquidity, market makers are the principal players in the NASDAQ market structure. They are independent dealers who actively compete for investor orders by displaying quotes representing their buy and sell interest in addition to customer limit orders. Every market maker has equal access to NASDAQ's trading system, which broadcasts their quotations simultaneously to all market participants. By standing ready to buy and sell shares of a company's stock, market makers provide immediate liquidity to NASDAQ-listed companies. Currently, there are more than 500 market making firms that provide liquidity support for NASDAQ-listed stocks.

NASDAQ market makers are charged with three major tasks. First, they are required to disclose their buy and sell intentions by displaying two-sided quotes in all stocks in which they choose to make a market. Second, they have to comply with the Securities and Exchange Commission's Order Handling Rules (SEC) with respect to displaying quotes and orders. Third, they are obliged to honour their quotes and to report trading in a timely manner. Failure to abide by the rules can lead to disciplinary action.