Chapter 15
THE FINANCIAL MARKETS

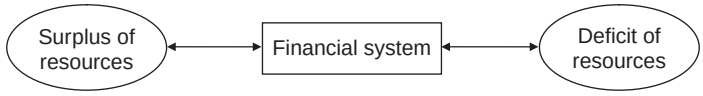
Now let' s step into the realm of finance

The introduction to this book discussed the role of financial securities in a market economy. This section will analyse the behaviour of the investor who buys those instruments that the financial manager is trying to sell. An investor is free to buy a security or not and, if he decides to buy it, he is then free to hold it or resell it in the secondary market.

The financial investor seeks two types of returns: the risk-free interest rate (which we call the time value of money) and a reward for risk-taking. This section looks at these two types of returns in detail but, first, here are some general observations about capital markets.

Section 15.1
THE RISE OF CAPITAL MARKETS

The primary role of a financial system is to bring together economic agents with surplus financial resources, such as households, and those with net financial needs, such as companies and governments. This relationship is illustrated below:



To use the terminology of John Gurley and Edward Shaw (1960), the parties can be brought together **directly** or **indirectly**.

In the first case, known as **direct finance**, the parties with excess financial resources directly finance those with financial needs. The financial system serves as a **broker**, matching the supply of funds with the corresponding demand. This is what happens when a small shareholder subscribes to a listed company's capital increase or when a bank places a corporate bond issue with individual investors.

In the second case, or **indirect finance**, financial intermediaries, such as banks, buy "securities" – i.e. loans – "issued" by companies. The banks in turn collect funds, in the form of demand or savings deposits, or issue their own securities that they place with investors. In this model, the financial system serves as a gatekeeper between suppliers and users of capital and performs the function of **intermediation**.

When you deposit money in a bank, the bank uses your money to make loans to companies. Similarly, when you buy bonds issued by a financial institution, you enable the institution to finance the needs of other industrial and commercial enterprises through loans. Lastly, when you buy an insurance policy, you and other investors pay premiums that the insurance company uses to invest in the bond market, the property market, etc.

This activity is called **intermediation**, and is very different from the role of a mere broker in the direct finance model.

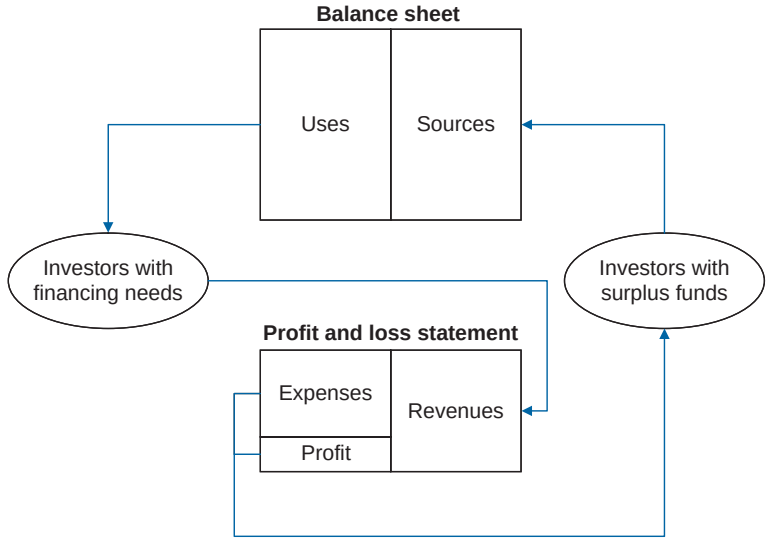
With direct finance, the amounts that pass through the broker's hands do not appear on its balance sheet, because all the broker does is to put the investor and issuer in direct contact with each other. Only brokerage fees and commissions appear on a brokerage firm's profit and loss, or **income**, statement.

In intermediation, the situation is very different. The intermediary shows all resources on the liabilities side of its balance sheet, regardless of their nature: from deposits to bonds to shareholders' equity. Capital serves as the creditors' ultimate guarantee. On the assets side, the intermediary shows all uses of funds, regardless of their nature: loans, investments, etc. The intermediary earns a return on the funds it employs and pays interest on the resources. These cash flows appear in its income statement in the form of revenues and expenses. The difference, or spread, between the two constitutes the intermediary's earnings.

The intermediary's balance sheet and income statement thus function as holding tanks for both parties – those who have surplus capital and those who need it:

@ *download*

BANK BALANCE SHEET AND INCOME STATEMENT



Today's economy is experiencing **disintermediation**, characterised by the following phenomena:

- more companies are obtaining financing directly from capital markets; and
- more companies and individuals are investing directly in capital markets.

When capital markets (primary and secondary) are underdeveloped, an economy functions primarily on debt financing. Conversely, when capital markets are sufficiently well developed, companies are no longer restricted to debt, and they can then choose to increase their equity financing. Taking a page from John Hicks, it is possible to speak of **bank-based economies** and **market-based economies**.

In a **bank-based economy**, the capital market is underdeveloped and only a small portion of corporate financing needs are met through the issuance of securities. Therefore, bank financing predominates. Companies borrow heavily from banks, whose refinancing needs are mainly covered by the central bank.

The central bank tends to have a strong influence on the level of investment, and consequently on overall economic growth. In this scenario, interest rates represent the level desired by the government for reasons of economic policy, rather than an equilibrium point between supply and demand for loans.

A bank-based economy is viable only in an inflationary environment. When inflation is high, companies readily take on debt because they will repay their loans with devalued currency. In the meantime, after adjustments are made for inflation, companies pay real interest rates that are zero or negative. A company takes on considerable risk when it relies exclusively on debt, although inflation mitigates this risk. Inflation makes it possible to run this risk and, indeed, it encourages companies to take on more debt. The bank-based (or credit-based) economy and inflation are inextricably linked, but the system is flawed because the real return to investors is zero or negative. Their savings are insufficiently rewarded, particularly if they have invested in fixed-income vehicles.

The savings rate in a credit-based economy is usually low. The savings that do exist typically flow into tangible assets and real property (purchase of houses, land, etc.) that are reputed to offer protection against inflation. In this context, savings do not flow towards corporate needs. Lacking sufficient supply, the capital markets therefore remain embryonic. As a result, companies can finance their needs only by borrowing from banks, which in turn refinance themselves at the central bank. This process supports the inflation necessary to maintain a credit-based economy.

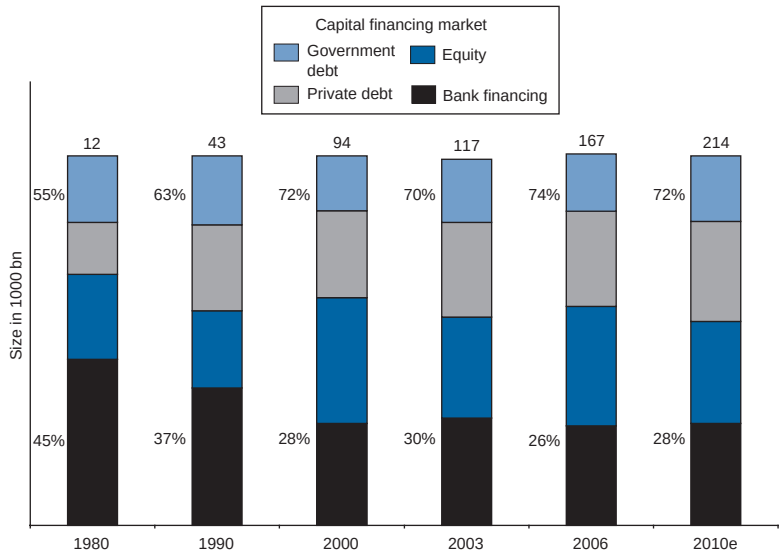
The lender's risk is that the corporate borrower will not generate enough cash flow to service the debt and repay the **principal**, or amount of the loan. Even if the borrower's financial condition is weak, the bank will not be required to book a provision against the loan so long as payments are made without incident.

In an economy with no secondary market, the investor's financial risk lies with the cash flows generated by his assets and their liquidity.

In a **market-based economy**, companies cover most of their financing needs by issuing financial securities (shares, bonds, commercial paper, etc.) directly to investors. A capital market economy is characterised by direct solicitation of investors' funds. Economic agents with surplus resources invest a large portion of their funds directly in the capital markets by buying companies' shares, bonds, commercial paper or other short-term negotiable debt. They do this either directly or through mutual funds. Intermediation gives way to the brokerage function, and the business model of financial institutions evolves towards the placement of companies' securities directly with investors.

In this economic model, bank loans are extended primarily to households in the form of consumer credit, mortgage loans, etc., as well as to small- and medium-sized enterprises that do not have access to the capital markets.

BANK AND CAPITAL MARKET FINANCING



@ *download*

Source: Mckinsey & Company 2007 and 2008.

According to Zingales and Rajan (2008), European financial markets have become more market-oriented in the last two decades. "Arm's length" financing, prevalent in the USA, delivers superior results when firms are bigger, when there is stronger legal enforcement and transparency, and when innovation tends to be more dynamic. In recent decades, the globalisation of capital markets has:

- increased the need for huge amounts of capital to manage global competition;
- developed mimicry behaviour among capital markets regarding legal enforcement and transparency; and
- "unified" the source of financing of innovation.

In light of these developments, a higher degree of market orientation in Europe would clearly be a good thing.

The growing disintermediation has forced banks and other financial intermediaries to align their rates (which are the rates that they offer on deposits or charge on loans) with market rates. Slowly but surely, market forces tend to pervade all types of financial instruments.

For example, with the rise of the commercial paper market, banks regularly index short-term loans on money-market rates. Medium- and long-term lending have seen similar trends. Meanwhile, on the liabilities side, banks have seen some of their traditional, fixed-rate resources dry up. Consequently, the banks have had to step up their use of more expensive, market-rate sources of funds, such as certificates of deposit.

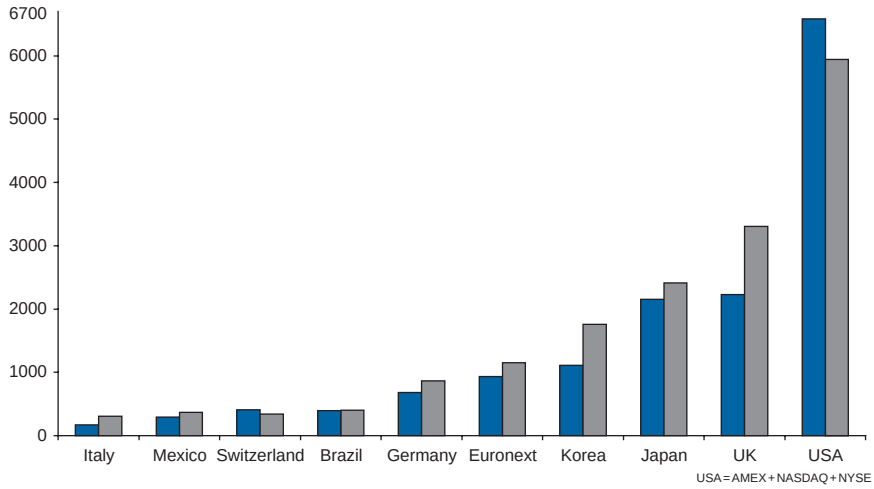
Since the beginning of the 1980s, two trends have led to the rapid development of capital markets. First, real interest rates in the bond markets have turned positive. Second, budget deficits have been financed through the bond market, rather than through the money market.

In Chapter 1, the financial manager was described as a seller of financial securities. This is the result of European economies becoming capital market economies.

The risks encountered in a capital market economy are very different from those in a credit-based economy. These risks are tied to the **value of the security**, rather than to whether cash flows are received as planned. During a stock market crash, for example, a company's share price might sink even though its published earnings exceed projections.

The following graphs provide the best illustration of the rising importance of capital markets.

NUMBER OF LISTED COMPANIES IN 2002 AND 2007

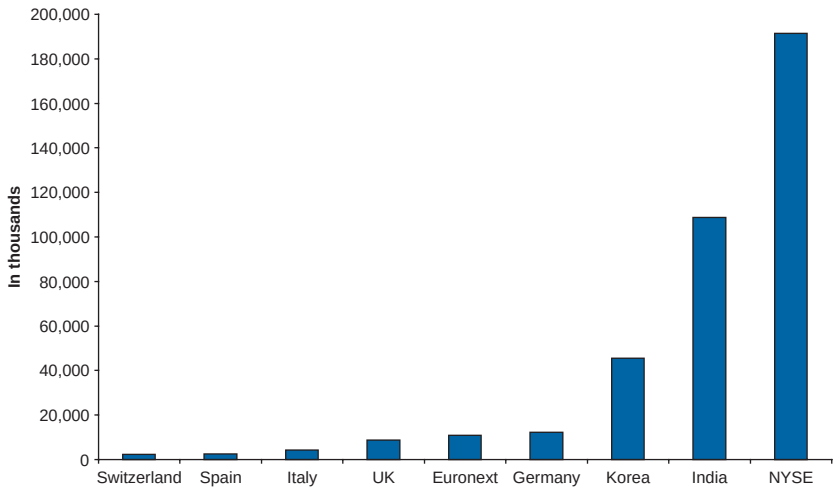


Source: World Federation of Exchange members.

. . . be it in terms of the number of listed companies . . .

@ *download*

NUMBER OF TRADES IN EQUITY SHARES IN DECEMBER 2007



Source: World Federation of Exchange members.

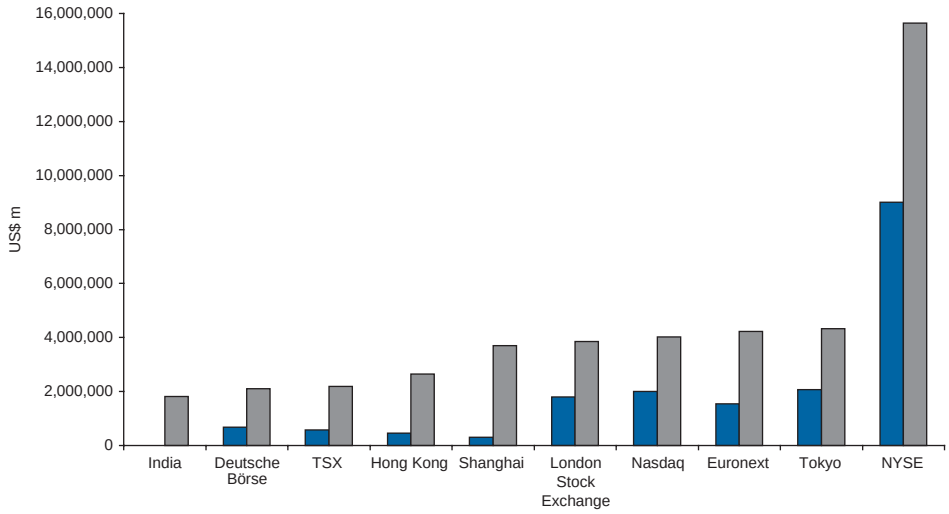
. . . transaction volumes . . .

@ *download*

. . . or the total value of listed companies

@ *download*

THE 10 BIGGEST STOCK MARKETS IN THE WORLD BY MARKET CAPITALISATION IN 2002 AND 2007



Source: World Federation of Exchanges members; no data available in 2002 for bombay.

Section 15.2
THE FUNCTIONS OF A FINANCIAL SYSTEM

The job of a financial system is to efficiently create financial liquidity for those investment projects that promise the highest profitability and that maximise collective utility.

However, unlike other types of markets, a financial system does more than just achieve equilibrium between supply and demand. A financial system allows investors to convert current revenues into future consumption. It also provides current resources for borrowers, at the cost of reduced future spending.

More specifically, we have three definitions of efficiency:

- **informational efficiency** refers to the ability of a market to *fully* and *rapidly* reflect new relevant information;
- **allocative efficiency** implies that markets channel resources to their most productive uses;
- **operational efficiency** concerns the property of markets to function with minimal operating costs.

Robert Merton and Zvie Bodie have isolated **six essential functions** of a financial system:

1 means of payment;
2 financing;
3 saving and borrowing;
4 risk management;
5 information;
6 reducing or resolving conflict.

1. A financial system provides means of payment to facilitate transactions. Cheques, debit and credit cards, electronic transfers, etc. are all means of payment that individuals can use to facilitate the acquisition of goods and services. Imagine if everything could only be paid for with bills and coins!

2. A financial system provides a means of pooling funds for financing large, indivisible projects. A financial system is also a mechanism for subdividing the capital of a company so that investors can diversify their investments. If factory owners had to rely on just their own savings, they would very soon run out of investible funds. Indeed, without a financial system's support, Nestlé and British Telecom would not exist. The system enables the entrepreneur to gain access to the savings of millions of individuals, thereby diversifying and expanding his sources of financing. In return, the entrepreneur is expected to achieve a certain level of performance. Returning to our example of a factory, if you were to invest in your neighbour's steel plant, you might have trouble getting your money back if you should suddenly need it. A financial system enables investors to hold their assets in a much more liquid form: shares, bank accounts, etc.

3. A financial system distributes financial resources across time and space, as well as between different sectors of the economy. The financial system allows capital to be allocated in a myriad of ways. For example, young married couples can borrow to buy a house or people approaching retirement can save to offset future decreases in income. Even a developing nation can obtain resources to finance further development. And when an industrialised country generates more savings than it can absorb, it invests those surpluses through financial systems. In this way, "old economies" use their excess resources to finance "new economies".

4. A financial system provides tools for managing risk. It is particularly risky for an individual to invest all of his funds in a single company because, if the company goes bankrupt, he loses everything. By creating collective savings vehicles, such as mutual funds, brokers and other intermediaries enable individuals to reduce their risk by diversifying their exposure. Similarly, an insurance company pools the risk of millions of people and insures them against risks they would otherwise be unable to assume individually.

5. A financial system provides price information at very low cost. This facilitates decentralised decision-making. Asset prices and interest rates constitute information used by individuals in their decisions about how to consume, save, or divide their funds among different assets. But research and analysis of the available information on the financial condition of the borrower is time-consuming, costly, and typically beyond the scope of the layman. Yet when a financial institution does this work on behalf of thousands of investors, the cost is greatly reduced. Unfortunately, this does not mean that financial systems always handle information perfectly. For example, herd behaviour occurs when investors move in pack-like formations and make decisions by following what everyone else is doing in the market. Such phenomenon can make the price of an asset diverge from its fundamental value. This is precisely what happened with Internet stocks in late 1999 and early 2000.

6. A financial system provides the means for reducing conflict between the parties to a contract. Contracting parties often have difficulty monitoring each other's behaviour. Sometimes conflicts arise because each party has different amounts of information and divergent contractual ties. For example, an investor gives money to a fund manager in the hope that he will manage the funds in the investor's best interests (and not his own!). If the fund manager does not uphold his end of the bargain, the market will lose confidence in him. Typically, the consequence of such behaviour is that he will be replaced by a more conscientious manager.

Section 15.3
THE RELATIONSHIP BETWEEN BANKS AND COMPANIES

Bank intermediation is carried out first and foremost by **commercial banks**. Commercial banks serve as intermediaries between those who have surplus funds, and those who require financing. The banks collect resources from the former and lend capital to the latter. Based on the strength of their balance sheet, commercial banks lend to a wide variety of borrowers and, in particular, to companies. Banks assume the risks related to these loans, therefore their financial condition must be sufficiently strong to withstand potential losses. However, the larger the bank's portfolio, the lower the risk – thanks once again to the law of large numbers. After all, not every company is likely to go bankrupt at the same time!

Commercial banking is an extremely competitive activity. After taking into account the cost of risk, profit margins are very thin. Bank loans are somewhat standard products, so it is relatively easy for customers to play one bank off against another to obtain more favourable terms.

Commercial banks have developed ancillary services to add value to the products that they offer to their corporate customers. Accordingly, they offer a variety of means of payment to help companies move funds efficiently from one place to another. They also help clients to manage their cash flows (see Chapter 46).

As a result, the growing importance of financial markets has changed the role of bankers. They have developed services to help their corporate clients gain direct access to capital markets, leading to the rise of **investment banking**. Investment banks offer primarily the following services:

- **Access to equity markets**: investment banks help companies prepare and carry out initial public offerings on the stock market. Later on, investment banks can continue to help these companies by raising additional funds through capital increases. They also advise companies on the issuance of instruments that may one day become shares of stock, such as warrants and convertible bonds (see Chapter 29).
- **Access to bond markets**: similarly, investment banks help large and medium-sized companies raise funds directly from investors through the issuance of bonds. The techniques of placing securities, and in particular the role of the investment bank in this type of transaction, will be discussed in Chapter 30. The investment bank's **trading room** is where its role as "matchmaker" between the investor and the issuer takes on its full meaning.
- **Merger and acquisition advisory services**: these investment banking services are not directly linked to corporate financing or the capital markets, although a public issue of bonds or shares often accompanies an acquisition.
- Certain banks use their knowledge of the financial markets to offer their clientele of individuals, companies and institutions, investment products comprised of portfolios of listed or unlisted securities. These products are called mutual funds and the activity is known as **asset management**.

For a long time, these various lines of business were separated for regulatory reasons. Today, they coexist in all major American, European and Asian financial institutions, although not without potential conflicts of interest. A creditor is not always a disinterested party when it comes to advising a corporate client.

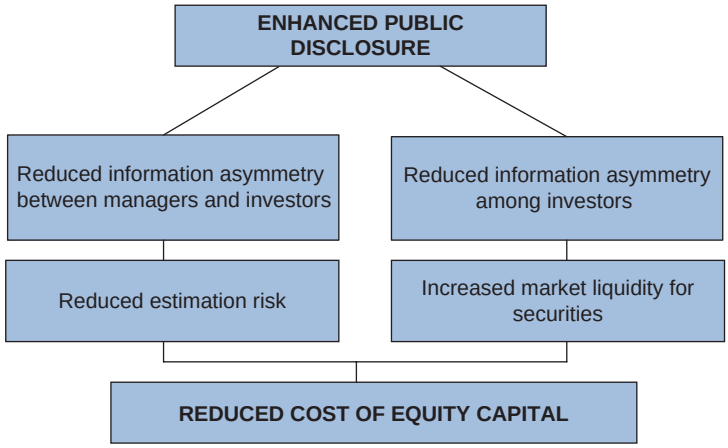
Section 15.4
FROM VALUE TO PRICE (1): FINANCIAL COMMUNICATION

If a company wants the financial market to price its securities fairly, it is necessary (but not sufficient) that it provides the market with all relevant financial information about its cash flows, particularly information regarding the magnitude, the risks involved, and timing of all such flows.

If the market receives inadequate information, then it will be unable to assess the real capacity of the firm to create value. Therefore, it is always necessary to communicate promptly to investors all pertinent information in order to facilitate a clear understanding of the company's value creation ability.

Financial communication serves an important economic function because it reduces the information asymmetries between market participants. Managers, for example, have more accurate information about the company they work for, compared to external investors or "outsiders". Asymmetric information may also exist among investors, for example, if some of them have access to private information.

If the market perceives that an appropriate financial communication has reduced information asymmetries, investors will accept a lower return from the company because of the lower risk of the company. This in turn reduces the cost of equity. The following diagram illustrates the two directions of the benefits of a higher disclosure (Botosan 2000):



The left path allows the company to reach a lower cost of equity through the reduction of the "estimation risk" of investors. If the flow of information is limited, investors will have more uncertainty about the cash flow estimates. Therefore, providers of funds will require a higher return, especially if the "information risk" cannot be diversified away.

Along the right path, the reduced information disparity among investors creates a higher liquidity of securities, which in turn leads to a lower cost of capital. Higher liquidity reduces the average transaction costs and allows the price of the securities to reach higher levels.

Botosan (2000) finds that the cost of equity is inversely related to the company's degree of disclosure. How significant is the benefit of better financial communication?

According to his findings, for transparent companies that are closely followed by analysts, the difference of the cost of equity can lead to a cost reduction of up to 9 percentage points.

Section 15.5
FROM VALUE TO PRICE (2): THE EFFICIENT MARKETS

In addition to financial communication, the relationship between value creation and price requires another condition: the efficiency of financial markets.

An efficient market is one in which the prices of financial securities at any time *rapidly* reflect *all available relevant* information. The terms "perfect market" or "market in equilibrium" are synonymous with "efficient market".

In an efficient market, prices instantly reflect the consequences of past events and all expectations about future events. As all known factors are already integrated into current prices, it is therefore impossible to predict future variations in the price of a financial instrument. Only new information will change the value of the security. Future information is by definition unpredictable, so changes in the price of a security are random. This is the origin of the **random walk** character of returns in the securities markets.

Competition between financial investors is so fierce that prices adjust to new information almost instantaneously. At every moment, a financial instrument trades at a price determined by its return and its risk.

Eugene Fama (1970) has developed the following three tests to determine whether a market is efficient.

1/ ABILITY TO PREDICT PRICES

In a **weak-form** efficient market, it is impossible to predict future returns. Existing prices already reflect all the information that can be gleaned from studying **past prices** and **trading volumes**, interest rates and returns. This is what is meant by the "weak form" of efficiency.

Extra returns can be obtained only if investors have future or privileged information. According to the weak-form of efficiency, the price of an asset is the sum of three components:

1 the last available price (P_{-1});
2 the expected return from the security (see Chapter 21); and
3 a random component due to new information that might be learned during the period in question. This component of random error is independent from past events and unpredictable in the future.

$$P_0 = P_{-1} + \text{Expected return} + \text{Random error}$$

When prices follow this model, they follow a random walk.

The efficient market hypothesis says that technical analysis has no practical value nor do martingales (martingales in the ordinary not mathematical sense). For example the notion that "if a stock rises three consecutive times, buy it; if it declines

two consecutive times, sell it" is irrelevant. Similarly, the efficient market hypothesis says that models relating future returns to interest rates, dividend yields, the spread between short- and long-term interest rates or other parameters are equally worthless.

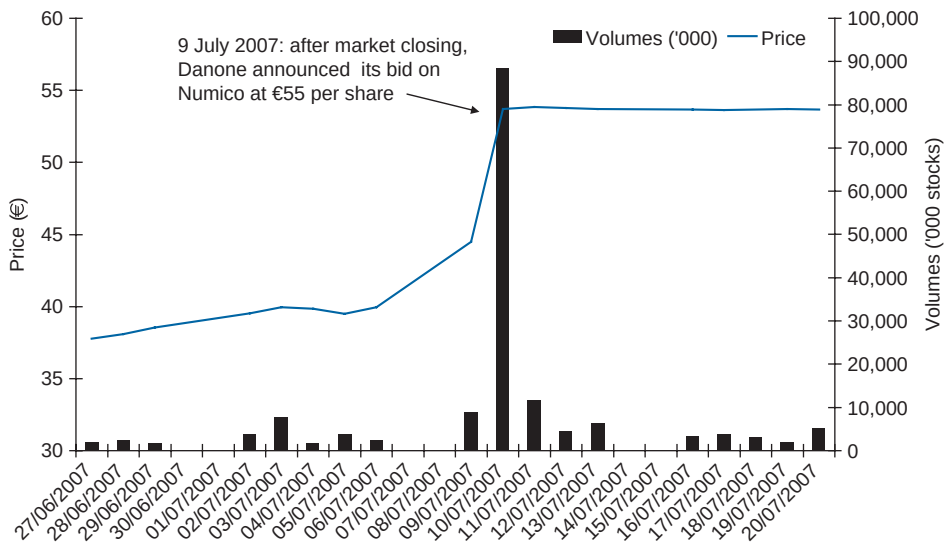
2/ THE MARKET RESPONSE TO SPECIFIC EVENTS

A **semi-strong** efficient market reflects all publicly available information, as found in annual reports, newspaper and magazine articles, prospectuses, announcements of new contracts, of a merger, of an increase in the dividend, etc.

Semi-strong efficiency is superior to weak-form efficiency because it requires that current prices include historical information (as assumed by the weak-form efficiency) *and* publicly available information. The latter, for example, is available in:

- financial statements;
- research on the company performed by external financial analysts; and
- company announcements.

This hypothesis can be empirically tested by studying the reaction of market prices to company events (**event studies**). In fact, the price of a stock reacts immediately to any announcement of relevant new information regarding a company. In an efficient market, no impact should be observable prior to the announcement, nor during the days following the announcement. In other words, prices should adjust rapidly only at the time any new information is announced.



On 9 July 2007 after market closing, Danone, the French food company, announced it would launch a takeover bid on Numico, the Dutch specialised nutrition producer. The following day, Numico's share price immediately reached the offer price of €55 with a very high level of stocks exchanged.

@ *download*

In order to prevent investors with prior access to information from using it to their advantage (and therefore to the detriment of other investors), most stock market regulators suspend trading prior to a mid-session announcement of information that is highly likely to have a significant impact on the share price. Trading resumes a few hours later or the following day, so as to ensure that all interested parties receive the information. Then, when trading resumes, no investor has been short-changed.

3/ THE IMPACT OF INSIDER INFORMATION ON THE MARKET

In a **strongly** efficient financial market, investors with privileged or insider information or with a monopoly on certain information are unable to influence securities prices. This is the "strong form" of efficiency.

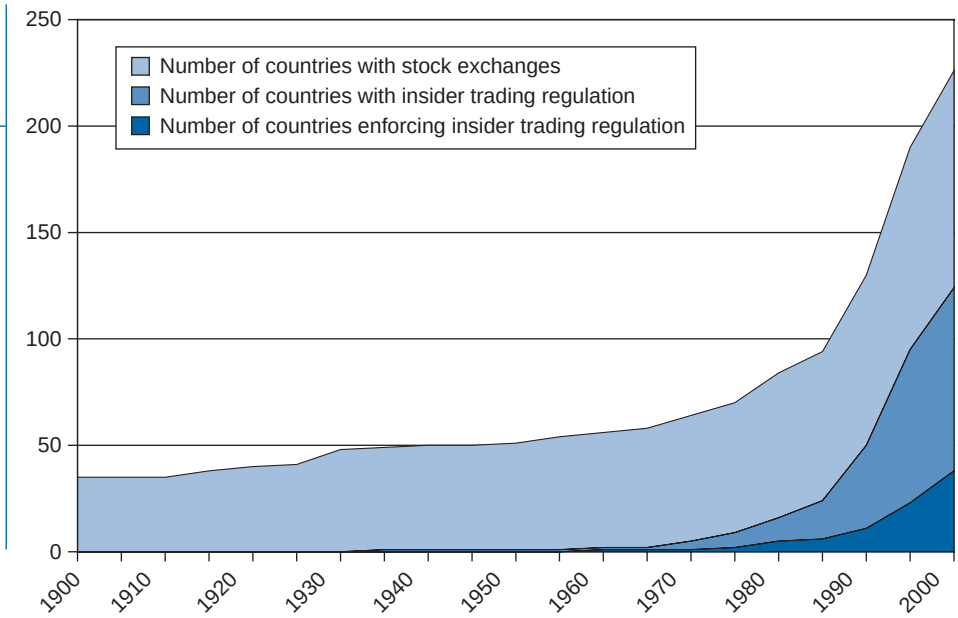
This holds true only when financial market regulators have the power to prohibit and punish the use of insider information.

In theory, professional investment managers have expert knowledge that is supposed to enable them to post better performances than the market average. However, without using any inside information, the efficient market hypothesis says that market experts have no edge over the layman. In fact, in an efficient market, the experts' performance is slightly below the market average, in a proportion directly related to the management fees they charge!

Rules against insider trading are becoming increasingly strict.

@ *download*

WORLDWIDE REGULATION OF INSIDER TRADING



Source: Bhattacharya and Daouk (2002).

Actual markets approach the theory of an efficient market when:

- participants have low-cost access to all information;
- transactions costs are low;
- the market is liquid; and
- investors are rational.

Take the example of a stock whose price is expected to rise 10% tomorrow. In an efficient market, its price will rise today to a level consistent with the expected gain. "Tomorrow's"

price will be discounted to today. Today's price becomes an estimate of the value of tomorrow's price.

In general, if we try to explain why financial markets have different degrees of efficiency, we could say that:

- **The lower transaction costs are, the more efficient a market is.** An efficient market must quickly allow equilibrium between supply and demand to be established. Transaction costs are a key factor in enabling supply and demand for securities and capital to adjust.

  Brokerage commissions have an impact on how quickly a market reaches equilibrium. In an efficient market, transactions have no costs associated with them, neither underwriting costs (when securities are issued) nor trading costs (when securities are bought and sold).

  When other transaction-related factors are introduced, such as the time required for approving and publishing information, they can slow down the achievement of market equilibrium.

- **The more liquid a market is, the more efficient it is.** The more frequently a security is traded, the more quickly new information can be integrated into the share price. Conversely, illiquid securities are relatively slow in reflecting available information. Investors cannot benefit from the delays in information assimilation because the trading and transaction volumes are low.

  In general, it can be said that the less liquid a financial asset is, the higher the investor's required return is. Lower trading volume leads to greater uncertainty about the market price.

  Research into the significance of this phenomenon has demonstrated that there is a statistical relationship between liquidity and the required rate of return. This indicates the existence of a risk premium that varies inversely with the liquidity of the security. The premium is tantamount to a reward for putting up with illiquidity, i.e. when the market is not functioning efficiently. We will measure the size of this premium in Chapter 22.

- **The more rational investors are, the more efficient a market is.** Individuals are said to be rational when their actions are consistent with the information they receive. When good and unexpected news is announced, rational investors must buy a stock – not sell it. And for any given level of risk, rational investors must also try to maximise their potential gain.

  This is probably the feeblest assumption of the efficient market hypothesis, because human beings and their feelings cannot be reduced to a series of mathematical equations. It has been demonstrated that the Dow Jones Industrial Average turns in below-average performance when it rains in Central Park, that stock market returns are lower on Monday than on Friday, and so on. These phenomena have given rise to **behavioural finance**, which takes psychology into account when analysing investor decisions. This field of research provides recent evidence that investors can make systematic errors in processing new information – information that is profitably exploited by other investors.

In 1985, De Bondt and Thaler published an article presenting robust evidence that investors **overreact** to news. Today, few would disagree that financial asset prices tend to be highly volatile. Shiller (2000) went a step further and claimed that financial markets are irrationally volatile. One explanation for this behaviour is **overconfidence**, which occurs when investors believe that they have better information regarding the true state of a company's affairs than is actually the case. As the true condition of the company is revealed over time, investors' beliefs move towards a fair valuation. This tendency causes prices to reverse.

Investors can also overreact because they **mimic** other investors. Psychologists call this penchant to follow the crowd the *herding instinct*, which is the tendency of individuals to mould their thinking to the prevailing opinion. Similarly, economists call this decision-making process an *information cascade* and believe that it happens in financial markets. However, the mimicry behaviour is rational if the investor mimics someone who knows more than he does. For example, it can be rational to sell one's shares when the company's executives are selling theirs. But this rationality disappears when an investor imitates those who know no more than he does and are themselves imitating other imitators! Graham (1999) finds that several types of analysts are likely to herd on *Value Line*'s (a financial information services provider) recommendations. The economist André Orléan has distinguished three types of mimicry:

- *Normative mimicry* – which could also be called "conformism". Its impact on finance is limited and is beyond the scope of this text.
- *Informational mimicry* – which consists of imitating others because they supposedly know more. It constitutes a rational response to a problem of dissemination of information, provided the proportion of imitators in the group is not too high. Otherwise, even if it is not in line with objective economic data, imitation reinforces the most popular choice, which can then interfere with efficient dissemination of information.
- *Self-mimicry* – which attempts to predict the behaviour of the majority in order to imitate it. The "right" decision then depends on the collective behaviour of all other market participants and can become a self-fulfilling prophecy, i.e. an equilibrium that exists because everyone thinks it will exist. This behaviour departs from traditional economic analysis, which holds that financial value results from real economic value.

At the point where these phenomena begin to occur, the market ceases to be efficient. It no longer acts in accordance with basic economic and financial data. If the "market" is a stock exchange, a speculative bubble forms that inflates the value of one or more stocks in a sector of the economy (e.g. Internet stocks in 1999). Initially, investors do not notice anything amiss. The rise in prices feeds on itself and vindicates the initial imitative behaviour. Finally comes a day when investors become conscious of the artificial nature of the trend and stop imitating each other – and begin to "rediscover" economic and financial fundamentals! The speculative bubble bursts, share prices tumble (e.g. Internet stocks in 2000), and reason and efficiency return.

Mimetic phenomena can be accentuated by **program trading**, which are the computer programs used by some traders that rely on pre-programmed buy or sell

decisions. For example, program trading might automatically close out a position, i.e. sell a security, as soon as the unrealised loss grows beyond a certain threshold. However, such programs working together can lead to snowball effects as they react to information. These programs are now subject to strict controls to prevent them causing market crashes, as they are suspected to have caused the stock market crash in 1987.

Other behaviourist researchers have found that **underreaction** to new information may be the prevalent behaviour. In this case, one explanation provided by "behaviourists" is **biased self-attribution**, when investors dismiss contradictory new evidence as being random noise. This phenomenon causes investors to underreact to public information signals that contradict their existing beliefs. As Barberis explains: "Suppose a company announces earnings that are substantially higher than expected. Investors see this as good news and send the stock price higher but for some reason not high enough. This mistake is only gradually corrected; over the next six months the stock price slowly drifts upwards towards the level it should have attained at the time of the announcement. An investor buying the stock immediately after the announcement would capture this upward drift and enjoy high returns" (Barberis, 1998, p. 164).

This means that the ongoing reaction continues over the next several months after the announcement. The pattern that is established is known as stock-price *momentum*, since positive initial returns are followed by the other positive returns in the mid-term.

Notwithstanding this rapidly growing field of research, financial assets prices are still largely unpredictable. Moreover, market-beating strategies generate transaction costs, which tend to cancel out the potential gains these anomalies offer. And that is good news for efficient market hypothesis and related theories!

We believe "behaviouralists" should never forget the words of **Ludwig Von Mises** about the scope and limits of economics (and finance, we might add): "The most popular objection raised against economics is that it neglects the irrationality of life and tries to press into dry rational schemes and bloodless abstractions the infinite variety of phenomena. No censure could be more absurd. Like every other branch of knowledge, economics goes as far as it can be carried by rational methods. Then it stops by establishing the fact that it is faced with an ultimate given, i.e. a phenomenon which – at least in the present state of our knowledge – cannot be further analysed" (Von Mises, 2007, Vol. I, p. 21).

Section 15.6
LIMITATIONS IN THE THEORY OF EFFICIENT MARKETS

1/ EVIDENCE

The vast majority of evidence regarding market efficiency has concerned the weak and semi-strong forms of efficiency. The most diffuse research methodologies and their major results are illustrated hereafter.

(a) Weak-form efficiency

A widely-used technique to test the weak-form of efficiency is to examine the correlation of daily returns (serial correlation). The existence of a correlation – regardless of its sign – implies that the returns of one day are influenced by the returns of the previous day. This contradicts the weak-form of efficiency, which states that prices follow a random walk.

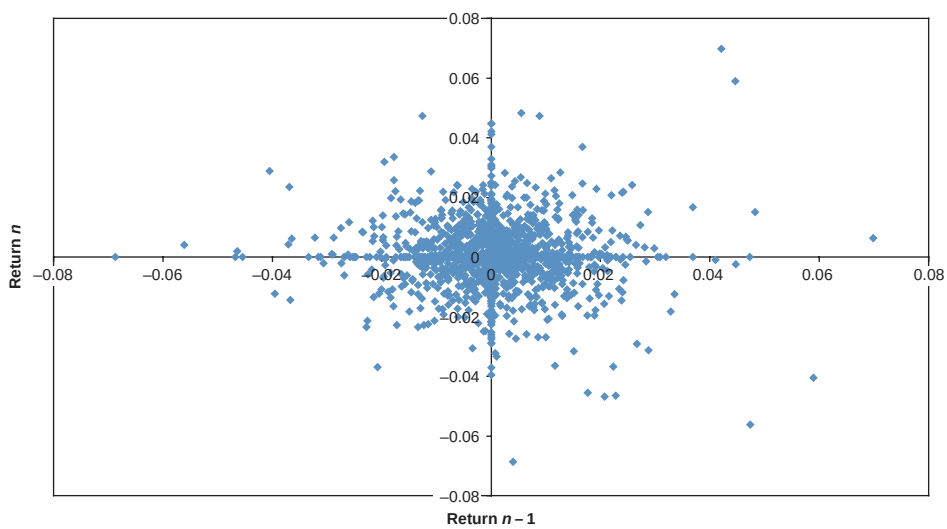
The following table illustrates some examples of the degree of serial correlation with the prices (daily returns over the period February 2003–February 2008) of European listed companies.

Total	−0.075	Sanofi-Aventis	−0.031
Nokia	0.035	ArcelorMittal	−0.012
ENI	−0.054	UniCredit	−0.01
Telefonica	−0.03	Unilever	−0.082
E.ON	−0.057	France Telecom	0.025
Siemens	0.001	Intesa Sanpaolo	−0.036
Banco Santander	−0.071	**Average**	**−0.031**

The correlation coefficient can range between −1 and +1. The figures in the table show that the coefficients are negative on average but rather small in their absolute value (only −3.1%). This is the kind of evidence we would expect from efficient markets.

The absence of serial correlation is easy to describe graphically. The following example for Telefónica (a Spanish telecommunications company) illustrates the point:

SERIAL CORRELATION OF TELEFONICA (FEBRUARY 2003–FEBRUARY 2008)



The distribution of returns is random and generates a mass of chaotic points. With a serial correlation, the distribution of points would resemble a straight line. So, if there were a robust positive (or negative) relationship, the linear trend would be positively (or negatively) sloped depending upon the correlation existing among successive returns.

(b) Semi-strong efficiency

The theory of semi-strong efficiency can be measured in two ways: with event studies that examine the market's reaction to price-sensitive announcements from companies, or with the analysis of mutual funds performance.

Event studies

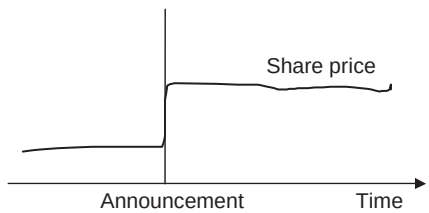
Event study analysis is based on the estimate of abnormal returns, which is obtained by subtracting the daily return of the market (R_M) from the return of the company (R) in the same day:

$$AR = R - R_M$$

According to the semi-strong efficiency hypothesis, the abnormal return should be observable only on the day when the information becomes public. As mentioned earlier, all previous information should have already been included in market prices. The return during the observed period is thus influenced solely by the unexpected new information. Event study methodology has been applied to dividends, earnings announcements, mergers and acquisitions, share issues, and so on.

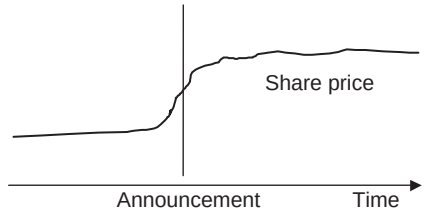
More specifically, event-studies also estimate the cumulative abnormal returns (CAR), which is the sum of subsequent abnormal returns. If the market is efficient, the CAR before the announcement should be nil or very low. Thus, if abnormal returns grew during the previous period, there is good evidence that some investors might have received information before others. The analysis of *ex-post* CAR is also interesting because, in efficient markets, abnormal returns should be zero. In short, the abnormal return should be confined to the announcement day and ideally no abnormal return should be registered before or after the announcement (Figure A).

(A) EFFICIENT MARKET

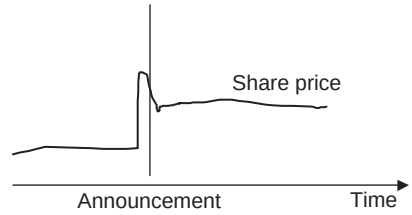


The higher the deviation from the fair market value and the more slowly it fades away, the less efficient is the financial market. In this instance we are faced with two alternative situations: the first is typical of a slow learning market and the second is characteristic of excessive reaction (market overreaction). Graphically, both situations can be represented as follows (Figures B and C):

(B) SLOW LEARNING MARKET



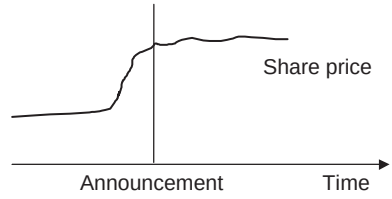
(C) OVERREACTING MARKET



Cases B and C depict inefficient markets because of the way the price converges at a new equilibrium price implicit in the announcement: with a delay (case B) or by erroneously estimating the value of the new information (Case C).

If there is a clear (and otherwise inexplicable) trend in prices before the announcement, then it is reasonable to assume that a few privileged investors had access to the information before the formal announcement was made to the entire market (Figure D):

(D) STRONGLY INEFFICIENT MARKET

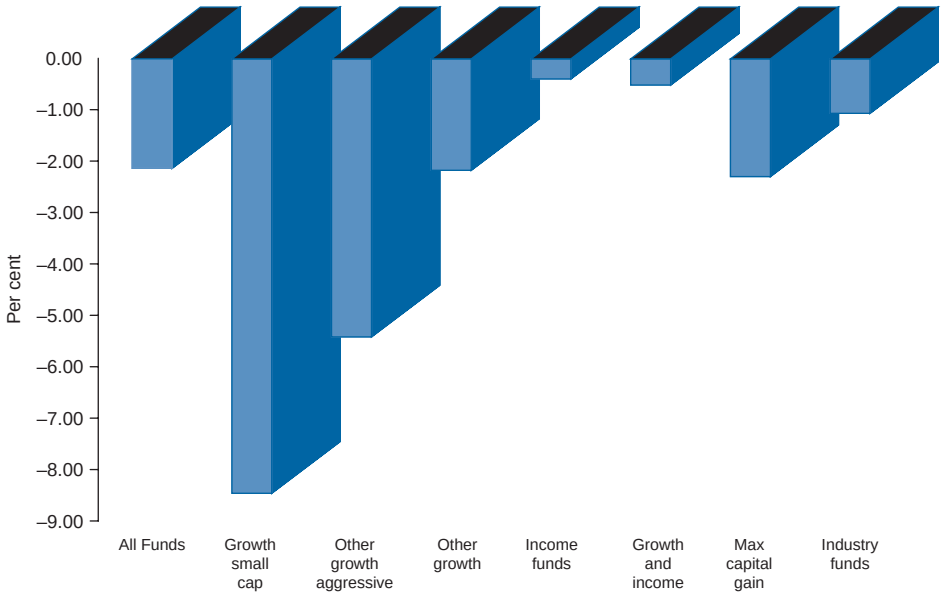


Mutual funds performance

The second methodology for testing semi-strong efficiency is to analyse the performance of mutual funds. In an efficient market, we would expect that their average returns would not differ systematically from the returns obtained by an average investor with a well-diversified portfolio.

The empirical evidence has been used to compare the mutual funds' results with market indexes. The results show that the managers of mutual funds tend to achieve *negative* performances compared to the market. The following graph shows this pro-efficiency result in the United States:

ANNUAL PERFORMANCE OF MUTUAL TRUST IN USA VS. THE MARKET INDEX (1963–1988)



Source: Lubos Pastor Stambaugh (2002).

In the light of this information, why do mutual funds exist? We have seen that the performance of mutual funds has been worse than the stock market index. Some may think that investors are rational if they compose their portfolio by randomly choosing stocks from a list of public companies. The major problem with this strategy is that investors may face undesired risks if the titles they choose are not consistent with their risk/return profile. The wide variety of mutual funds may help to solve this problem.

2/ ANOMALIES

Although most of the available evidence confirms the efficient market hypothesis, the reader should be aware of anomalies that have arisen in the market:

1 **Dimension of companies**. There is some evidence that the compound annual return on the smallest companies is higher than on the biggest companies. Although the risk of these small stocks is also higher, it is not high enough to justify the extra return of these smaller capitalisation stocks. The reason for this excessive return is difficult to explain. Some researchers suggest that the superior historical return is a compensation for the higher transaction costs of dealing with these securities.

2 **Value vs. growth companies**. Stocks with low price-to-book and low price-to-earnings ratios are often called *value stocks*, whereas those with high values in these two ratios are called *growth stocks*. Value stocks belong to oil, motor, finance, and utilities. Growth stocks are in the high-tech, telecommunications and computers sectors. There is some evidence that historical returns on value stocks have exceeded those of growth stocks. A possible explanation for this anomaly is

behavioural: investors can get overexcited about the growth prospects of firms with rapidly increasing earnings and, irrationally, strongly bid for them.

3 **Calendar anomalies**. Recent research has revealed that there are predictable periods during the year when some stocks tend to outperform. Maybe the most tried and true anomaly is the outperformance of small stocks with respect to large stocks in one specific month of the year: January. As Shiller (2000) explains, the *January effect* is the most important reason that small stocks have obtained greater total returns than large stocks over the last 70 years.

   Similar to the January effect, and just as inexplicably, stocks tend to do much better (a) in the first few days of a month, and (b) on Fridays rather than on Mondays (the so-called *weekend effect*). Calendar anomalies are even more puzzling because they imply that the stock market is partially predictable and therefore possible to beat.

4 **Initial public offer discounts**. Year in and year out, in almost every country around the world, the very short-term returns on IPOs are surprisingly high. Financial economists refer to this anomaly as *IPO underpricing*, meaning that the offer price is substantially lower than what the market is willing to pay.[1] For more details, see Chapter 30.

1 *However, the long-run performance of most IPOs fails to live up to their promise after they are issued. See Ritter (1991) and Loughran and Ritter (1995).*

Section 15.7
INVESTORS' BEHAVIOUR

At any given point in time, each investor is either:

1 a hedger;
2 a speculator; or
3 an arbitrageur.

1/ HEDGING

When an investor attempts to protect himself from risks he does not wish to assume he is said to be *hedging*. The term "to hedge" describes a general concept that underlies certain investment decisions, for example, the decision to match a long-term investment with long-term financing, to finance a risky industrial investment with equity rather than debt, etc.

This is simple, natural and healthy behaviour for nonfinancial managers. Hedging protects a manufacturing company's margin, i.e. the difference between revenue and expenses, from uncertainties in areas relating to technical expertise, human resources, and sales and marketing, etc. Hedging allows the economic value of a project or line of business to be managed independently of fluctuations in the capital markets.

Accordingly, a European company that exports products to the United States may sell dollars forward against euros, guaranteeing itself a fixed exchange rate for its future dollar-denominated revenues. The company is then said to have hedged its exposure to fluctuations in currency exchange rates.

Similarly, a medium-term lender that refinances itself with resources of the same maturity has also hedged its interest-rate and liquidity exposure.

Companies can also structure their operations in such a way that they are automatically hedged without recourse to the financial markets. A French company that both produces and sells in the United States will not be exposed to exchange rate risk on all of its US revenues but only on the residual flows not covered by dollar-denominated costs. This is the only portion it will have to hedge.

Keep in mind, however, that hedging techniques are not always so simple, even if they are designed to produce the same end result.

An investor hedges when she does not wish to assume a calculated risk.

2/ SPECULATION

In contrast to hedging, which eliminates risk by transferring it to a party willing to assume it, speculation is the assumption of risk. A speculator takes a position when he makes a bet on the future value of an asset. If he thinks its price will rise, he buys it. If it rises, he wins the bet; if not, he loses. If he is to receive dollars in a month's time, he may take no action now because he thinks the dollar will rise in value between now and then. If he has long-term investments to make, he may finance them with short-term funds because he thinks that interest rates will decline in the meantime and he will be able to refinance at lower cost later. This behaviour is diametrically opposed to that of the hedger.

- Traders are professional speculators. They spend their time buying currencies, bonds, shares or options that they think will appreciate in value and they sell them when they think they are about to decline. Not surprisingly their motto is "*Buy low, sell high, play golf!*"
- **But the investor is also a speculator most of the time.** When an investor predicts cash flows, he is speculating about the future. This is a very important point, and you must be careful not to interpret "speculation" negatively. Every investor speculates when he invests, but his speculation is not necessarily reckless. It is founded on a conviction, a set of skills, and an analysis of the risks involved. The only difference is that some investors speculate more heavily than others by assuming more risk.

People often criticise the financial markets for allowing speculation. **Yet speculators play a fundamental role in the market, an economically healthy role, by assuming the risks that other participants do not want to accept.** In this way, speculators minimise the risk borne by others.

Accordingly, a European manufacturing company with outstanding dollar-denominated debt that wants to protect itself against exchange rate risk (i.e. a rise in the value of the dollar vs. the euro) can transfer this risk by buying dollars forward from a speculator willing to take that risk. By buying dollars forward today, the company knows the exact dollar/euro exchange rate at which it will repay its loan. It has thus eliminated its exchange rate risk. Conversely, the speculator runs the risk of a fluctuation in the value of the dollar between the time he sells the dollars forward to the company and the time he delivers them, i.e. when the company's loan comes due.

Likewise, if a market's long-term financing needs are not satisfied, but there is a surplus of short-term savings, sooner or later a speculator will (fortunately) come along and assume the risk of borrowing short-term in order to lend long-term. In so doing, the speculator assumes intermediation risk.

Speculative bubbles are isolated events that should not put into question the utility and normal operation of the financial markets.

What, then, do people mean by a "speculative market"? A speculative market is a market in which all the participants are speculators. Market forces, divorced from economic reality, become self-sustaining because everyone is under the influence of the same phenomenon. Once a sufficient number of speculators think that a stock will rise, their purchases alone are enough to make the stock price rise. Their example prompts other speculators to follow suit, the price rises further, and so on. But at the first hint of a downward revision in expectations the mechanism goes into reverse and the share price falls dramatically. When this happens, many speculators will try to liquidate positions in order to pay off loans contracted to buy shares in the first place, thereby further accentuating the downfall.

3/ ARBITRAGE

In contrast to the speculator, the arbitrageur is not in the business of assuming risk. Instead, he tries to earn a profit by exploiting tiny discrepancies which may appear on different markets that are not in equilibrium.

An arbitrageur will notice that Fortis shares are trading slightly lower in London than in Brussels. He will buy Fortis shares in London and sell them simultaneously (or nearly so) at a higher price in Brussels. By buying in London, the arbitrageur bids the price up in London; by selling them in Brussels, he drives the price down there. He or other arbitrageurs then repeat the process until the prices in the two markets are perfectly in line, or in equilibrium.

With no overall outlay of funds or assumption of risk, arbitrage consists of combining several transactions that ultimately yield a profit.

In principle, the arbitrageur assumes no risk, even though each separate transaction involves a certain degree of risk. In practice, arbitrageurs often take on a certain amount of risk as their behaviour is on the frontier between speculation and arbitrage. For arbitrage to be successful, the underlying securities must be liquid enough for the transactions to be executed simultaneously.

Arbitrage is of paramount importance in a market. By **destroying opportunities as it uncovers them**, arbitrage participates in the development of new markets by creating liquidity. It also eliminates the temporary imperfections that can appear from time to time. As soon as disequilibrium appears, arbitrageurs buy and sell assets and increase market liquidity. It is through their very actions that the disequilibrium is reduced to zero. Once equilibrium is reached, arbitrageurs stop trading and wait for the next opportunity.

The irrationality of some investors – suggested by 'behaviouralists' – does not really present a problem if the anomalies can be quickly corrected by arbitrage and if there is a rapid return to efficiency. Additionally, the presence of irrational investors among market players does not necessarily mean that the markets are inefficient, especially if the trades made by these investors set each other off or if rational investors can use arbitrage to bring about a return to balanced prices.

Thanks to arbitrage, all prices for a given asset are equal at a given point in time. Arbitrage ensures fluidity between markets and contributes to their liquidity. It is the basic behaviour that guarantees market efficiency.

Throughout this book, you will see that financial miracles are impossible because arbitrage levels the playing field between assets exhibiting the same level of risk.

You should also be aware that the three types of behaviour described here do not correspond to three mutually exclusive categories of investors. A market participant who is primarily a speculator might carry out arbitrage activities or partially hedge his position. A hedger might decide to hedge only part of his position and speculate on the remaining portion, etc.

Moreover, these three types of behaviour exist simultaneously in every market. A market cannot function only with hedgers, because there will be no one to assume the risks they don't want to take. As we saw above, a market composed wholly of speculators is not viable either. Finally, a market consisting only of arbitrageurs would be even more difficult to imagine.

A market is fluid, liquid and displays the "right prices" when its participants include hedgers, speculators and arbitrageurs.

SUMMARY

@ *download*

The job of a financial system is to bring together those economic agents with surplus funds and those with funding needs:

- either through the indirect finance model, wherein banks and other financial institutions perform the function of intermediation; or
- through the direct finance model, wherein the role of financial institutions is limited to that of a broker.

But a financial system also provides a variety of payment means, and it facilitates transactions because:

- the funds of many investors are pooled to finance large projects; and
- the equity capital of companies is subdivided into small units, enabling investors to diversify their portfolios.

A financial system also distributes financial resources across time and space, and between different sectors. It provides tools for managing risk, disseminates information at low cost, facilitates decentralised decision-making, and offers mechanisms for reducing conflict between the parties to a contract.

Financial markets are becoming more important every day, a phenomenon that goes hand-in-hand with their globalisation. The modern economy is no longer a credit-based economy, where bank loans are the predominant form of finance. Today it is rather a capital market economy, wherein companies solicit funding directly from investors via the issuance of shares and bonds.

Alongside their traditional lending function, banks have adapted to the new system by developing advisory services to facilitate corporate access to the financial markets, being they equity markets or bond markets.

Conceptually, markets are efficient when security prices always reflect all relevant available information. It has been demonstrated that the more liquid a market is, the more readily available information is, the lower transaction costs are and the more individuals act rationally, then the more efficient the market is. The last of these factors probably constitutes the biggest hindrance to market efficiency because human beings cannot be reduced to a series of equations. Irrational human behaviour gives rise to mimicry and other anomalies, leading to speculative excesses that specialists in behavioural finance are still trying to comprehend and explain.

A financial market brings together three types of players:

- hedgers, who refuse to assume risk and instead wish to protect themselves from it;
- speculators, who assume varying degrees of risk; and
- arbitrageurs, who exploit market disequilibria and, in so doing, eliminate these discrepancies and therefore ensure market liquidity and efficiency.

QUESTIONS

@ *quiz*

1/ Nick Leeson bought futures betting on the Nikkei 225 index on the Osaka stock exchange, which he sold simultaneously on the Singapore stock exchange. He lost a billion euros, plunging Barings Bank into bankruptcy. Was this speculation, hedging or arbitrage?

2/ What is the economic function of speculation?

3/ Can you explain why an "excessive" financial manager and a narrow-minded businessman will be unable to understand each other?

4/ How can the ordinary saver reduce the risk she faces?

5/ What conditions are necessary for arbitrage to work?

6/ What is the economic function of arbitrage?

7/ Can a market in which speculators are the only traders last indefinitely?

8/ Would you be speculating if you bought so-called risk-free government bonds? What type of risk is not present in "risk-free" bonds?

9/ Is it true that investors who lost money on Internet shares in early 2000 would not have lost anything if they had held onto their shares instead? State your views.

10/ What is a speculative market?

11/What sort of regulatory mechanisms are in place to prevent speculative bubbles on:

- derivatives markets;
- secondary markets for debt securities;
- equity markets.

12/Throughout the world, financial intermediaries can be split into two groups:

- brokers: they connect buyers with sellers. Trades can only be completed if the brokers find a buyer for each seller, and vice versa. Brokers work on commission.
- market makers: when securities are sold to an investor, market makers buy them at a given price and try simultaneously or subsequently to sell them at a higher price. Their earnings are thus the difference between the sell price and the buy price.

In your view, is the price difference earned by market makers logically equal to, higher than or lower than the commissions earned by brokers?

13/Yes or no?

	Yes	No
Provided that investors' demands are met, companies have access to unlimited funds		
The announcement of anticipated losses has an impact on the share price		
Manipulating accounting indicators has no impact on value		

14/Which of the following statements in your view describe the inefficiency of a market? Which test demonstrates this?

(a) Tax-free US municipal bonds with a lower rate of return for the investor than government bonds which are taxed.
(b) Managers make higher than average profits by buying and selling shares in the company they work for.
(c) There is some correlation between the market rate of return during a given quarter and a company's expected change in profits the following quarter.
(d) Market watchers have observed that shares that have shot up in the recent past will go up again in the future.
(e) The market value of a company will tend to go up before the announcement of a takeover bid.
(f) Earnings on shares in a company whose profits have recently risen sharply will be high in the coming months.
(g) On average, earnings on shares that carry a risk are higher than earnings on shares that are relatively risk free.

15/What is the purpose of behavioural finance?

16/If financial markets are only occasionally efficient, is this of greater concern to small or large companies? Why?

ANSWERS

Questions

1/ *In theory, as far as his superiors were concerned, he was executing arbitrage transactions. In reality, he was speculating without his superiors being aware of his actions.*
2/ *To take risks which intermediaries do not wish to take.*
3/ *The financial manager diversifies his risk. The businessman often cannot afford to do so.*
4/ *He can diversify his portfolio by buying shares in mutual funds or unit trusts.*
5/ *Trading costs must be low, all players must have access to all markets, and there must be freedom of investment.*
6/ *To ensure market equilibrium and liquidity.*
7/ *No, because it is removed from economic reality.*
8/ *Yes, on changes in interest rates. The risk of the issuer going bankrupt.*
9/ *No, because assets have a market value at any point in time.*
10/ *A market controlled solely by speculators (it is removed from economic reality).*
11/ *Delivery of the underlying security on maturity which forces equality of the trade price and the price of the underlying security. Repayment, which means that on maturity, the value of the debt security will be equal to the repayment amount. Economic value of the company.*
12/ *Higher, because the risk is higher.*
13/ *Yes. No. Yes.*
14/ *b, c, d, e, f: Inefficiency.*
15/ *It factors in the nonrational side of investors' behaviour.*
16/ *Small companies, since the limited number of investors interested in their shares means that their liquidity is low and that their share prices could shift away from a stable value for long periods.*

BIBLIOGRAPHY

For more on the macro-economic topics covered in this chapter:

A. Franklin, Stock markets and resource allocation, in C. Mayer and X. Vives (eds), *European Financial Integration*, CEPR, 1992.

J. Gurley, E. Shaw, *Money in a Theory of Finance*, The Brookings Institution, 1960.

J.R. Hicks, *Value and Capital*, 2nd ed., Oxford University Press, 1975.

MacKinsey, Mapping Global Capital Markets: Fourth annual report, McKinsey 2008.

N. Naik, The many roles of financial markets, in G. Bickerstaffe (ed.), *Mastering Finance*, London, FT/Pitman Publishing, 1998.

R. Rajan, L. Zingales, *Banks and markets: the changing character of European finance*, Working Paper, International Monetary Fund (IMF) and University of Chicago, 2008.

R. Stulz, The limits of financial globalization, *Journal of Finance*, **60**(4), 1529–1638, August 2005.

For more about efficient markets:

U. Bhattacharya, H. Daouk, The world price of insider trading, *Journal of Finance*, **57**(1), 75–108, February 2002.

C. Botosan, Evidence that greater disclosure lowers the cost of equity capital, *Journal of Applied Corporate Finance*, **12**(4), 60–69, Winter 2000.

A. Bressand, C. Distler (eds), *Enhanced Transparency: Meeting European Investors' Needs*, Promethee publication for Standard & Poor's, 2003.

E. Dimson, M. Mussavian, A brief history of market efficiency, *European Financial Management*, **4**(1), 91–103, March 1998.
E. Dimson, M. Mussavian, *Foundations of Finance*, Darmouth Publishing Company, 2000.
E. Fama, Efficient capital markets: A review of theory and empirical work, *Journal of Finance*, 383–417, May 1970.
E. Fama, Efficient capital market II, *Journal of Finance*, 1575–1617, December 1991.
E. Fama, Market efficiency, long-term returns and behavioral finance, *Journal of Financial Economics*, **49**(3), 283–306, September 1998.
J. Fuller, M. Jensen, Just say no to Wall Street: Putting a stop to the earnings game, *Journal of Applied Corporate Finance*, **14**(4), 27–40, Winter 2002.
B. Malkiel, *A Random Walk down Wall Street* 8th ed., New York, W.W. Norton & Company, 2003.
P. Marsh, Myths surrounding short-termism, in G. Bickerstaffe (ed.), *Mastering Finance*, London, FT/Pitman Publishing, 1998.
M. Rubinstein, Rational markets: yes or no? The affirmative case, *Financial Analysts Journal*, May–June 2001.

About empirical evidence and anomalies of efficient financial markets:

R. Banz, The relationship between return and market value of common stock, *Journal of Financial Economics*, **9**, 3–18, 1981.
M. Gibbons, H. Patrick, Day of the week effects and asset returns, *Journal of Business*, **54**, 579–596, October 1981.
R. Haugen, J. Lakonishok, *The Incredible January Effect*, Irwin, 1989.
G. Hawawini, D. Keim, *The Cross Section of Common Stock Returns: A Review of the Evidence and some New Findings*, Working Paper, Wharton School, University of Pennsylvania, May 1997.
D. Keim, Size-related anomalies and stock return seasonality: Further empirical evidence, *Journal of Financial Economics*, **12**, 13–32, 1983.
T. Loughran, Book-to-market across firm size, exchange, and seasonality: Is there an effect? *Journal of Financial and Quantitative Analysis*, **32**, 249–268, September 1997.
T. Loughran, J. Ritter, The new issue puzzle, *Journal of Finance*, **50**(1), 23–51, March 1995.
R. Raghuram, *Has Financial Development Made the World Riskier?* NHBER Working Paper, 2005.
J. Ritter, The long-run performance of IPOs, *Journal of Finance*, **46**(1), 3–27, March 1991.

For those wanting to know more about behavioural finance:

N. Barberis, Markets: the price may not be right, in G. Bickerstaffe (ed), *Mastering Finance*, London, FT/Pitman Publishing, 1998.
W. DeBondt, R. Thaler, Does the stock market overreact? *Journal of Finance*, **49**(3), 793–805, 1985.
J. Graham, Herding among investment newsletters: Theory and evidence, *Journal of Finance*, **54**, 237–268, February 1999.
R. Shiller, A. Banjeree, A simple model of herd behavior, *Quarterly Journal of Economics*, **107**(3), 797–817, 1992.
R. Shiller, Conversation, information and herd behavior, *American Economic Review*, **85**(2), 181–185, 1995.
R. Shiller, *Irrational Exuberance*, Princeton University Press, 2000.
H. Shefrin, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*, Harvard Business School Press, 2000.
Lubos Pastor Stambaugh, Mutual fund performance and seemingly unrelated assets, *Journal of Financial Economics*, **63**(3), 315–349, 2002.
R. Thaler (ed.), *Advances in Behavioural Finance*, Russell Sage Foundation, 1993.
R. Thaler, The end of behavioral finance, *Financial Analysts Journal*, 12–17, November–December 1999.
L. Von Mises, *Human Action*, Liberty Fund, Indianapolis, 2007.

Websites:

www.bestcalls.com Free access to conference calls, annual statements and other documents of American companies.

www.ecgn.org Website of the European Corporate Governance network. It is possible to download international regulations, conference proceedings and other documents on corporate governance.

www.world-exchanges.org Website of International Federation of Stock Exchanges. Free download of monthly, quarterly and annual statistics regarding stock markets.